A Lightweight Talk on Cryptographic Standardization at ISO

Orr Dunkelman

In cooperation with so many people: Tomer Ashur, Atul Luykx, *********, **********, …

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ISO 3103

- Defines the process of brewing a tea cup

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ISO 4165

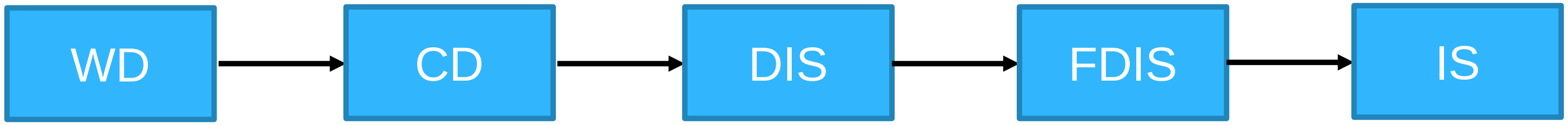
- Defines the power outlets of cars

International Standardization Organization

- Covers different types of standards
- Divided into different committees
  - we discuss ISO/IEC JTC 1 (ICT technologies)
- Committees are further divided into subcommittees:
  - SC27 – IT Security Techniques
  - SC31 – Automatic identification and data capture techniques
  - SC37 – Biometrics
- Subcommittees are further divided into working groups:
  - SC27/WG2 – Cryptography and security mechanisms
  - SC27/WG3 – Security evaluation, testing and specification
  - SC31/WG4 – Radio communications (RFID, RTLS, Security)

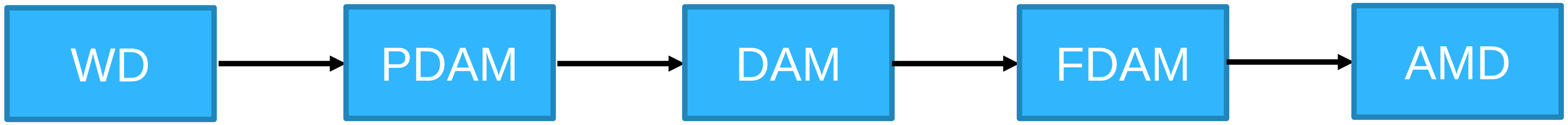
The ISO Process (Simplified)

