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FI

Chain of trust: Unravelling references among Common Criteria certified products

IFIP-SEC 2024

Adam Janovsky, Lukasz Chmielewski, Petr Svenda, Jan Jancar, Vashek Matyas

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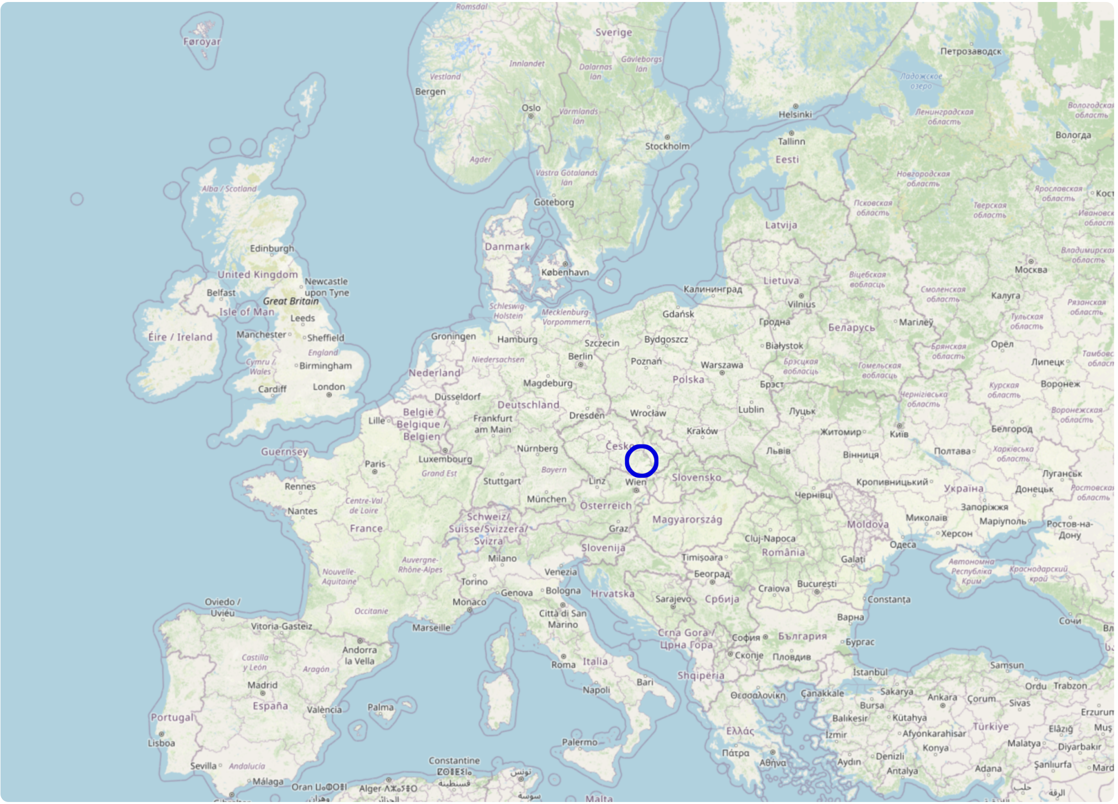
Føroyar
Sverige
Bergen
Oslo
Helsinki
Tallinn
Eesti
Stockholm
Göteborg
Latvija
Danmark
København
Lietuva
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Edinburgh
United Kingdom
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London
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Luxembourg
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Paris
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Rennes
Nantes
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München
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Wien
Slovensko
Österreich
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Milano
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Україна
Москва
Санкт-Петербург
Италия
Italia
Roma
Napoli
Bari
Palermo
Shqipëria
Crna Gora / Црна Гора
София
България
Пловдив
İstanbul
Ankara
Türkiye
Ελλάς
Αθήνα
Oviedo / Uviéu
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Portugal
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Sevilla
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Common Criteria 101

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(This is a summary by Victor Lomne from ANSSI.)

