



Recap of the Nuttx International workshop

2019 –July 16 & 17, Gouda, NL



>12
Speakers



>16
Sessions



multiple
Workshops

Some seminars you cannot wait to attend; Expectations are high, and you want to validate your thoughts and get in touch with people who also have the same passion for the subject. The first-ever NuttX International Workshop in Gouda, NL, that I attended last week was exactly such an event.

Greg Nutt, the original author of NuttX, was present, as were a number of the leading lights from NuttX development over the past 17 years¹. As befits a project born of the Internet Age, none of these people had ever met in person before, so it was as much an occasion for them as it was for us, relative newbies!

Greg's 17 year, the ongoing, mission has been to create the 'perfect' operating system for embedded systems. While someone needs to tell him that mission will take several lifetimes, NuttX, with APIs that are largely POSIX compliant, and a modular, internally consistent and well-structured architecture, is already a little closer to that goal than most. The fringe benefit is that Linux refugees instantly feel at home in the userland.

Nearly 60 attendees came from all over the world and participated in the workshop with the passion and zeal born of knowing you're following a true path, with benefits on the show for all to see in the form of demos and breakouts.

If you couldn't attend, missed a session or perhaps want to review the keynote then slides and videos will be posted over the next couple of weeks at www.nuttX2019.org...or catch up with the community on Google ² or the IRC channel from freenode.net #nuttx.

Location

The event was a well structured two days of lecture sessions, hands-on, open discussions, and a little bit of beer. The event was at Technolutions facility in Gouda, NL and, even in the warmth of a Dutch summer, they provided a very pleasant and comfortable facility, and we were well looked after by our hosts.



Dave Marples chaired the event, and he kept things moving along without cutting anyone off mid-flow. He was as passionate about NuttX as the rest of the attendees, and he added a great deal of extra content.



Mission

The get together was designed to allow everyone to meet up and exchange ideas and applications in the light of the invariants that guide NuttX development. Those invariants are worth mentioning as they underpin everything NuttX is. A few other projects would be well advised to draw up a similar list;

- * Maintain POSIX compliance whenever possible
- * Maintain a modular architecture
- * Maintain clarity and consistency of the code and its interfaces
- * Maintain an open an unencumbered license

NuttX is a substantial project within these constraints, representing some 2.5 Million lines of code supporting baby 8-biters like the venerable Z80 through to heavy lifting multi-core ARM CORTEX A SoCs. No matter the size of the device, the interface for user programs looks the same, making portability from one device to another much more straightforward than is traditionally the case in the embedded world.

NuttX also has a set of guiding principles that influence development. Not exactly specified as the invariants above, but boil down to demands for resource efficiency, reliability, memory conservancy, full real-time operation and openness in the context of a community that is proud of their achievements and appearance, but isn't distracted by business concerns. Despite addressing a different use case, it was mentioned several times by some of the greyer beards in the room that NuttX has a similar feel to the early days of the Linux community.



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The Sessions



Greg Nutt, the original author, and current project lead started off the event with an overview of where NuttX came from and his background. Alan Carvalho de Assis followed up with the traditional 30 000ft overviews of the operating system, and then Dave Marples showed off an open-source board for the OS. I think Dave was concerned that might not be interesting enough, so he also threw in a load of material about ARM real-time debugging using SWO and TRACE as a free bonus.



After the break, Fabio Balzano from Stara Space talked about their work on Cubesats and the role of NuttX in the crucial control systems of their upcoming space-based comms network before Ingo Lütkebohle from Bosch research showed their work on integrating NuttX with ROS (the Robot Operating System). There was then a bit of a change of gear when Luther Johnson from MakerLisp presented a whole alternate approach to computing using the MakerLisp machine, and it's own lisp dialect...that machine can use NuttX as its host operating system and, surely, expecting that it's Lisp interpreter will be natively available on NuttX too.

After lunch, Michael Jung from FEIG talked about how they use NuttX in card payment machines and the rest of the session was taken up with Takayoshi Koizumi giving a hands-on session using Sonys Spresense system – a six-core CORTEX-M with more features than you can shake a stick at. All attendees got a Spresense together with its various expansion boards, so you can expect some interesting work using these to pop up soon.

Day one wrapped up with drinks and snacks at a local bar, very kindly paid for by EBV. A great opportunity to chat 1:1 with the various other attendees and there were certainly some stories to tell!

Day two was, if anything, even more, interesting than the first. It started with Markus Bernet and Johnny Billquist from Hexagon mining demonstrating their system for keeping big mining trucks and small, soft, squidgy humans a sensible distance apart. Mattias Edlund from Tagmaster then demonstrated how they've been using NuttX in their card readers for years (you've probably used it yourself if you've been down a European toll road in the past 6-7 years).

After another quick break, we started on the drones; David Sidrane talked about the role of NuttX in PX4 before Iain Galloway from NXP showed their 'drone games' which you can buy today from the usual NXP outlets! Finally, for this session, Anthony Merlino of Verge Aero, and primary author of a chunk of wireless functionality in NuttX demonstrated just how cool 130 illuminated drones could look after dark if you've got smart enough software to keep them all co-ordinated!

Later, Masayuki Ishikawa demonstrated SMP in NuttX on a LC823450, with some very informative data showing the effects of memory contention when multiple CPUs are trying to grab data from a single store. Finally, Maciej Wójcik did a sort of 'grab bag' presentation, covering his project management utility upm, some information about using the REST APIs and an overview of LittleVGL on NuttX.

For the afternoon hacking session, NXP had provided one of their IMX-RT1062 development boards, and Infineon also provided an XMC4500-Relax board. Expect to see the effects of folks having these boards in the mailing list soon!

Finally, on the evening of the second day, there was an 'outreach session' at the hotel. Alan did a great job walking the attendees through the process of setting NuttX up on a STM32LDISCOVERY board provided by ST and EBV, with the result that everyone went away with an overly complicated stopwatch!

Devices

Supporters of the event provided us with a variety of boards, and we left with an IMXRT1060-EVK, XMC4500-Relax, STM32L152-DISCOVERY, and Spresense boards to continue our NuttX journey.

In conclusion

The event was too short. It was intense, high end and very informative and inspiring. It went beyond its promise and expectations and was certainly well worth visiting but...at some point we had to go home. I had a great time and too bad I could not connect longer with all attendees. I had especially a great talk at the bar with those guys from Sony, thanks for that. I think cultures in NuttX do integrate, and together, we can achieve great things. Moreover, contribute to the goal of making NuttX a perfect embedded operating system!

Photos

Alan has put up some photos at <https://500px.com/acassis/galleries/nuttX-workshop>.

Want to know more

<http://nuttx.org/>

Supporters

I want to thank the supporters of what was a fantastic event! In alphabetic order, they were ChampagneWebs, EBV, Infineon, NXP, Sony Corporation, ST, and Technolution.

Based on the success of NuttX2019 NuttX2020 is already in the planning for July 2020. More information will be released shortly ...