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• **Ihor Kuz** • 14 days ago • editedFeatured by seL4 Summit

Welcome to the last talk of the summit.

I'll be around to answer questions in the forum.

Some links to more detailed information about the driver framework:

Driver Environment

<https://github.com/seL4/uti...>

CAMkES support

<https://github.com/seL4/cam...>

Example Drivers

<https://github.com/seL4/glo...>

Example app/system

<https://github.com/seL4/cam...>

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**Regan Robertson** Mod • 14 days ago

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[Jason H Li](#) • 14 days ago

Great intro of drivers. Really like slide 7.

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[Jason H Li](#) • 14 days ago • edited

Are you suggesting a standard driver structure and API for various kinds of drivers? If so, what do they look like? Maybe in a later slide. By API I meant driver interface, of course.

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[Ihor Kuz](#) [Jason H Li](#) • 14 days ago • edited

Among other things.

Look at some of the links that I've provided (the example drivers). But these interfaces will evolve as we (and others) get more experience developing those kinds of drivers.

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[Jason H Li](#) • 14 days ago

Really enjoyed the different views. Made total sense.

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[disqus Ite0Ccr7P2](#) • 14 days ago

What type of devices are you supporting initially?

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[Ihor Kuz](#) [disqus Ite0Ccr7P2](#) • 14 days ago

serial, timer, ethernet, gpio, clock.

We've converted a lot of our existing drivers to use the DDF mechanisms.

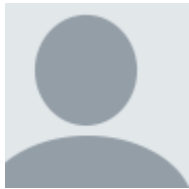
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[Carl Nerup](#) · 14 days ago

Not thinking GPU?

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[Ihor Kuz](#) [Carl Nerup](#) · 14 days ago

Not yet. GPU is way more complicated.

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[Ihor Kuz](#) [Ihor Kuz](#) · 14 days ago

But happy to get input on that!

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[Olin Sibert](#) • 14 days ago

This, too, is a nice, clean, well-architected framework for device drivers, similar to (but simpler than, and much more trustworthy) what's in most contemporary operating systems. But it's not the serial port and the clock (which make easy examples) that are hard, it's things like bus-connected devices (e.g., USB, PCIe) and devices with complex error behaviour (e.g., disks).

Busess seem especially problematic from a security standpoint, since they completely get in the way of connecting a device (like a disk) to a software client. Even if the actual devices are physically configured in an unalterable way, the bus driver has to go through all the same initialization, configuration, and power management activities as it would when a device is plugged in dynamically.

How do you see evolving the model to these more challenging devices?

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[Ihor Kuz](#) [Olin Sibert](#) • 14 days ago

That's a good question.

The answer is that I don't really know, other than at the base level a bus driver is also a driver.

I think that this will be one of the next steps, looking at how more complex devices fit in.

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[Olin Sibert](#) [Ihor Kuz](#) • [14 days ago](#)

I'd be happy to have a chat about this sometime. It's a hard problem (just look at the Windows Driver Model if you want a reason to scream, lol)

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[Ihor Kuz](#) [Olin Sibert](#) • [14 days ago](#)

I'd be delighted to talk and get input on this!

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[Carl Nerup](#) • [14 days ago](#)

Customers really care about this in their deployments. Well done and very timely.

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[Ihor Kuz](#) • [14 days ago](#)

I'd like to emphasise that this DDF isn't "done and dusted" it's v1 of a framework, and I expect that it will grow and evolve as we (as a collective community) gain experience with using it, and developing more, and more complex, drivers.

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