Security Considerations of Attested TLS

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Based on joint work with Thomas Fossati[2], Hannes Tschofenig[3], Simon Frost[4] and Ned Smith[5]

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[3]University of Applied Sciences Bonn-Rhein-Sieg and Siemens, Germany

[4]Arm, Cambridge, UK

[5]Intel Corporation, USA

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Attested TLS = Composition of RA and TLS

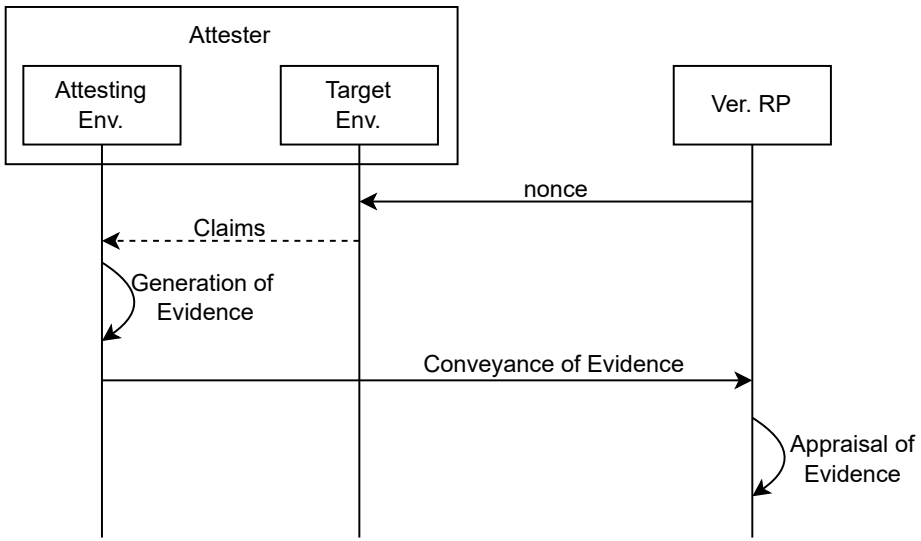


Figure: Remote Attestation

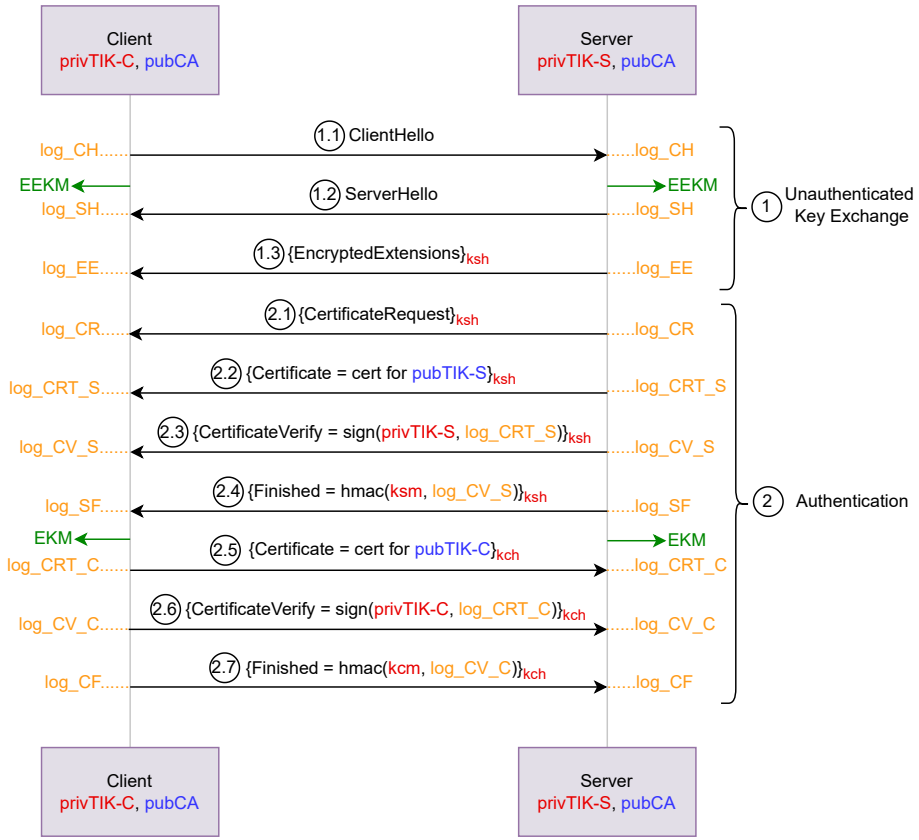
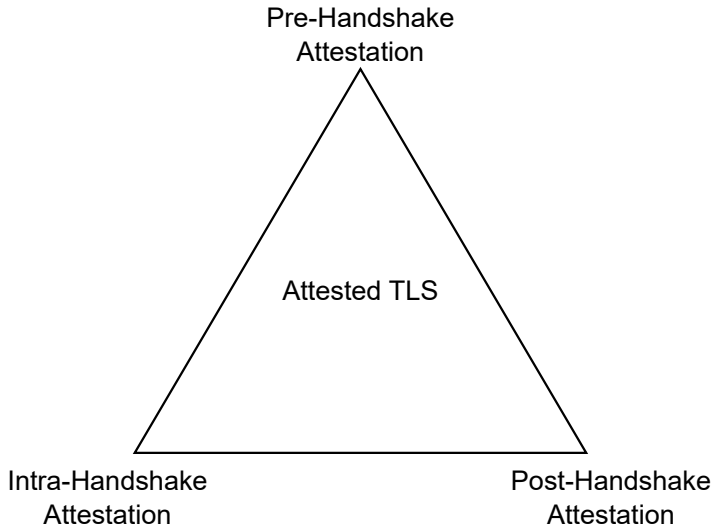