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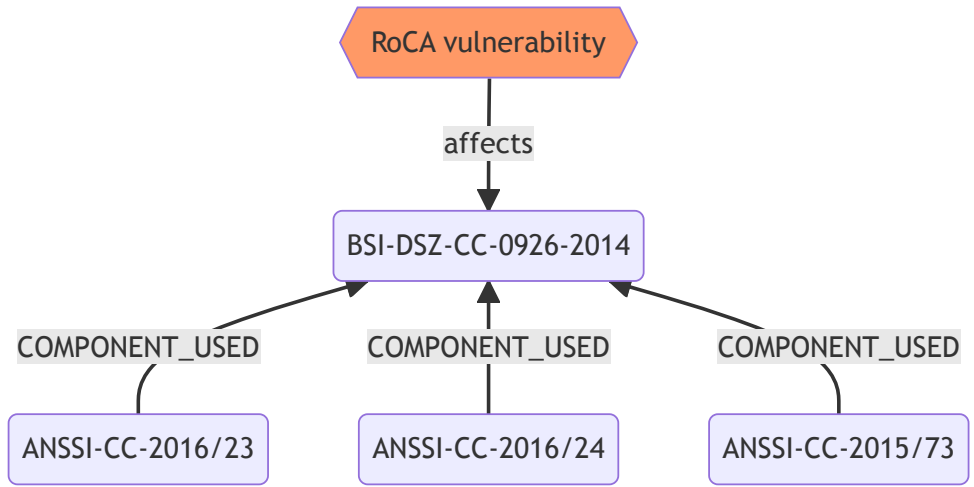
- ⚠ *How many devices certified under Common Criteria are impacted?*


RoCA vulnerability
affects
BSI-DSZ-CC-0926-2014
COMPONENT_USED
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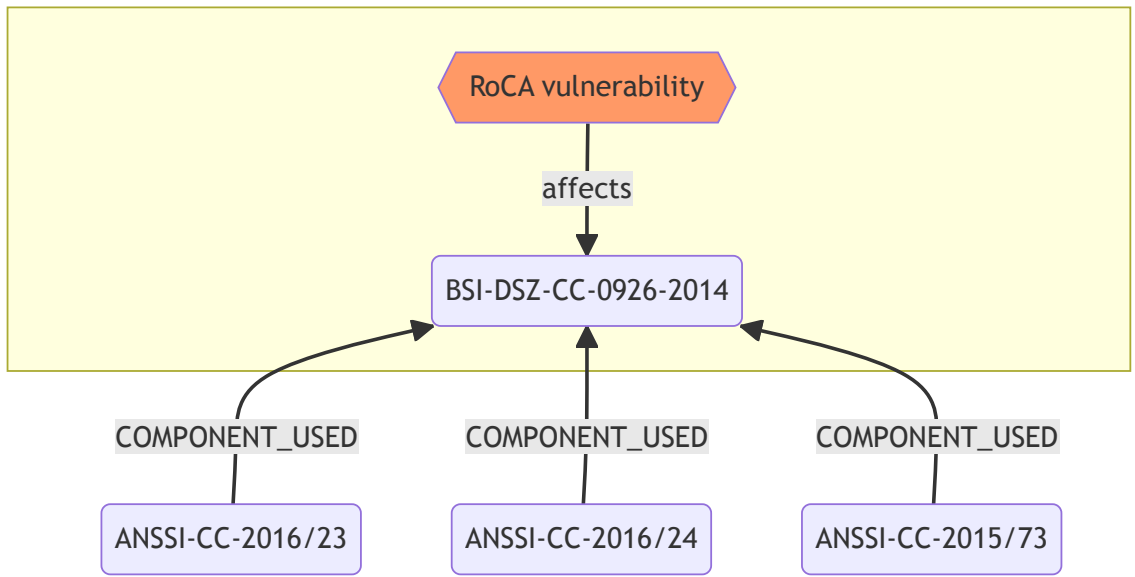
ANSSI-CC-2016/23
ANSSI-CC-2016/24
ANSSI-CC-2015/73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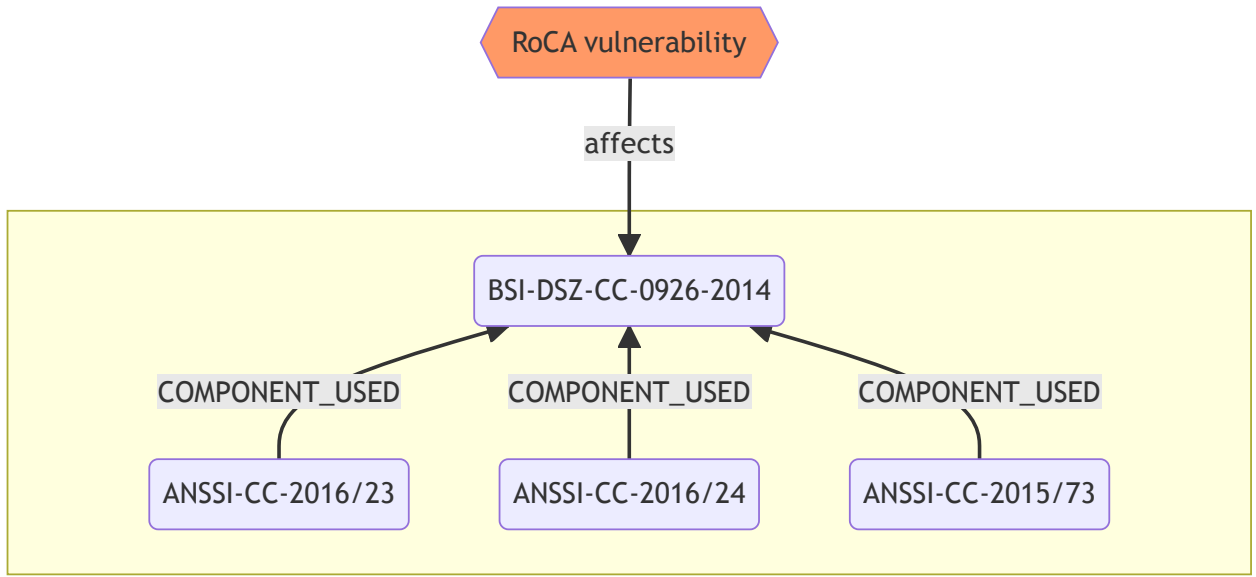
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sec-certs.org

