

# Designing a next generation ARM Developer Platform

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David Tischler



**Linaro**  
**connect**

Bangkok 2019

# Let's Rewind a Few Months...



**Jon Masters** @jonmasters · 28 Nov 2018



I've suggested to @Arm that this needs investment. Specifically I have asked numerous times over the past few years for an Arm "NUC". I think the world has changed enough that this now makes a lot more sense. It needs to match NUC pricing and model.

**miniNodes** @miniNodes

Replying to @PCzanik @jonmasters and 5 others

Yes, a cheap, standards-compliant "desktop PC" (terminology used loosely) or server product that feels like a "normal" x86 box is what is missing and needed in the Arm ecosystem. Cheap, readily available, and useable by mere mortals in IT organizations.



 **Peter Robinson**  @nullr0ute · 29 Nov 2018



Replying to @jonmasters @Arm

Yes please!! 100 thousand times over! The problem here is a decent but affordable Desktop class SoC to build a device on. The closest that is available to date for this is the QCom SD850 bit it's not SBSA/SBBR compliant, there really needs to be a Desktop DBSA/DBBR to cover!



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**Carlos Eduardo** @carlopedp · 29 Nov 2018

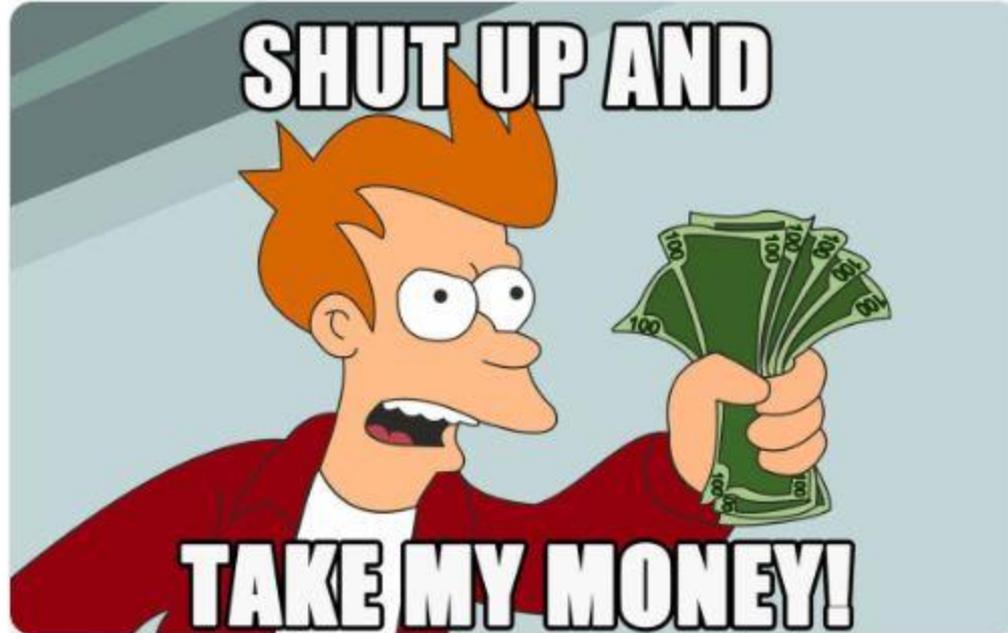


Exactly, having each SBC wit it's own image, dtb, u-boot image and partition scheme is a pain. I wonder when these manufacturers can standardize on at least UEFI and Acpi.



**Ed Maste** @ed\_maste · 28 Nov 2018

Replying to @jonmasters





**Jon Masters** @jonmasters · 28 Nov 2018



None of those @Arm embedded toys were standards compliant. It's /really/ important that a NUC-style box be available that can "just run" any distro without special hacks, and continue to run for years ahead. Needs to have A76+ cores, 2xgigE, DDR slots, nvme/SATA, USB, HDMI, etc.

# Fast Forward to January...



**Jon Masters** @jonmasters · Jan 2

Because it's a loss leader. It's an important loss leader but someone would have to fund a mainstream @Arm NUC built on real standards. And that entity would have to really know what that means. It doesn't mean a toy widget.