Figure: TLS with Client AuthN

Design Options



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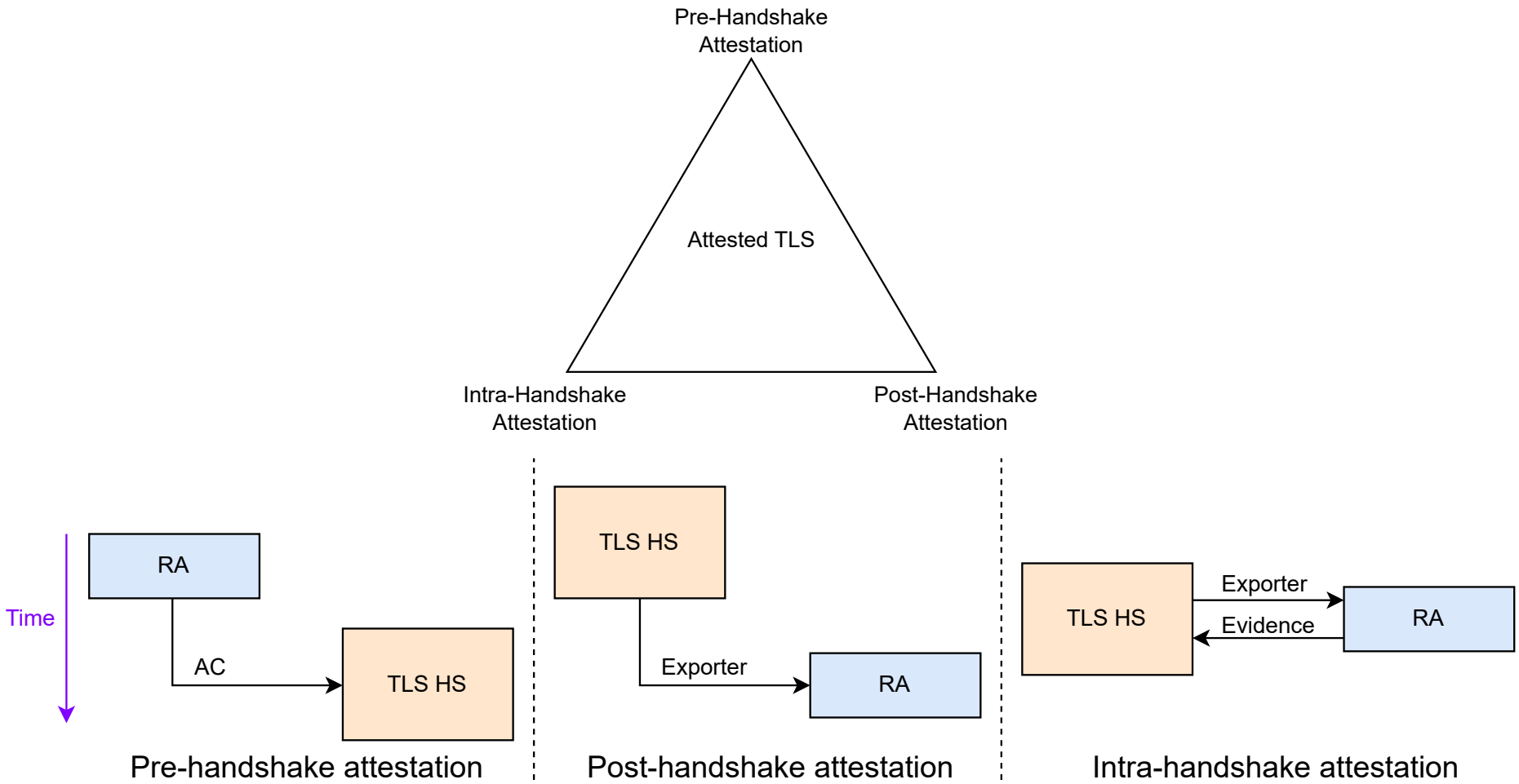