sec-certs: Examining the security certification practice for better vulnerability mitigation

Infineon Security Controller M7892 A21 with optional RSA 2048/4096 1.02.013, EC v1.02.013, SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware)

⚠ This certificate has known related **CVEs**, which means that the certified product might be vulnerable.

CSV information ?

Status	archived
Valid from	06.02.2012
Valid until	01.09.2019
Scheme	DE
Manufacturer	Infineon Technologies AG
Category	ICs, Smart Cards and Smart Card-Related Devices and Systems
Security level	AVA_VAN.5, EAL5+, ALC_DVS.2
Protection profiles	• PKISKPP, SECURITY_IC_V1.0

Heuristics summary ?

Certificate ID: **BSI-DSZ-CC-0758-2012**

Certification report

Certification report | PDF | TXT

Extracted keywords

Cryptography

Device

Common Criteria

Security

Other

File metadata

Title:	Certification Report BSI-DSZ-CC-0758-2012
Subject:	Common Criteria Certification
Keywords:	"Common Criteria, Certification, Zertifizierung, Infineon Security Controller M7892 A21, Infineon Technologies AG"
Author:	Bundesamt für Sicherheit in der Informationstechnik
Creation date:	D:20120214152801+01'00'
Modification date:	D:20120214153307+01'00'
Pages:	44
Creator:	Writer
Producer:	OpenOffice.org 3.2

References

Incoming

- BSI-DSZ-CC-0833-2013 - CardOS V5.0 with Application for QES, V1.0
- BSI-DSZ-CC-0782-2012 - Infineon Security Controller M7892 B11 with optional RSA2048/4096 v1.02.013, EC v1.02.013, SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware)

Heuristics ?

Certificate ID: **BSI-DSZ-CC-0758-2012**

Extracted SARs

ASE_TSS.1, ADV_TDS.4, AGD_PRE.1, APE_REQ.2, AVA_VAN.5, ALC_TAT.2, ADV_FSP.5, ALC_LCD.1, APE_INT.1, ASE_REQ.2, AGD_OPE.1, ASE_ECD.1, ADV_SPM.1, ADV_IMP.1, APE_ECD.1, ALC_DEL.1, ATE_FUN.1, ATE_DPT.3, APE_OBJ.2, ALC_FLR.3, ADV_INT.2, ATE_IND.2, ASE_SPD.1, ALC_CMS.5, ATE_COV.2, ASE_CCL.1, APE_SPD.1, APE_CCL.1, ALC_DVS.2, ALC_CMC.4, ASE_OBJ.2, ASE_INT.1, ADV_ARC.1

CPE matches

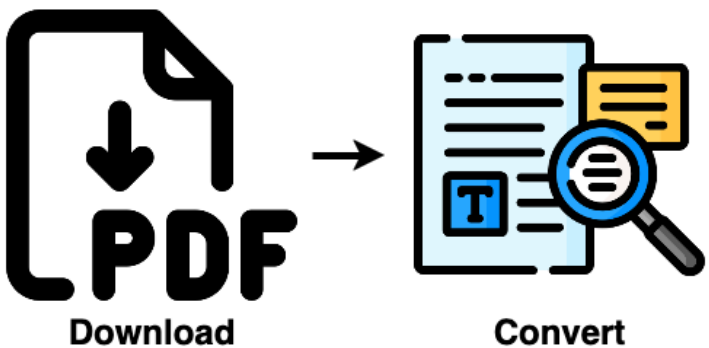
- cpe:2.3:a:infineon:rsa_library:1.02.013:*:*:*:*:*:*:*

Related CVEs

			CVSS Score			
ID	**Links**	**Severity**	**Base**	**Exploitability**	**Impact**	**Published on**
CVE-2017-15361	C M N	! MEDIUM	5.9		3.6	16.10.2017 17:29