**Vitaly Vidmirov** @vvid

Replying to @jonmasters @Arm

I don't understand why no one can make an "inexpensive" board for "big" ARM processor, like Talos2 lite. Server ARM vendors are not interested in enthusiast market and developers. \$15k TX2 workstation is a joke  
@CaviumInc

# Last Month, Linus Said...

“Without a development platform, ARM in the server space is never going to make it. Trying to sell a 64-bit "hyperscaling" model is idiotic, when you don't have customers and you don't have workloads because you never sold the small cheap box that got the whole market started in the first place.”

...

“And the only way that changes is if you end up saying "look, you can deploy more cheaply on an ARM box, and here's the development box you can do your work on".”



**Jon Masters** @jonmasters · 3h

I've been asking for this to be funded for years. It needs to be a loss leader (initially) and I agree about the benefits. The NUC was a great move well worth emulating by @Arm

**Peter Czanik** @PCzanik

Nice summary by @garyexplains why we need @Arm-based PC/Workstation ASAP.

Just one note: system engineers / architects also need it, in a format...

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**Jon Masters** @jonmasters · 3h

Not a toy (A53 or Raspi) or embedded non-standard box, but a real SBSA one that can run any OS without modification. It's totally doable, just needs a large check to be written

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**Marcin Juskiewicz** @haerwu · Mar 13



After doing builds on dual socket ThunderX2 (224 threads) doing same builds on my SandyBridge desktop is pain (8 threads).

Where, o where are multicore #aarch64 desktops...

# We Have Identified a Problem

What can we do about it?



[Photo from Neil McIntosh via Flickr \(CC-BY-2.0\)](#)

# Gathering Blue-Sky Specifications

- Needs to support 4 or more fast (A72 or better) cores
- No BIG.little config
- Needs at least 4GB of RAM
- Needs SATA (2 ports)
- Ideally can also have NVMe support
- Needs at least one port of native GbE (no USB adapters)
- WiFi support is...?
- Should have PCI-express expansion
- Must have upgradable memory
- Must have HDMI and/or DP for video
- Must be able to handle full screen YouTube without turning into a smouldering crater
- Must support SBSA
- Any Linux distro installer should “just work”
- Price Target: around 500 USD
- Should have a management solution for hardware control (BMC)
- Should have expansion port(s) available for using features like SPI, I2C, GPIO

# Coming back down closer to reality

## Expandable memory

This is hard, because DRAM training is hard and most SoC manufacturers skip this by requiring RAM on the board. So...embrace that. Let's use the 96Boards SoM spec to enable a swappable board with RAM on board (also processor upgrade) and allow the mfgs to work to their strengths.

## Form Factor

The Intel NUC is cool, but it requires a lot of extra engineering. Instead, let's move all those problems to a standardized system by using Mini-ITX as a form factor. Off the shelf cases, power supplies, and support for the larger PC ecosystem.

## Diversity of connectors

One common carrier board, with a minimal amount of extra parts. Much like modern PC "SoC" design boards, not all ports will be supported by all SoM boards. This is OK, and it means one board so that costs can be driven down by increasing volume. This allows more of the target budget on the SoM for more features.

# The problem is software

## EBBR

The 96Boards SoM spec enforces EBBR compliance, but we would also need to prefer UEFI over other bootloaders. This should allow most distributions to install without issue, and including a BMC means that a serial interface is available without special hardware (just access the web page).

