The Hashed Token SASL Mechanism

draft-ietf-kitten-sasl-ht-00

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Motivation

- application protocols using a persistent connection
- connection re-establishment becomes more frequent
- connection re-establishment takes a long time

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XMPP login takes too long...

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- Note: Numbers are from my FOSDEM 2015 talk [4]
- Numbers are with 80ms round-trip

Phase	Time
TCP connect incl. DNS	60ms
Client-Server Initial Stream	80ms
TLS RFC 6120 § 9.1.1	420ms
SASL RFC 6120 § 9.1.2	470ms
Compression XEP-138	160ms
Stream Management XEP-198	190ms
Roster retrieval using versioning	80ms
Privacy List already set	80ms
Total (Real)	1750ms
Total (Sum. Parts)	1540ms

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SASL-HT [5]

SASL-HT token used to authenticate

***Fast Authentication Streamlining Tokens* (XEP-0483) [7]**

SASL-HT [5]

obtain token

The Hashed Token SASL Mechanism (SASL-HT)

Hashed **Token**

Token

- quick re-authentication using a token
- token is obtained after authentication via “strong” SASL mechanism
- token is required to
  - be generated by a cryptographically secure randon number generator
  - contain at least 128 bits of entropy
- application-protocol specific extension to obtain token required, for example the XMPP Extension Protocols (XEPs):
  - *Fast Authentication Streamlining Tokens* [7]
  - *Instant Stream Resumption* [3]

Hashed Token

Hash

- token is protected by cryptographically secure hash
- SASL-HT uses the TLS channel-binding data as key for the HMAC function
- additional benefit: *mutual authentication*
- even without channel-binding data, attacks based on pre-computed hash values seem not practical given that the token is at least a 16-byte number

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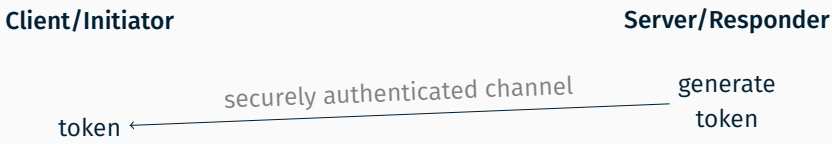
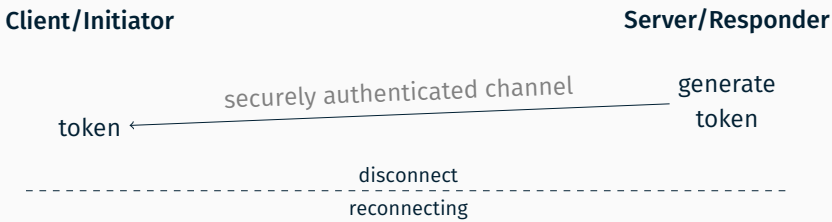
Channel Binding

- unfortunately not all environments support channel binding
- therefore, SASL-HT specifies the NONE channel-binding type