Processing CC artifacts

Processing CC artifacts



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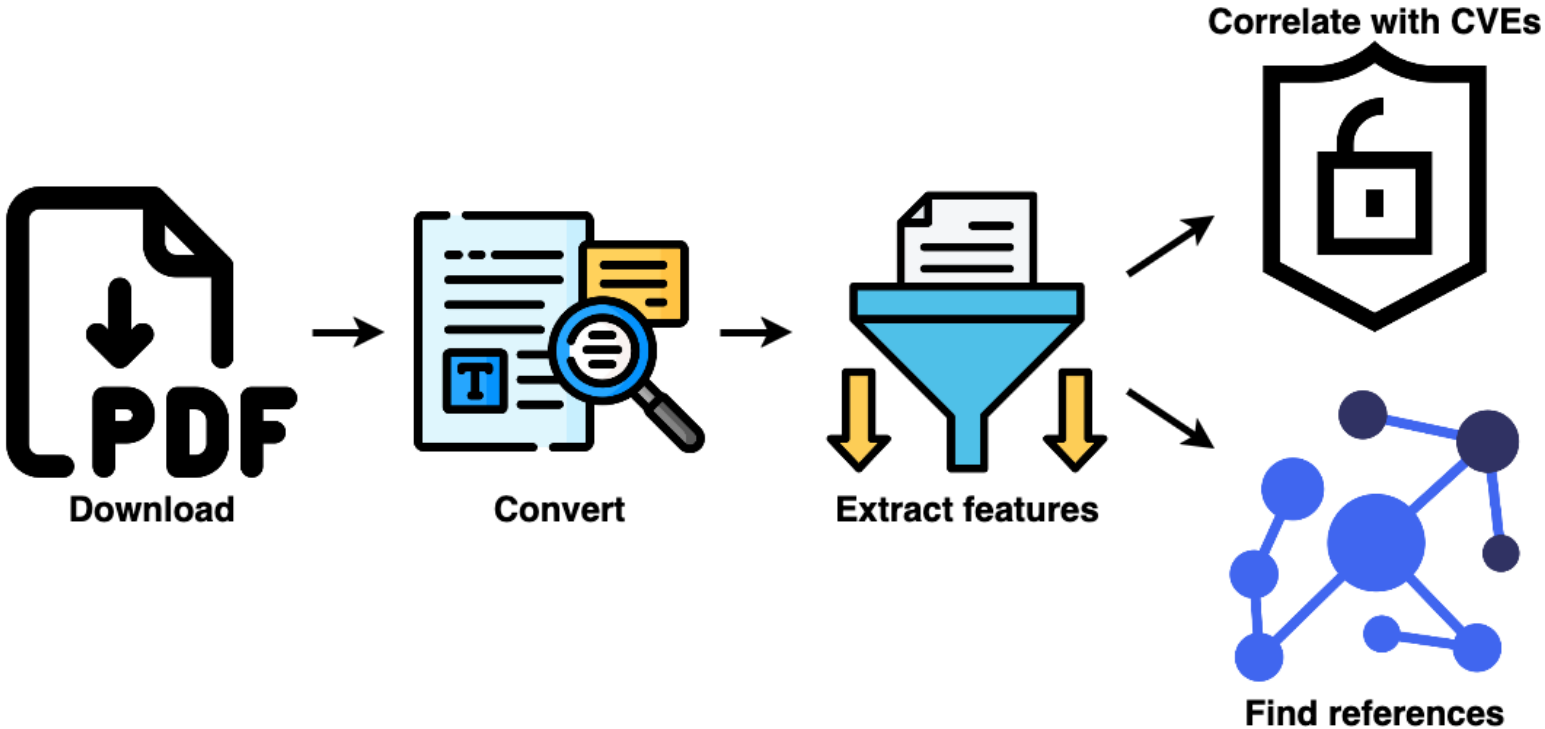

Building the reference graph

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- The categorical context of the reference, e.g. `` `COMPONENT_USED` ``, is an **edge label**.
- We work with **5394** vertices and **2712** edges.