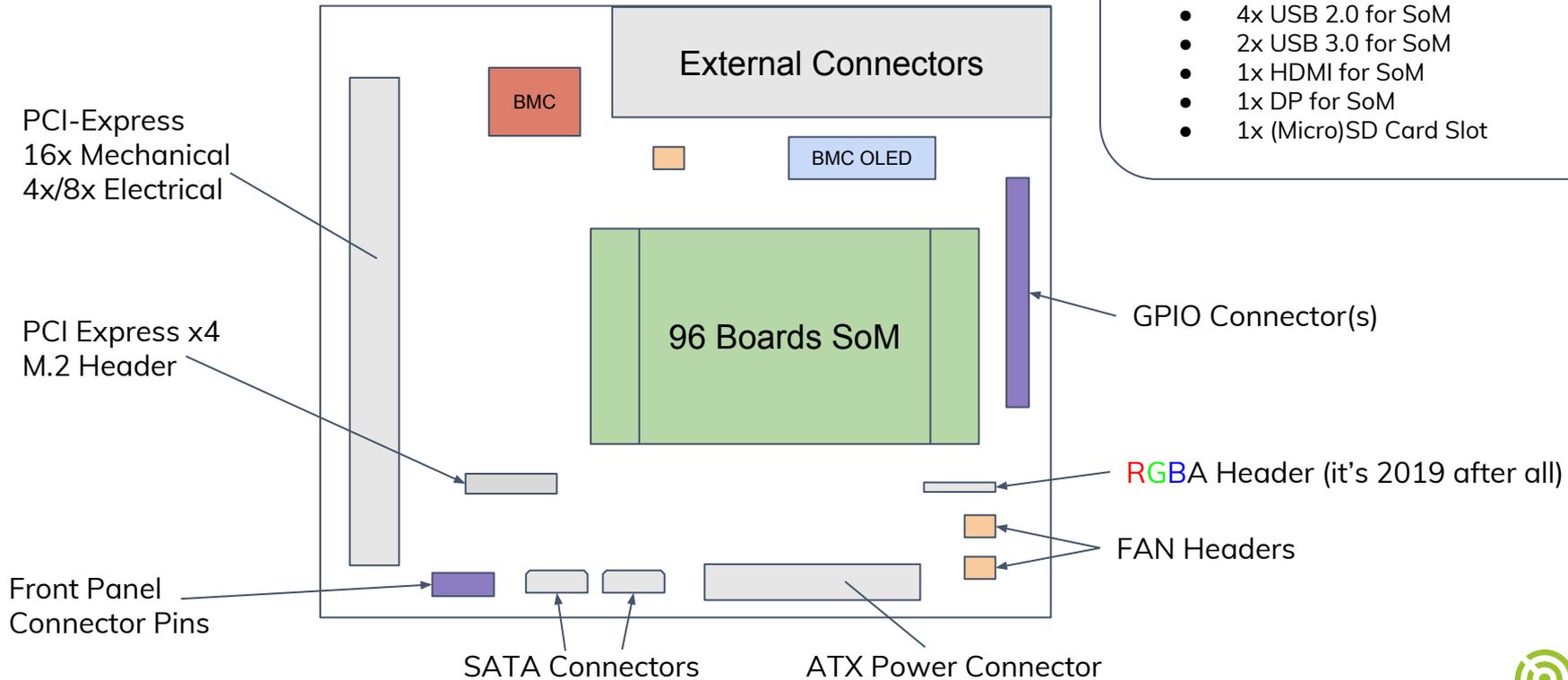
## Graphics/Video

Some people care, some do not. The ability to choose your SoM and provide features the end users want. Some folks will want an integrated GPU/VPU, and others will want a more mature PCI-express solution. This allows for both paths to be supported.

## Drivers

Another advantage of this approach: the larger software/kernel ecosystem will help the market force use of the components that are going to have the best support, and bury the solutions that do not. It won't come overnight, and we're planning on working with orgs which have better support out of the gate for first parts.

# What would this look like?



## External Connectors:

- 2x GbE for the SoM
- 1x 10/100 Ethernet for BMC
- 4x USB 2.0 for SoM
- 2x USB 3.0 for SoM
- 1x HDMI for SoM
- 1x DP for SoM
- 1x (Micro)SD Card Slot

# Potential Current Gen. SoCs Options:

- Snapdragon
  - 845: Kryo™ 385 CPU, Octa-core CPU Up to 2.8 GHz,
  - 855: Kryo™ 485 CPU, Octa-core CPU Up to 2.84 GHz,
  - 8cx: Kryo™ 495 CPU, Octa-core CPU Up to ??? GHz,
- Layerscape:
  - LS1046A: 4 x Cortex-A72, 1.8 GHz, 3 x Gen3.0
  - LS2084A/LS2088A: 8 x Cortex-A72, 2.0 GHz, 4 x Gen3.0
  - LX2160A: 16 x Cortex-A72, 2.2 GHz, 8 x Gen4.0
- Marvell:
  - [Octeon TX 82XX and 83XX](#) (would need external GPU)
  - [Armada 8040](#) (would need external GPU)
- HiSilicon
  - Kirin 970



**The best way to  
predict the future is to  
invent it.**

- Alan Kay

Questions & Discussion

# Reach out to us!

Would love to hear from the Community, SoC Vendors, Board / Embedded manufacturers, and more!

