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NETCONF over TLS 1.3

Abstract

RFC 7589 defines how to protect NETCONF messages with TLS 1.2. This document describes how to protect NETCONF messages with TLS 1.3.

About This Document

This note is to be removed before publishing as an RFC.

The latest revision of this draft can be found at <https://netconf-wg.github.io/netconf-over-tls13/draft-ietf-netconf-over-tls13.html>. Status information for this document may be found at <https://datatracker.ietf.org/doc/draft-ietf-netconf-over-tls13/>.

Discussion of this document takes place on the Network Configuration Working Group mailing list (<mailto:netconf@ietf.org>), which is archived at <https://mailarchive.ietf.org/arch/browse/netconf/>. Subscribe at <https://www.ietf.org/mailman/listinfo/netconf/>.

Source for this draft and an issue tracker can be found at <https://github.com/netconf-wg/netconf-over-tls13>.

Status of This Memo

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

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This Internet-Draft will expire on 27 April 2023.

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1. Introduction

[[RFC7589](#)] defines how to protect NETCONF messages [[RFC6241](#)] with TLS 1.2 [[RFC5246](#)]. This document describes defines how to protect NETCONF messages with TLS 1.3 [[I-D.ietf-tls-rfc8446bis](#)].

This document addresses cipher suites and the use of early data, which is also known as 0-RTT data. It also updates the "netconf-tls" IANA Registered Port Number entry to refer to this document. All other provisions set forth in [[RFC7589](#)] are unchanged, including connection initiation, message framing, connection closure, certificate validation, server identity, and client identity.

2. Conventions and Definitions

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.

3. Early Data

Early data (aka 0-RTT data) is a mechanism defined in TLS 1.3 [[I-D.ietf-tls-rfc8446bis](#)] that allows a client to send data ("early data") as part of the first flight of messages to a server. Note that TLS 1.3 can be used without early data as per [Appendix F.5](#) of [[I-D.ietf-tls-rfc8446bis](#)]. In fact, early data is permitted by TLS 1.3 only when the client and server share a Pre-Shared Key (PSK), either obtained externally or via a previous handshake. The client uses the PSK to authenticate the server and to encrypt the early data.

As noted in [Section 2.3](#) of [[I-D.ietf-tls-rfc8446bis](#)], the security properties for early data are weaker than those for subsequent TLS-protected data. In particular, early data is not forward secret, and there is no protection against the replay of early data between connections. [Appendix E.5](#) of [[I-D.ietf-tls-rfc8446bis](#)] requires applications not use early data without a profile that defines its use. This document specifies that NETCONF implementations that support TLS 1.3 **MUST NOT** use early data.

4. Cipher Suites

Implementations that support TLS 1.3 [[I-D.ietf-tls-rfc8446bis](#)] are **REQUIRED** to support the mandatory-to-implement cipher suites listed in [Section 9.1](#) of [[I-D.ietf-tls-rfc8446bis](#)].

Implementations that support TLS 1.3 **MAY** implement additional TLS cipher suites that provide mutual authentication and confidentiality, which are required for NETCONF [[RFC6241](#)].

NETCONF implementations **SHOULD** follow the recommendations given in [[I-D.ietf-uta-rfc7525bis](#)].

So, this is what {{Section 9.1 of I-D.ietf-tls-rfc8446bis}} says:

A TLS-compliant application **MUST** implement the TLS_AES_128_GCM_SHA256 [GCM] cipher suite and **SHOULD** implement the TLS_AES_256_GCM_SHA384 [GCM] and TLS_CHACHA20_POLY1305_SHA256 [RFC8439] cipher suites (see Appendix B.4).

A TLS-compliant application **MUST** support digital signatures with rsa_pkcs1_sha256 (for certificates), rsa_pss_rsae_sha256 (for CertificateVerify and certificates), and ecdsa_secp256r1_sha256. A TLS-compliant application **MUST** support key exchange with secp256r1 (NIST P-256) and **SHOULD** support key exchange with X25519 [RFC7748].

Is there any reason to narrow the algorithm choices?

My guess is not. These ought to be available in all TLS libraries.

5. Security Considerations

Please review the Security Considerations in TLS 1.3 [[I-D.ietf-tls-rfc8446bis](#)].

Please review the recommendations regarding Diffie-Hellman exponent reuse in [Section 7.4](#) of [[I-D.ietf-uta-rfc7525bis](#)].

Please review the Security Considerations in NETCONF [[RFC6241](#)].

NETCONF is used to access configuration and state information and to modify configuration information. TLS 1.3 mutual authentication is used to ensure that only authorized users and systems are able to view the NETCONF server's configuration and state or to modify the NETCONF server's configuration. To this end, neither the client nor the server should establish a NETCONF over TLS 1.3 connection with an unknown, unexpected, or incorrectly identified peer; see [Section 7](#) of [[RFC7589](#)]. If deployments make use of a trusted list of Certification Authority (CA) certificates [[RFC5280](#)], then the listed CAs should only issue certificates to parties that are authorized to access the NETCONF servers. Doing otherwise will allow certificates that were issued for other purposes to be inappropriately accepted by a NETCONF server.

Please review [[RFC6125](#)] for further details on generic host name validation in the TLS context.

Please review the recommendations regarding certificate revocation checking in [Section 7.5](#) of [[I-D.ietf-uta-rfc7525bis](#)].

6. IANA Considerations

IANA is requested to add a reference to this document in the "netconf-tls" entry in the "Registered Port Numbers". The updated registry entry would appear as follows:

| | |
|------------------------|-----------------------------|
| Service Name: | netconf-tls |
| Transport Protocol(s): | TCP |
| Assignee: | IESG <iesg@ietf.org> |
| Contact: | IETF Chair <chair@ietf.org> |
| Description: | NETCONF over TLS |
| Reference: | RFC 7589, [THIS RFC] |
| Port Number: | 6513 |

7. References

7.1. Normative References

[[I-D.ietf-tls-rfc8446bis](#)] Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.3", Work in Progress, Internet-

Draft, draft-ietf-tls-rfc8446bis-04, 7 March 2022, <<https://datatracker.ietf.org/doc/html/draft-ietf-tls-rfc8446bis-04>>.

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- [RFC6125] Saint-Andre, P. and J. Hodges, "Representation and Verification of Domain-Based Application Service Identity within Internet Public Key Infrastructure Using X.509 (PKIX) Certificates in the Context of Transport Layer

Security (TLS)", RFC 6125, DOI 10.17487/RFC6125, March 2011, <<https://www.rfc-editor.org/rfc/rfc6125>>.

Acknowledgments

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