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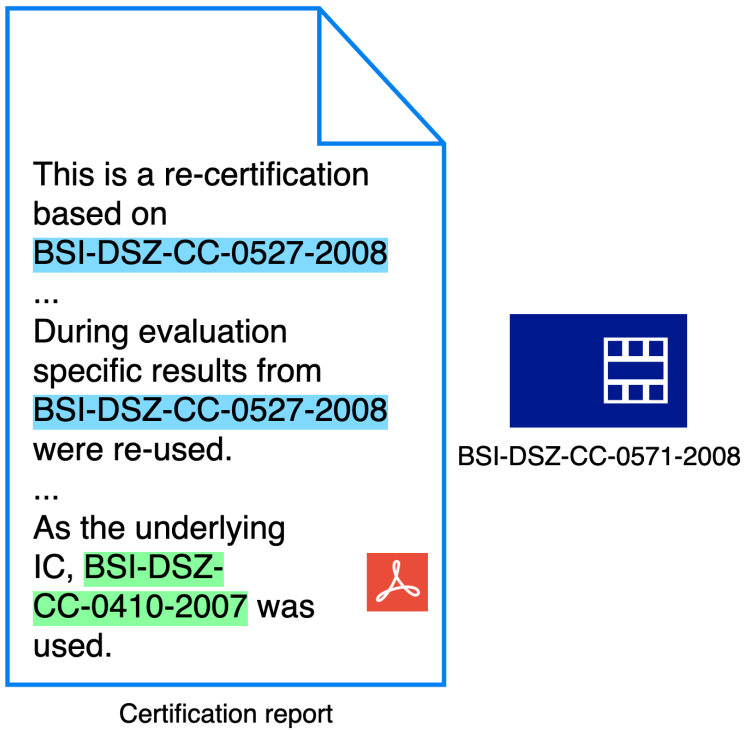

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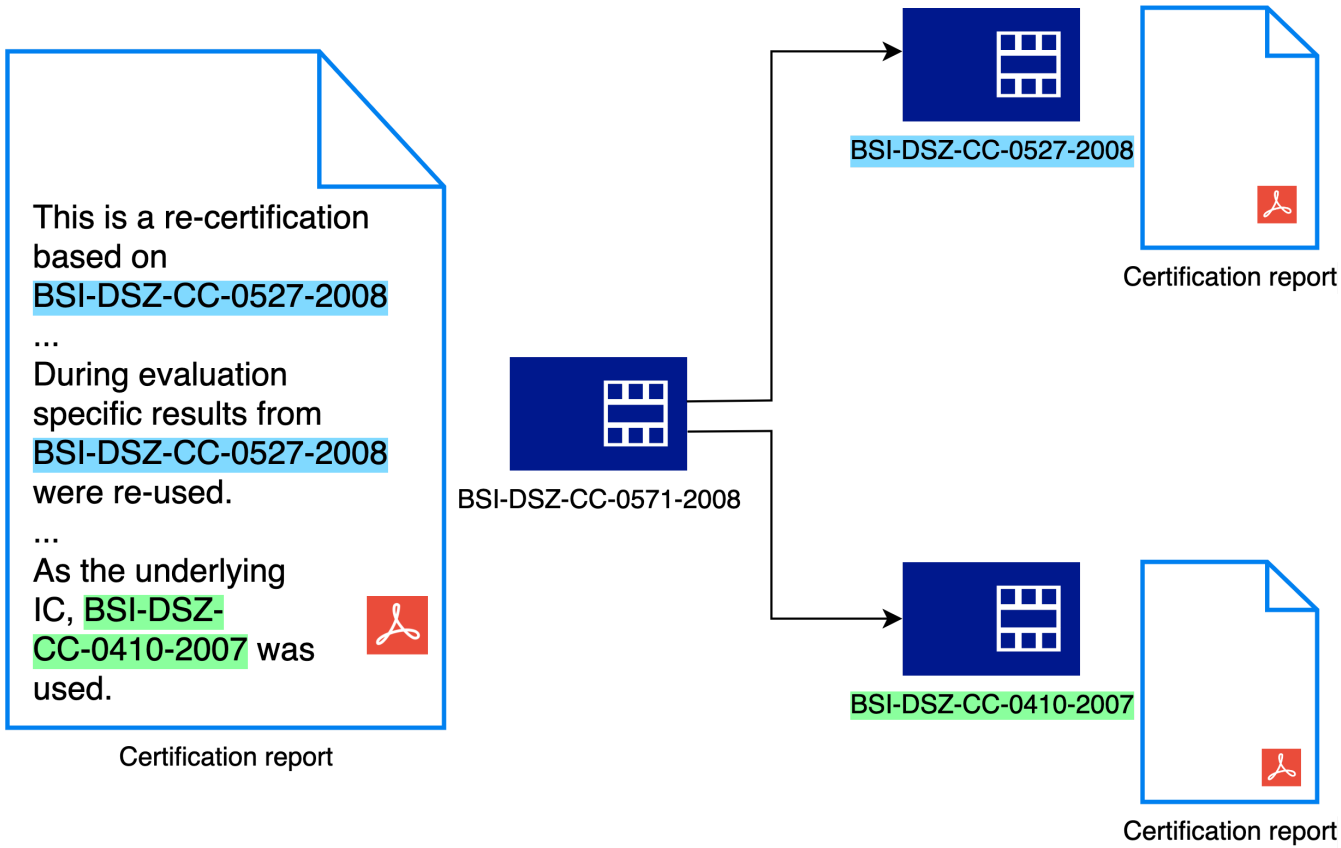