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Linaro 

  
Boards

# Thank you

Join Linaro to accelerate deployment of your  
Arm-based solutions through collaboration

[contactus@linaro.org](mailto:contactus@linaro.org)



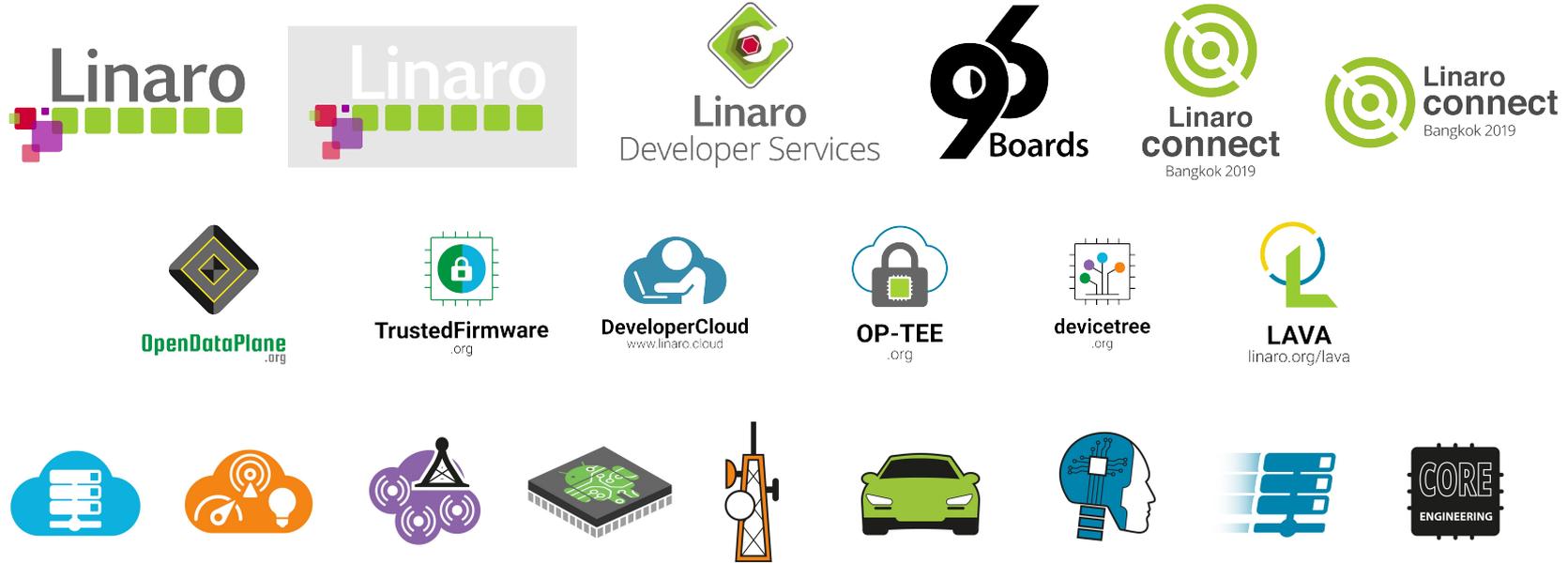
9Boards is a range of specifications with boards and peripherals offering different performance levels and features in a standard footprint.



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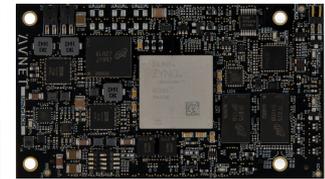
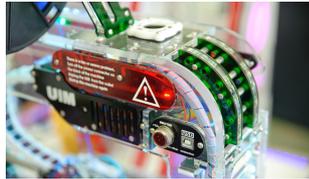
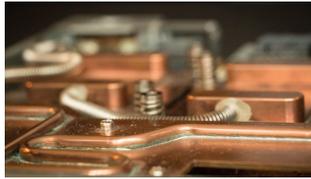
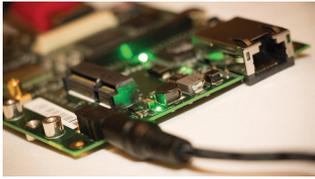
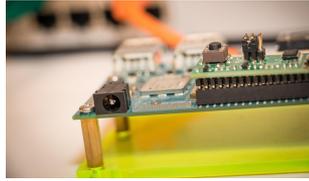
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[marketing-team@linaro.org](mailto:marketing-team@linaro.org)

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