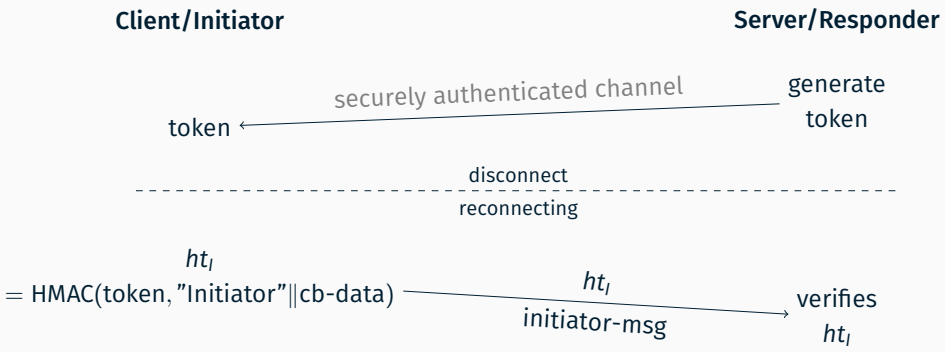
SASL-HT Authentication Sequence



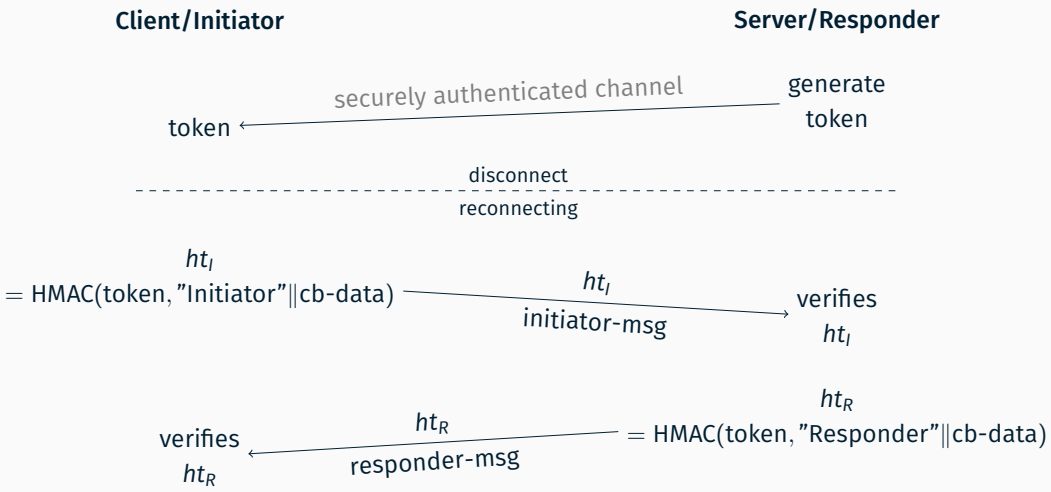
SASL-HT Authentication Sequence



SASL-HT Authentication Sequence



SASL-HT Authentication Sequence



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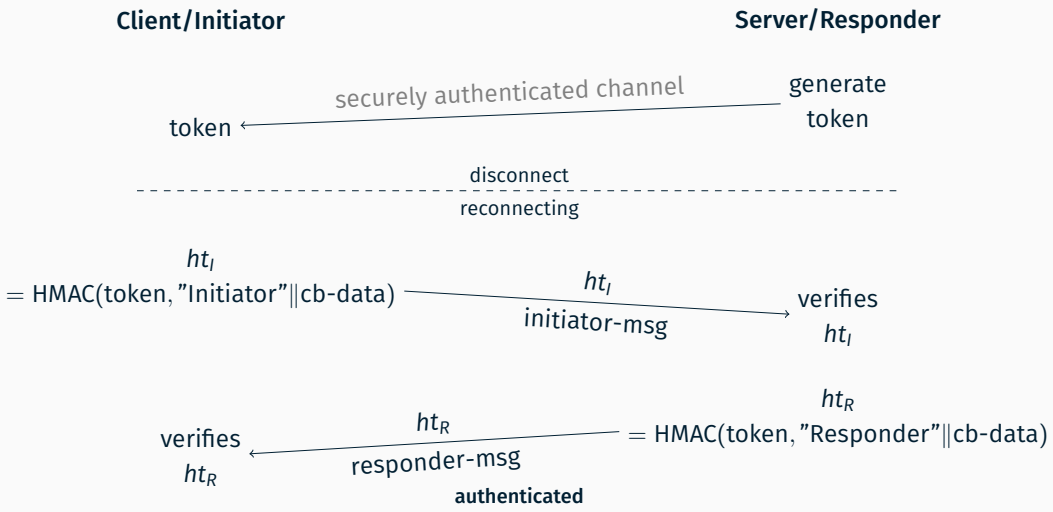

Current Status

Deployments

- XEP-FAST [7] gained a lot of traction within the XMPP ecosystem
- XEP-FAST uses SASL-HT
- therefore, SASL-HT has been implemented by various XMPP software

- responder message can now signal an error condition

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- how to deal with the wire format change, given that there are already deployments of the previous wire format?
  - Rename mechanism to HT2-*?
  - Ignore?
  - ...

Open Questions

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TLS 0-RTT Data

- SASL-HT [5] and XEP-ISR [3] require the TLS 0-RTT data to exclusively contain the authentication data
- XEP-FAST [7] requires the TLS 0-RTT data to also contain further data (like feature negotiation or commands)

Thanks for your attention

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Questions?

References

[1] Dave Cridland, Thilo Molitor, and Matthew Wild. ***Extensible SASL Profile.*** XEP 0388. Version 1.0.2. XMPP Standards Foundation, Feb. 7, 2017–Aug. 6, 2024. URL: https://xmpp.org/extensions/xep-0388.html.

[2] Dave Cridland et al. ***Extensible Simple Authentication and Security Layer (SASL).*** Internet-Draft draft-melnikov-sasl2-02. Work in Progress. Internet Engineering Task Force, Dec. 2, 2024. 10 pp. URL: https://datatracker.ietf.org/doc/draft-melnikov-sasl2/02/.

[3] Florian Schmaus. ***Instant Stream Resumption.*** XEP 0397. Version 0.1.1. XMPP Standards Foundation, Feb. 12, 2016–Nov. 3, 2018. URL: https://xmpp.org/extensions/xep-0397.html.

[4] Florian Schmaus. **“XMPP and Android. Creating stable, reliable, push-enabled and battery friendly XMPP connections on Android”.** Talk. Free and Open source Softare Developers’ European Meeting (FOSDEM) 2015 (Université Libre de Bruxelles, Jan. 31–Feb. 1, 2015). Jan. 31, 2015. URL: https://archive.fosdem.org/2015/schedule/event/xmpp_and_android/.

[5] Florian Schmaus and Christoph Egger. ***The Hashed Token SASL Mechanism.*** Internet-Draft draft-ietf-kitten-sasl-ht-00. Work in Progress. Internet Engineering Task Force, Feb. 21, 2025. 11 pp. URL: https://datatracker.ietf.org/doc/draft-ietf-kitten-sasl-ht/00/.

[6] Kevin Smith and Matthew Wild. ***Bind 2.*** XEP 0386. Version 1.0.1. XMPP Standards Foundation, Feb. 8, 2017–July 2, 2024. URL: https://xmpp.org/extensions/xep-0386.html.

[7] Matthew Wild. ***Fast Authentication Streamlining Tokens.*** XEP 0484. Version 0.2.0. XMPP Standards Foundation, Oct. 19, 2022–June 30, 2024. URL: https://xmpp.org/extensions/xep-0484.html.