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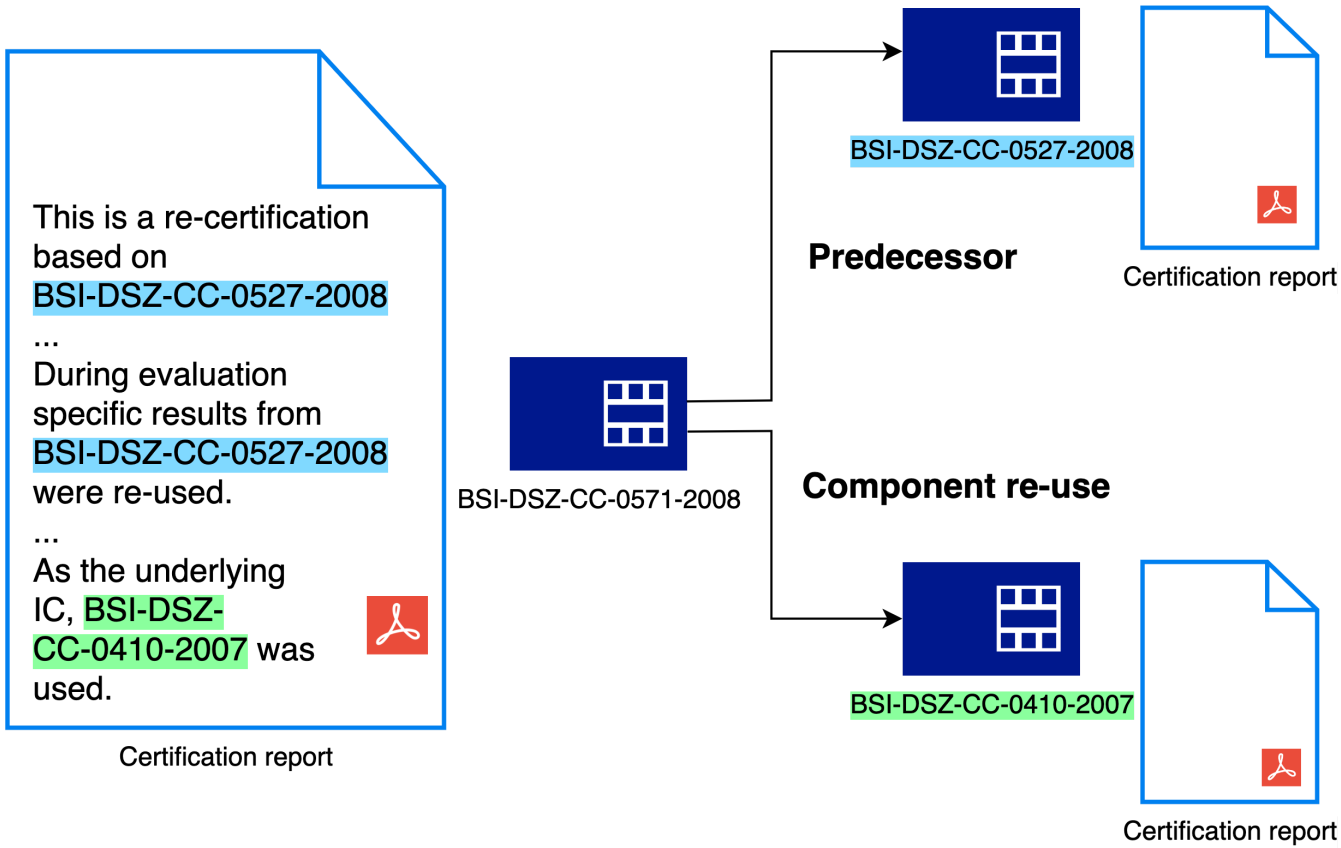

