TETRA RustIEC

secure programming on IoT, edge & cloud

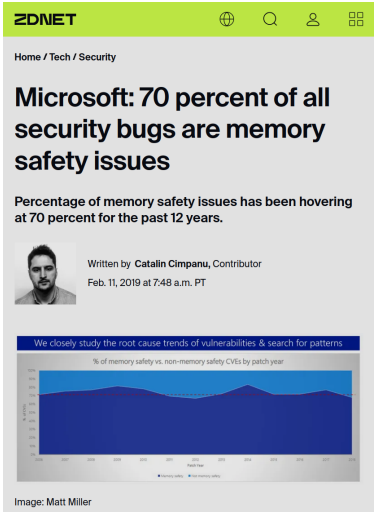
Vlaio HBC.2021.0066

November 14, 2024

VUB ETRO ELECTRONICS & INFORMATICS

MET DE STEUN VAN VLAIO

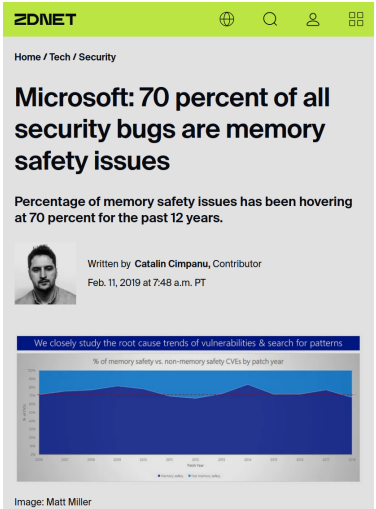
DistriNet KU LEUVEN



ZDNET [1]

C and C++ are language of choice for

- Embedded programming
- High performance
- Device drivers
- . . .



ZDNET [1]

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until Rust was released in 2015

performance compiled language

reliability type system & borrow checker

productivity modern tooling

RUST IS GROWING

AND POPULAR

Rust is mature:

Mozilla	for their Servo web engine
Microsoft	in the Windows kernel [2]
Linux	certain device drivers
	…

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but what about Flemish SME's?

PROJECT PARTICIPANTS

(INCOMPLETE)

more companies joined later

PROJECT RESULTS

THREE WORKSHOPS

basics	Rust 101 (four times)
embedded	Programming pong, see demo (twice[a])
c2rust	Progressively converting a C codebase to Rust (once)

[a] once done, second Tuesday November, 26, next week!

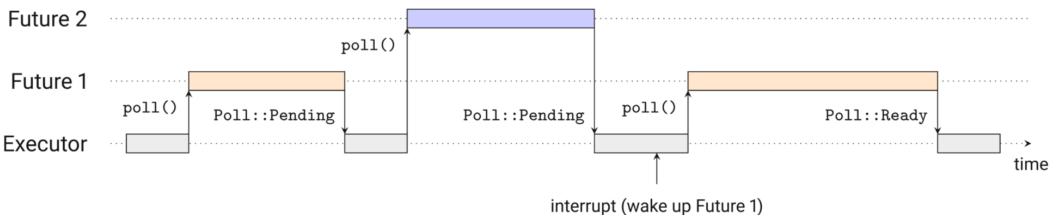
PROJECT RESULTS

DEMO

Based on the “advanced” embedded course:

- Multiplayer, wireless pong clone
- Entirely in Rust
- Demonstrates concurrent, async programming
- Complete TCP/IP stack on IEEE 802.15.4

"Overview of Embedded Rust Operating Systems and Frameworks," Vandervelden, De Smet, Deac, et al. [3]



PROJECT RESULTS

RESEARCH – OTHER

Cryptography R. De Smet, R. Blancquaert, T. Godden, et al., "Armed with Faster Crypto: Optimizing Elliptic Curve Cryptography for ARM Processors," Sensors, vol. 24, no. 3, p. 1030, 3 Jan. 2024, ISSN: 1424-8220. DOI: 10.3390/s24031030. [Online]. Available: https://www.mdpi.com/1424-8220/24/3/1030 (visited on 02/05/2024)

Embedded T. Vandervelden, D. Deac, R. Van Glabbeek, et al., "Evaluation of 6LoWPAN Generic Header Compression in the Context of a RPL Network," Sensors, vol. 24, no. 1, p. 73, 1 Jan. 2024, ISSN: 1424-8220. DOI: 10.3390/s24010073. [Online]. Available: https://www.mdpi.com/1424-8220/24/1/73 (visited on 01/05/2024)

PROJECT RESULTS

MEETINGS WITH INDUSTRY

1:1 contact	direct contact for concrete advice
UC meetings	4 user committee meetings: ► technical presentations; ► discussions; ► networking
technical reports	varying topics [1]

[1] soon available on the project website

CONTACT US

Interest in joining a TETRA project? Contact:

- An Braeken (an.breaken@vub.be) and
- Jorn Lapon (jorn.lapon@kuleuven.be)

Interest in joining next week[2]'s embedded course? Interest in a workshop? Contact:

- Ruben De Smet (rubedesm@vub.be)
- An Braeken (an.braeken@vub.be)

https://www.rustiec.be

[2] Tuesday November 26, 2024, whole day

REFERENCES I

[1] C. Cimpanu, "Microsoft: 70 percent of all security bugs are memory safety issues," ZDNET, Feb. 11, 2019. [Online]. Available: https://www.zdnet.com/article/microsoft-70-percent-of-all-security-bugs-are-memory-safety-issues/ (visited on 10/06/2023).

[2] T. Claburn, "Microsoft is rewriting core Windows libraries in Rust," The Register, Apr. 23, 2023. [Online]. Available: https://www.theregister.com/2023/04/27/microsoft_windows_rust/ (visited on 10/06/2023).

[3] T. Vandervelden, R. De Smet, D. Deac, K. Steenhaut, and A. Braeken, "Overview of Embedded Rust Operating Systems and Frameworks," Sensors, vol. 24, no. 17, p. 5818, Sep. 7, 2024, ISSN: 1424-8220. DOI: 10.3390/s24175818. [Online]. Available: https://www.mdpi.com/1424-8220/24/17/5818 (visited on 11/13/2024).

REFERENCES II

[4] R. De Smet, R. Blancquaert, T. Godden, K. Steenhaut, and A. Braeken, "Armed with Faster Crypto: Optimizing Elliptic Curve Cryptography for ARM Processors," Sensors, vol. 24, no. 3, p. 1030, 3 Jan. 2024, ISSN: 1424-8220. DOI: 10.3390/s24031030. [Online]. Available: https://www.mdpi.com/1424-8220/24/3/1030 (visited on 02/05/2024).

[5] T. Vandervelden, D. Deac, R. Van Glabbeek, R. De Smet, A. Braeken, and K. Steenhaut, "Evaluation of 6LoWPAN Generic Header Compression in the Context of a RPL Network," Sensors, vol. 24, no. 1, p. 73, 1 Jan. 2024, ISSN: 1424-8220. DOI: 10.3390/s24010073. [Online]. Available: https://www.mdpi.com/1424-8220/24/1/73 (visited on 01/05/2024).