New Standard



WD → CD → DIS → FDIS → IS

Amending Standard



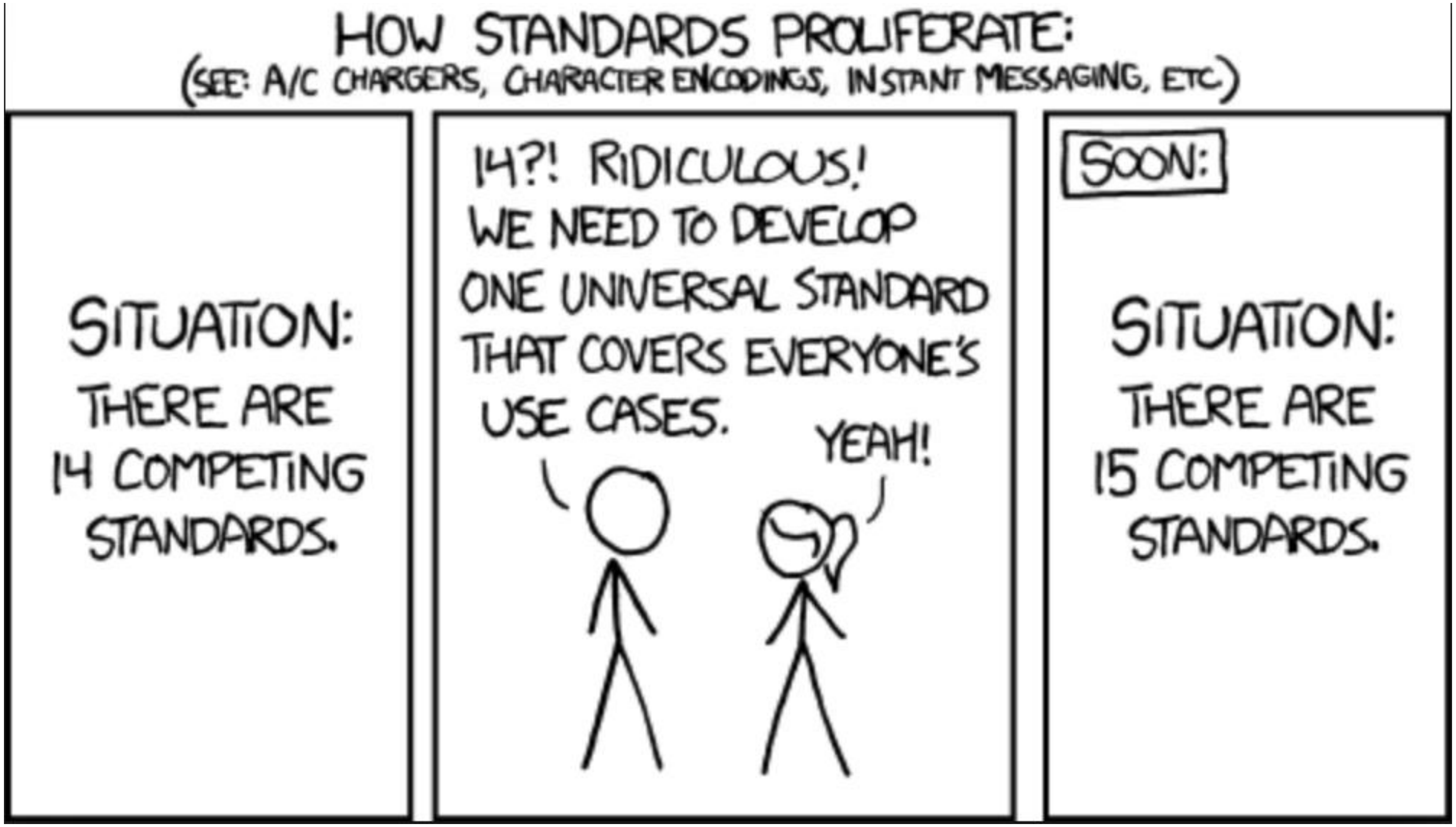
WD → PDAM → DAM → FDAM → AMD

Pre-Working Draft

- Preliminary:
  - Announcement
  - Study Period (Discussion)
  - Decision – Continue to Proposal/Go back to SP/Cancel
- Proposal:
  - Registration
  - Vote
  - Study Period + Improvements
  - Decision – Continue to WD/Go back to SP/Cancel

- See codes at https://www.iso.org/stage-codes.html

Cryptographic Standardization


HOW STANDARDS PROLIFERATE:
(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC.)
SITUATION: THERE ARE 14 COMPETING STANDARDS.
14?! RIDICULOUS! WE NEED TO DEVELOP ONE UNIVERSAL STANDARD THAT COVERS EVERYONE'S USE CASES.
YEAH!
SOON:
SITUATION: THERE ARE 15 COMPETING STANDARDS.

“The good thing about standards is that there are so many to choose from” — Andrew S. Tanenbaum

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Cryptographic Standards of ISO

- Offer multiple options for the same task
- ISO 9797-1 (Block Cipher-based MACs):
  - Defines 6(!) different approaches for using an n-bit block cipher to produce m-bit tag
  - 3 different paddings, 2 different initial transformations, 3 different output transformation
  - + Truncation! (rightmost bits)
  - Alg. 1: CBC-MAC
  - Alg. 5: CMAC
  - For more details – purchase ISO 9797-1:2011 for just 158 CHF

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Cryptographic Standards of ISO

- ISO 9796: Signatures with message recovery
- ISO 9797: MACs
- ISO 9798: Security Authentication
- ISO 18033-2: Asymmetric encryption
- ISO 18033-3: Block ciphers: 3DES, Misty1, CAST128, HIGHT, AES, Camellia, SEED
- ISO 18033-4: Stream ciphers
- ISO 10118: Hash Functions: SHA224, RIPEMD128, RIPEMD160, SHA1, SHA256, SHA384, SHA512, Whirlpool
- ...

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Lightweight Cryptography (ISO 29192)

- 29192-2: Block ciphers: PRESENT, CLEFIA
- 29192-3: Stream ciphers: Enocoro, Trivium
- 29192-4: Asymmetric
- 29192-5: Hash functions: Photon, SpongeNT, Lesamnta-LW

The ISO 18031 Fiasco

- A.K.A. Dual EC DBRG
- 2005: introduced
- June ‘06: ANSI SP 800-90A
- Crypto ‘07: Dan Shumow & Niels Fergueson – “It’s a point? It’s another point? It’s a backdoor!”
- 2013: Snowden revelations

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How ISO works

- Votes are done by country (NB)
- During the meeting (every 6 months), the WG can have as many experts representing a WG
- Votes then are “advisory”
- After the meeting of WG (and during the meeting), a HoD vote takes place
- After that HoD vote, a plenary of the SC takes place

Simon/Speck

- ARX design by the NSA
  - For the NSA?
- Received a great deal of cryptanalytic attention
- Submitted to standardization…

Recent Results

- Two weeks ago, SC27/WG2, voted for the cancelation of Simon&Speck as part of PDAM3: 8-4 (4 abstained)
- SC27 rectified this decision explicitly: 14-3 (8 abstrained)
- Wall of shame in SC27: US, UK, KR

- So Simon/Speck in SC27 is (currently) off the table!

But wait there is more!

- ISO SC31/WG4 is close to standardize these ciphers for RFID authentication (FDIS)
- How come they didn’t consult with SC27?
- No need!

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Your help is needed!

- Contact your NB
- Tell them to speak with the SC31/WG4 people
  - Option 1: Explain to them that standardization of weak crypto when SC27 rejected it is a bad idea, ask them to consult the SC27 experts
  - Option 2: Tell them that following SC27’s decision, you fear the security of the proposed FDIS. Ask them to increase number of rounds
  - Option 3: Participate in ISO! (and IETF, ETSI, IEC, NIST processes and more)

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Thank you for your attention!

מתי

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