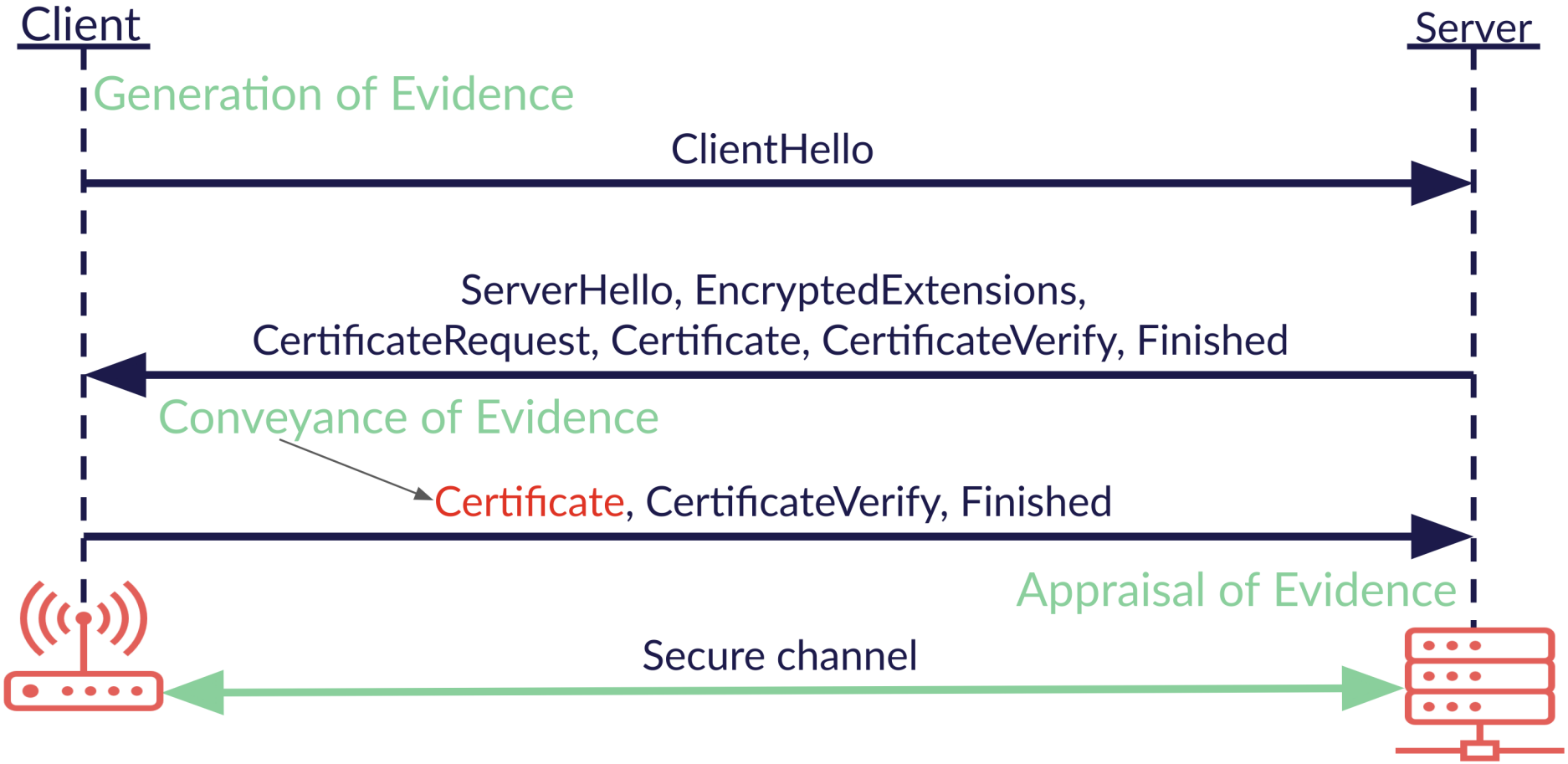
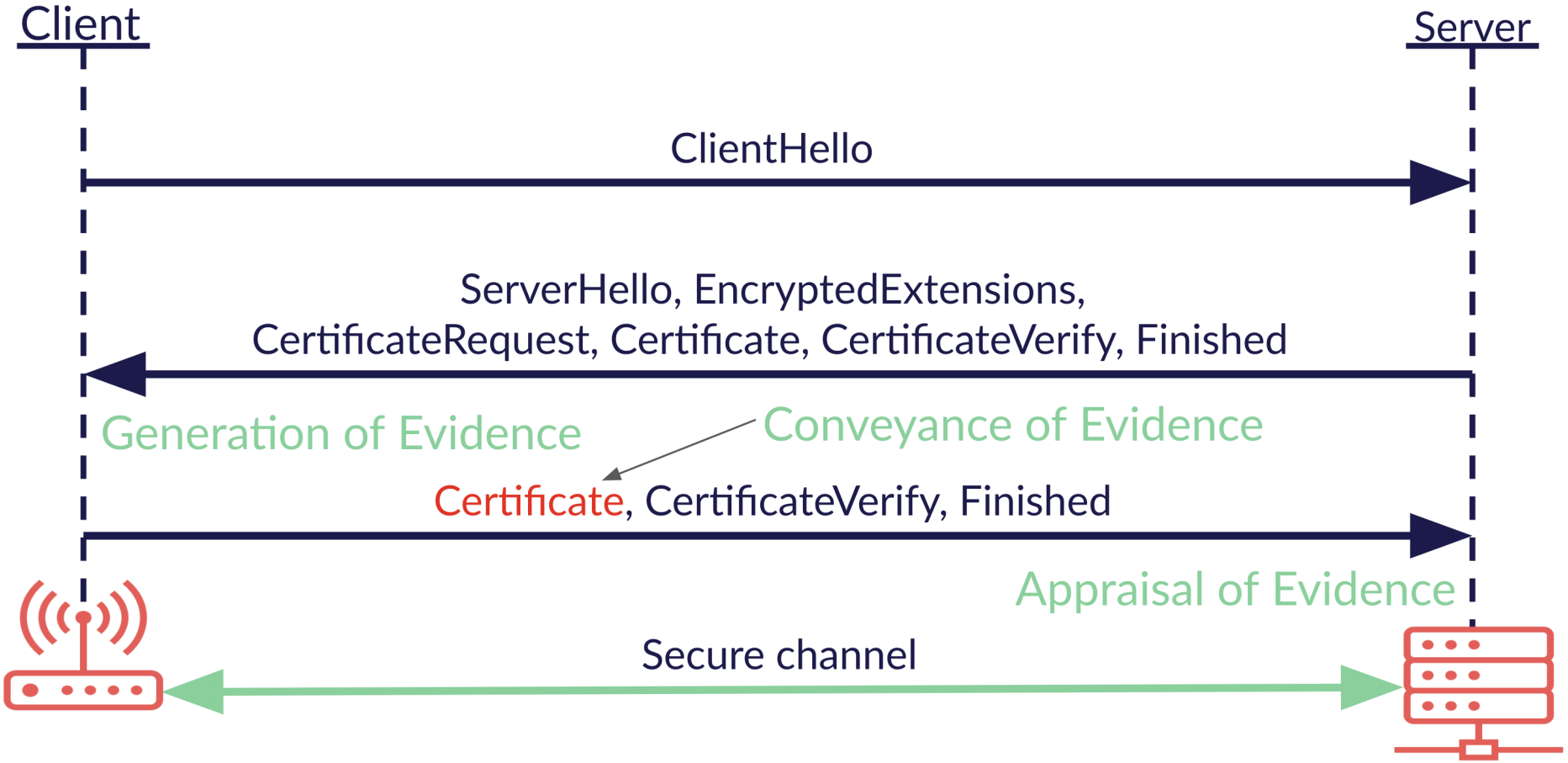


