Knowledge article

ARM And RISC-V Cores

Created 8 months ago Active 8 months ago Last edited 8 months ago Viewed 39 times 1 min read

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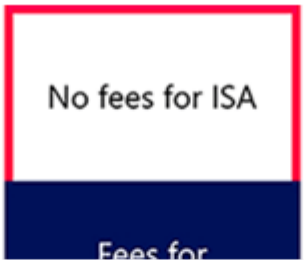
8

ARM And RISC-V Core

While reading through some of the new COTS (commercial off-the-shelf) hardware available in open market, I came across this Lichee RV-86 RISC-V
This article talks about "Lichee RV-86 RISC-V Linux 4-inch panel targets home automation, HMI applications". This hardware is said to cost between 39$ to 98$ and uses RISC-V processor core from vendor named AllWinner.
I did some basic study to compare and understand ARM and RISC-V offerings and here are my notes around same.

#	ARM	RISC	Additional Notes
1	Its an Instruction set architectures, or ISAs	Its an Instruction set architectures, or ISAs	
2	It's a RISC design	It's a RISC design	ISAs are reduced instruction set computer (or RISC) designs, meaning the base instructions the CPU has access to are inherently simple but ideally fast to calculate.
3	ARM - Advanced RISC machines	RISC - Reduced instruction Set computers	Currently RISC-V
4	In 1990, Acorn Computers established Advanced RISC Machines, later known as ARM Ltd.	RISC began development in 2010 as a project of UC Berkeley's Parallel Computing Laboratory	
5	In partnership with Apple, ARM licensing business model was initiated in 90's	Close to 36 tech companies came together to support RISC-V and founded the RISC-V Foundation. In 2020, the RISC-V Foundation renamed itself RISC-V International	
6	ARM has been licensing ARM artchitecture to companies who are ready to pay	RISC-V is a totally open-source and royalty-free ISA	
7	ARM doesn't make hardware. ARM designs CPU cores that their customers can integrate into SOC designs	RISC-V is an open standard, so anybody can design a CPU core around the instruction set.	In order to build a custom SOC, you need a processor core. ARM will license you one, or you can license one from a company that designs RISC-V cores. Either way, you'll have to pay. The general outcome could be that the RISC-V archecture processor could be tad cheaper than that of core.
8	Basic ARM cores are designed and developed by ARM Ltd itself and arent allowed to change. Companies that licnese ARM can add additional stuff which are part of ARM IP library to meet their needs	Companies can use the RISC-V ISA for free. No licensing fees, no royalties, no strings attached. Companies are also allowed to do whatever they want with RISC-V cores.	But, as open-source software proponents tend to say, "open source doesn't mean free." Companies that use RISC-V are not obligated to share their innovations with anyone, though they are free to license and sell their IP just like ARM can
9	ARM beleives that usage of RISC-V could result in "fragmentation," which is basically a lack of standards throughout an industry that creates an obstacle for compatibility in both hardware and software. Since ARM provides standardized cores, the risk of fragmentation is averted	RISC asserts that many industries are increasingly looking to integrate computer chips into the business, and RISC-V could cater to such a diverse crowd of customers. RISC-V's inherent modularity and design freedom make it the ideal choice and there is no need for licensing negotiations and fees, making it faster and cheaper to use RISC-V.	
10	ARM's stronghold has been phones, but the ISA is seeing increasing usage in other sectors. ARM cores	RISC-V sees its biggest avenue for expansion in the industrial sector, IoT devices, and A.I. By 2025, RISC-	



Managed By	ARM Inc.	RISC-V Foundation
Instruction Set	A64	...
Architecture	load-store	load-store

Conclusion

It is hard to predict the future but one can undoubtedly say, the future is RISC machines be it in the form of ARM in every mobile phone or RISC-V in every other device. For the short term future, ARM has big corporate backers while RISC-V is generating interest from every other company that needs low-cost custom solutions like Internet of Things manufacturers, cloud computing operators or even universities doing their research works. It is no wonder that some big tech giants are interested in RISC-V designs.

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edited Jun 5, 2022 at 16:25

created Jun 5, 2022 at 14:25

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