Celtic-Plus Event
28-29 April 2016, Stockholm

SASAGEP
Safe and Secure and Green European Processor

Klaus Kinzinger
Basics

- IT security is an architectural feature and no add-on. One can not mount or reliably glue it onto hardware that by design has no support for it (von Neumann).

- A major technology leap is needed – an IT reboot, that ought to start with critical infrastructures and then should expand into the mass markets.

- For economic reasons, in the mass markets energy efficiency is paramount for success.

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Chain of Trust?

IT security can not exist without proper hardware anchoring
It never has and never will
Exploit of a SW bug

Attacker triggers SW crash

At ISA level, the system is unguarded and an easy prey

Exploit => bypasses the whole software stack (and any "chain of trust")

Control flow is hijacked and directed to the attackers machine code

At ISA level, the system is unguarded and an easy prey

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Cyberdefense – Option 1

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"Security by bug-free coding" (a popular illusion)

"Security by bug-fix" (hopeless, e.g. Microsoft)

"Security by hunting malware" (hopeless, e.g. Symantec)
Cyberdefense – Option 2

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Cyber attack

"Security by Stack Canaries" (only partial solution)

"Security by NX-Bit" (interesting because non-von-Neumann approach, only partial solution)

Other HW-centered approaches

Guard the impact point
Cyberdefense – Option 3

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Technology Stack

Cyber attack

Withdraw all computer linguistic means needed to program / perform the attack

Cybersecure Virtual ISA
It can be done!

So talk to me and join in

Project Status
- Carefully planned in a detailed 150 page paper
- Scientifically evaluated and verified by the Institute of Cryptography and IT Security at the Karlsruhe Institute of Technology KIT, Germany (=> LOI available)
- Two PCT patent applications covering (1) security / safety and (2) energy efficiency aspects
- Executive summary available
- SASAGEP is ready for the prototype phase for further proof of concept – mainly compiler / chip design issues – overall fine tuning and improvement, and implementation

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