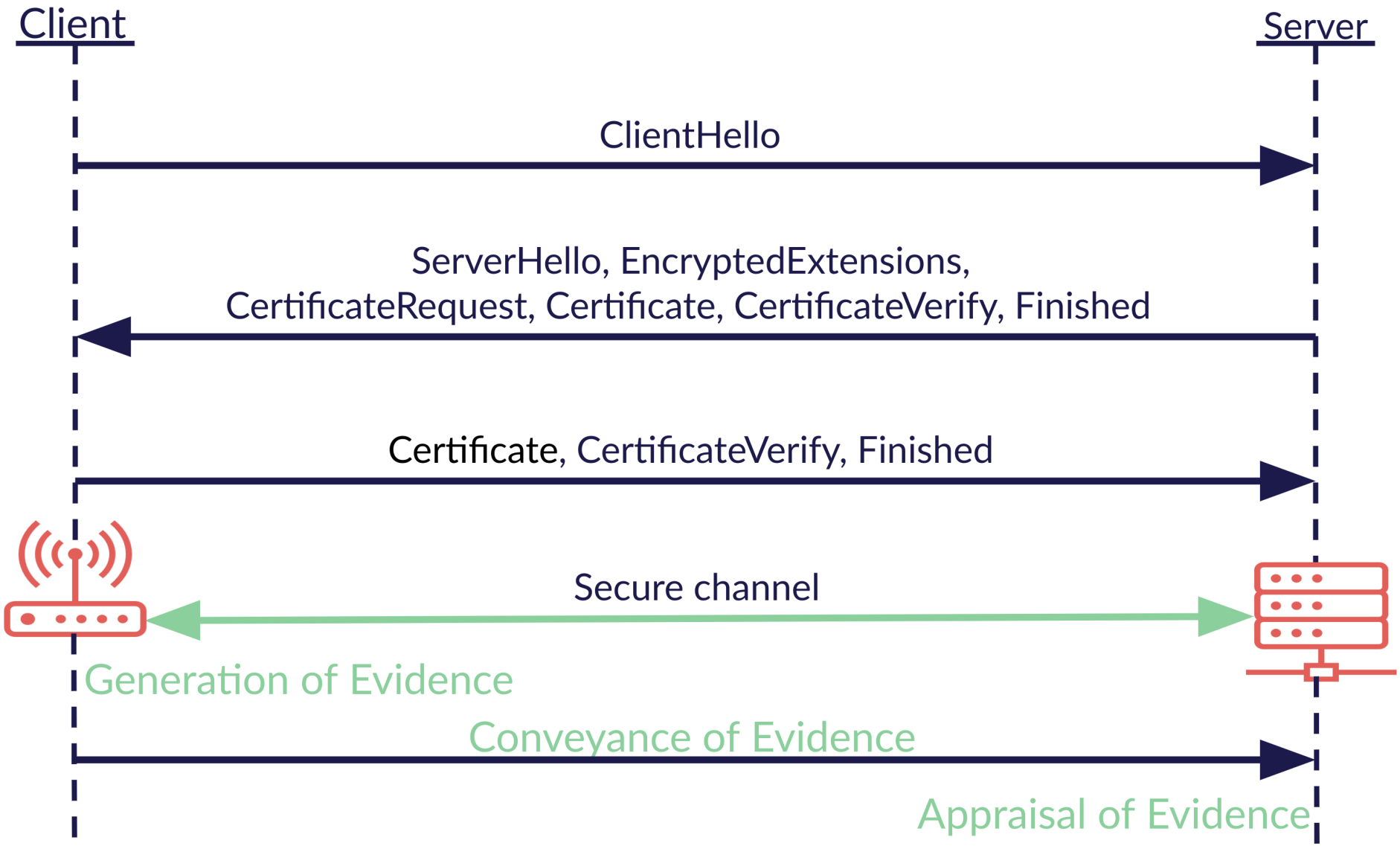
1 Pre-HS Attestation (Client as Attester)



