

Generic Cryptographic Interface

Documentation Steve Wagner

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Laboratory for Embedded Systems and Communication Electronics
Hochschule Offenburg
Prof. Axel Sikora
Andreas Walz

Statutory declaration

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

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Date

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Abstract

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Bibliography

- [1] Christof Paar and Jan Pelzl. *Understanding cryptography: a textbook for students and practitioners*. Springer Berlin Heidelberg, Berlin; Heidelberg [u.a.], 2. corr. printing edition, 2010.
- [2] Ph.D. Rolf, Oppliger. *SSL and TLS: Theory and Practice*. Artech House, eSECURITY Technologies; Beethovenstrasse 10; CH-3073; Gümligen; Switzerland, 2009.

Appendix

Appendix A.

Documentation of the Generic Cryptographic Interface

[Link](#)