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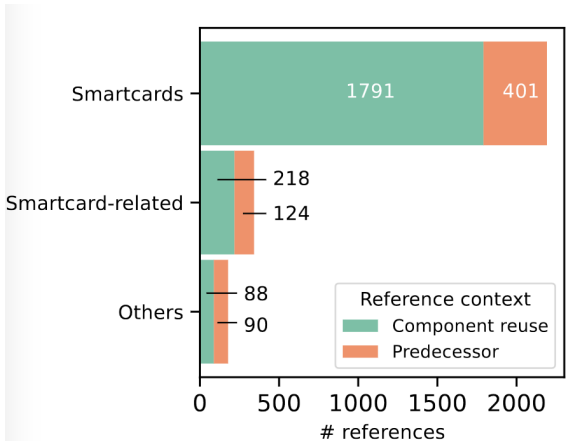
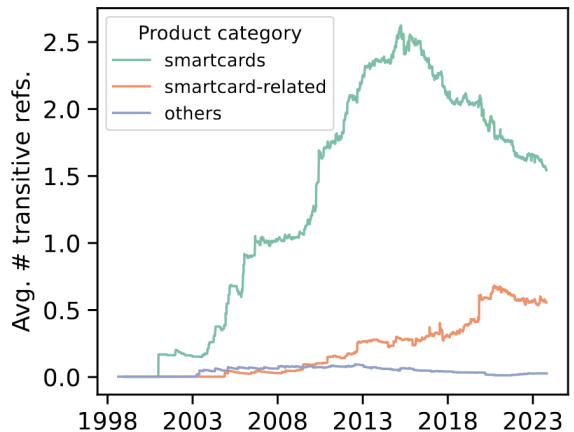
Weighted F1 score: **0.89**, combine with 15% of manually annotated dataset.

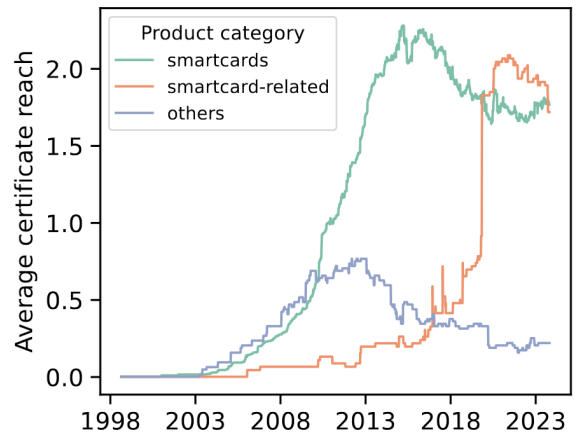
Ecosystem trends



(a) Reference context freq.



(b) Avg. # trans. refs



(c) Average product reach

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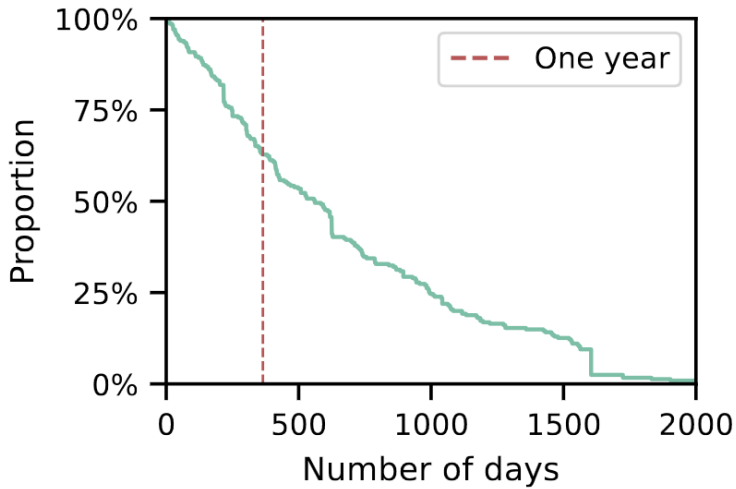
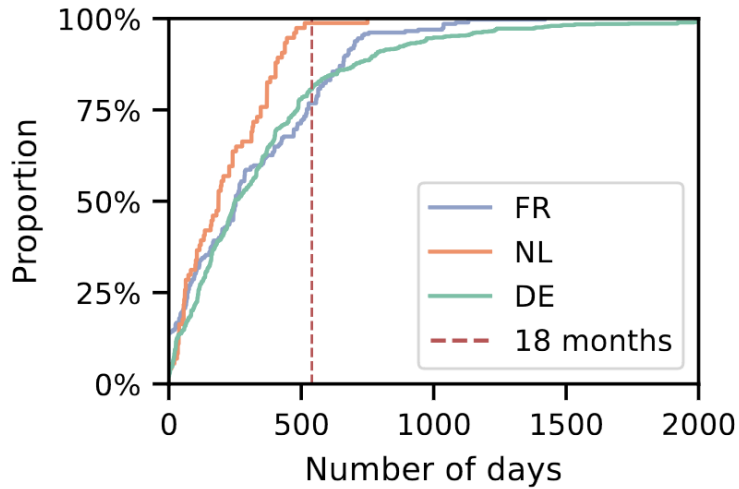
- These are microcontrollers, typically with cryptographic functionality.
- Higher reach is positively associated with higher evaluation assurance level (Spearman's rank 0.23, $2.73\mathrm{e}^{-23}$ p-value).
- We also measured that a vulnerability in cryptographic functionality would spread from high-reach devices to approx. 70% of their dependants.