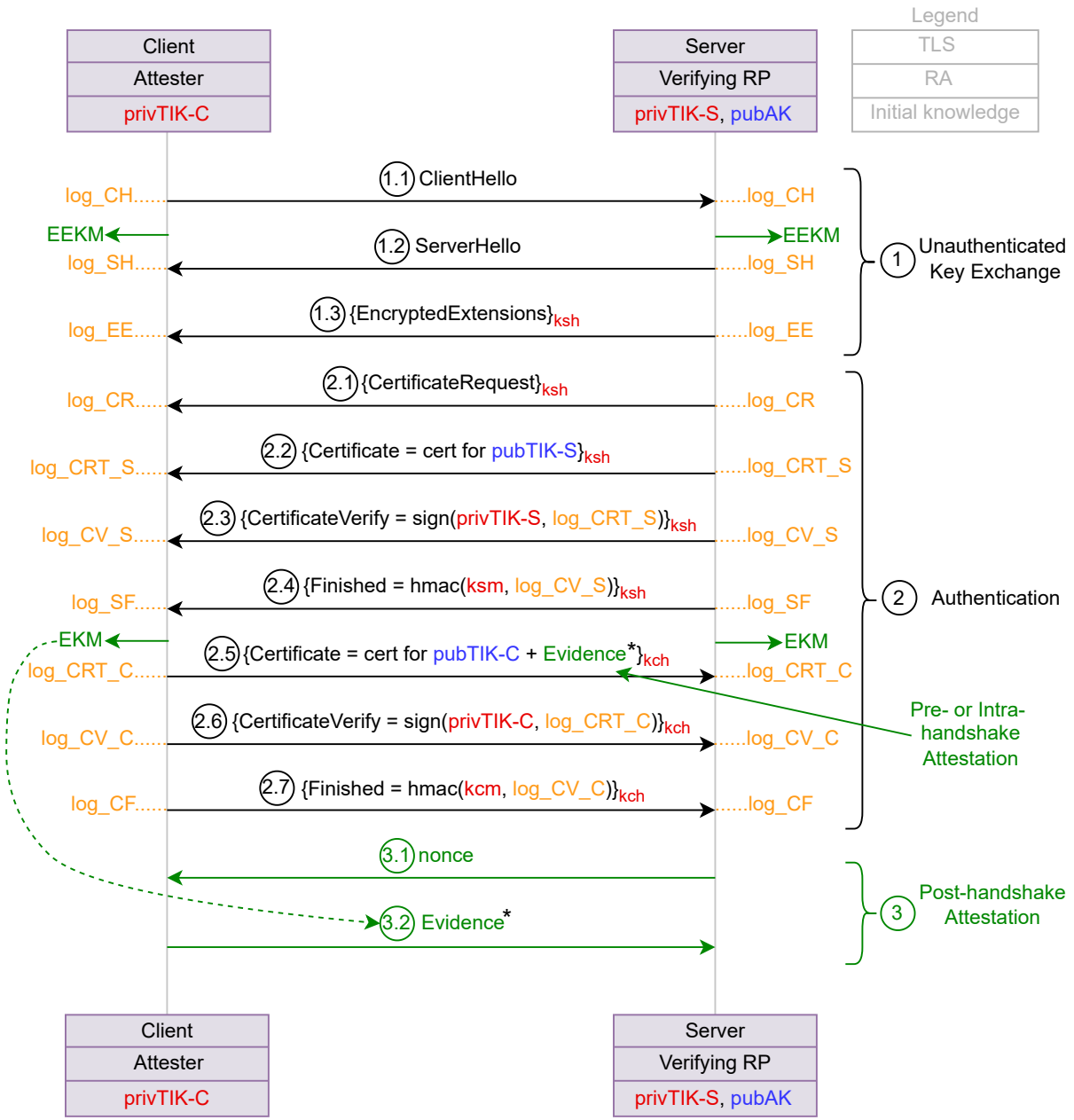
2 Intra-HS Attestation (Client as Attester)



3 Post-HS Attestation (Client as Attester)



Generic Protocol (Client as Attester)



Properties for Attested TLS

- Base security properties of subprotocols

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- Discussion: any other property?

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Summary

Underspecified = NOT trustworthy!

Key References

Birkholz, Henk, Dave Thaler, Michael Richardson, Ned Smith, and Wei Pan. *Remote ATtestation procedureS (RATS) Architecture*. RFC 9334. Jan. 2023. DOI: 10.17487/RFC9334. URL: https://www.rfc-editor.org/info/rfc9334.

Rescorla, Eric. *The Transport Layer Security (TLS) Protocol Version 1.3*. RFC 8446. Aug. 2018. DOI: 10.17487/RFC8446. URL: https://www.rfc-editor.org/info/rfc8446.

Sardar, Muhammad Usama, Arto Niemi, Hannes Tschofenig, and Thomas Fossati. *Towards Validation of TLS 1.3 Formal Model and Vulnerabilities in Intel's RA-TLS Protocol*. Oct. 2024. URL: https://www.researchgate.net/publication/385384309_Towards_Validation_of_TLS_13_Formal_Model_and_Vulnerabilities_in_Intel's_RA-TLS_Protocol.

ACK

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