

• **Noah Evans** • 14 days ago

Hey guys. Thanks for attending my presentation. I'll be happy to answer any questions.

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Regan Robertson **Mod** • 14 days ago

Good Morning,

The video will start on this page at 11:30am, and you may have to hit play or unmute. As a reminder this site works best in a Chrome Browser. You can write in comments through this feature to continue the conversation or ask questions. Please login or sign up for a Disqus account to participate in the discussion boards.

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Jason H Li • 14 days ago

Hello Noah and all.

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Jason H Li • 14 days ago

Not to distract the gang here ... but some folks about about MIT-LL update on seL4 and Rust. I have them now, but was told it's not publicly released yet so can only share with gov guys and national labs. If you are interested, please send an email to me at jason.li@siegetechnologies.com.

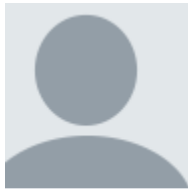
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Noah Evans Jason H Li • 14 days ago

Not a problem at all. Their work is actually directly relevant to this presentation.

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Nathaniel Husted Jason H Li • 14 days ago

And Done!

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Renato Levy • 14 days ago • edited

This is usually how my wife sees the dishwasher: If it fails to wash a dish, it is the end of the world!
;^)

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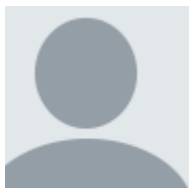


Noah Evans Renato Levy • 14 days ago

Same here. I'm the official dishwasher operator in the evening. :)

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Renato Levy Noah Evans • 14 days ago

Which leads to the question: How many PhDs it takes to operate a dishwasher?
answer: 1 loving husband....

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June Andronick Renato Levy • 14 days ago

At my place, the operators for a working dishwasher are both halves; and the operators of a non-working one varies but it's often wife for SW resets and husband for physical damage ;)

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Ihor Kuz June Andronick • 14 days ago

In our family both partners have PhDs, so it always takes at least one to operate the dishwasher. Neither of us can repair it when it breaks though :-)

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Nathaniel Husted • 14 days ago • edited

Noah, do you all happen to work with the cyber department (sorry -- I have a hard time keeping the departments straight there) folks at SNL? I'm hoping to make some connections with some folks I know there as I think your expertise would be very useful in something else I'm involved in with some of your colleagues (can't really go into detail here).

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Noah Evans Nathaniel Husted • 14 days ago • edited

Hey **Nathaniel Husted** I'm in group 8741 digital foundations and math, Sandia's new formal methods division. I'd be happy to be introduced to people you know though.

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Nathaniel Husted Noah Evans • 14 days ago

Hi Noah, that helps immensely! I'll see if I can work on connecting the dots on my end -- would it be possible to reach out to you via email?

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Noah Evans Nathaniel Husted • 14 days ago

Sure, it's first initial last name at sandia.gov.

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Nathaniel Husted Noah Evans • 14 days ago

Hopefully you'll see an e-intro in your inbox here soon! Great talk!

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Nathaniel Husted • 14 days ago

Is eChronos still being actively developed? <https://github.com/echronos...> doesn't seem to have activity after June,12 2019 presuming I'm reading things correctly.

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Noah Evans Nathaniel Husted • 14 days ago

I'm not sure. Is Gernot around?

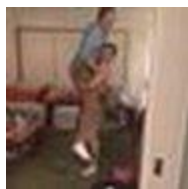
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Raymond Richards Noah Evans • 14 days ago

It is approaching 4AM in Sydney. It may still be too early for our Data61 friends

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Noah Evans Raymond Richards • 14 days ago

I'm not going to complain about waking up on pacific time anymore.

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Ihor Kuz Raymond Richards • 14 days ago

I'm here for any D61 questions :-)

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June Andronick Ihor Kuz • 14 days ago

Also here, but Ihor already replied ;)

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Ihor Kuz Nathaniel Husted • 14 days ago • edited

Echronos is not being actively developed at the moment - lack of resources, so we are focussing our efforts on seL4.

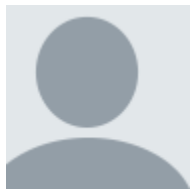
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Ihor Kuz Nathaniel Husted • 14 days ago

We did work looking at memory protection (using MPU) in echronos. We found that there were limits in how well that could protect against malicious processes.

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Noah Evans Ihor Kuz • 14 days ago

Can you give more background here?

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Ihor Kuz Noah Evans • 14 days ago • edited

also slides here: <https://github.com/schnommu...>

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Noah Evans Ihor Kuz • 14 days ago

Thank you!

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Jason H Li • 14 days ago

Question to D61 friends - what do you think of single address space seL4? Or is it ill-suited at this moment?

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Noah Evans Jason H Li • 14 days ago

That's really the core question this presentation is posing. Would the community be interested in a single address space system? Would it buy us enough to be a viable middle ground between an RTOS and fully fledged microkernel?

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Ihor Kuz Jason H Li • 14 days ago

I think that the FAQ answer doesn't do justice to the issue and a more extensive discussion is needed.

Having said that I think that if you start looking at a single-address space system without MMU provided protections, then it would no longer be seL4.

Gernot has stronger opinions on this though, and I'll point him to this discussion when he's up.

So come back to see updates!

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Jason H Li Ihor Kuz • 14 days ago

Yeah understand that. It may not be seL4 anymore.

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Stuart Card • 14 days ago

Hurrah segmentation! Multics forever! Not all who wander are lost. :-)

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Noah Evans Stuart Card • 14 days ago

The grump in me says the world would be a better place if all we had were Multics and VMS ;)

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Jason H Li Noah Evans • 14 days ago

LOL ... sometimes newer cooler technologies also mean complexity and messiness!

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Noah Evans Jason H Li • 14 days ago

We actually still have VMS machines for work. I was going through some old DEC manuals the other day. It's very much the "medieval engineer marveling at Roman aquaduct" feeling.

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Jason H Li Noah Evans • 14 days ago

LOL. Messed with VMS myself decades ago.

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Jason H Li Stuart Card • 14 days ago

Principles persist! Then we have to deal with ideals and reality.

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Jason H Li • 14 days ago

Really enjoy the thought experiment. Back to some fundamental issues, needs vs. available technologies.

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Noah Evans Jason H Li • 14 days ago

Doing the due diligence for the presentation turned into something much more interesting than what I was expecting. Talking to our designers, it quickly became apparent that seL4 would not work out of the box on our mission systems.

So the project then became, "How **could** we make seL4 work and what would that entail?" Which turned out to be very thought provoking.

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Jason H Li Noah Evans • 14 days ago

Yep - we should talk more on this later this week.

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Regan Robertson Mod • 14 days ago

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Olin Sibert • 14 days ago

We had paging+segmentation MMUs in 1968 (GE 645), back when each transistor came in its very own little metal can. I am skeptical of the "too complex for our hardware" argument, especially when the proffered alternative is a segmentation MPU like on PDP-11s. Are you confident that you've really explored the available design space of paging MMUs?

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Noah Evans Olin Sibert • 14 days ago

You're likely right, but the designer's argument is that we don't have enough die given all of our requirements. Our processors and many of our peripherals live on a ViArray (<https://www.osti.gov/biblio...> which is about 270000 gates. Our processor has certain requirements that I can't go into which consume quite a few gates as well.