Ageing references

Each product is valid for 5 years, some schemes require re-evaluation after 18 months in composite chains.



(a) Ratio of component-reuse referenced certificates with > 0 reach at n days post-archival (only includes products with positive reach on the date of their archival).



(b) CDF: the age of the referenced certificate on the issuance date of the referencing certificate.

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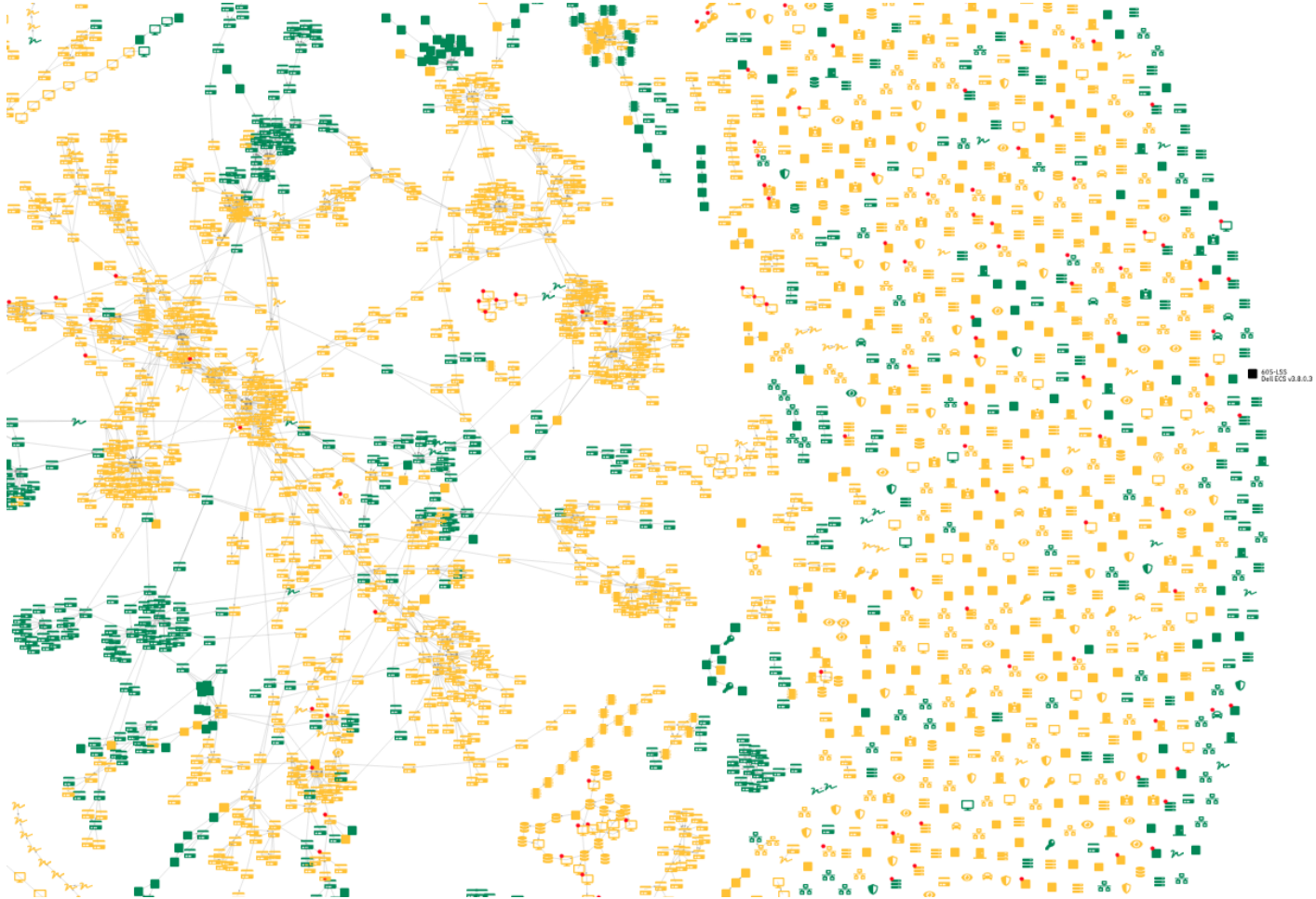
- Actual dependencies can be inferred from inter-certificate references.
- Certified dependencies popular among smartcards, more than 10% of all smartcards depend on top-10 smartcards.
- Affecting 50+ certified products, RoCA was not an outlier.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