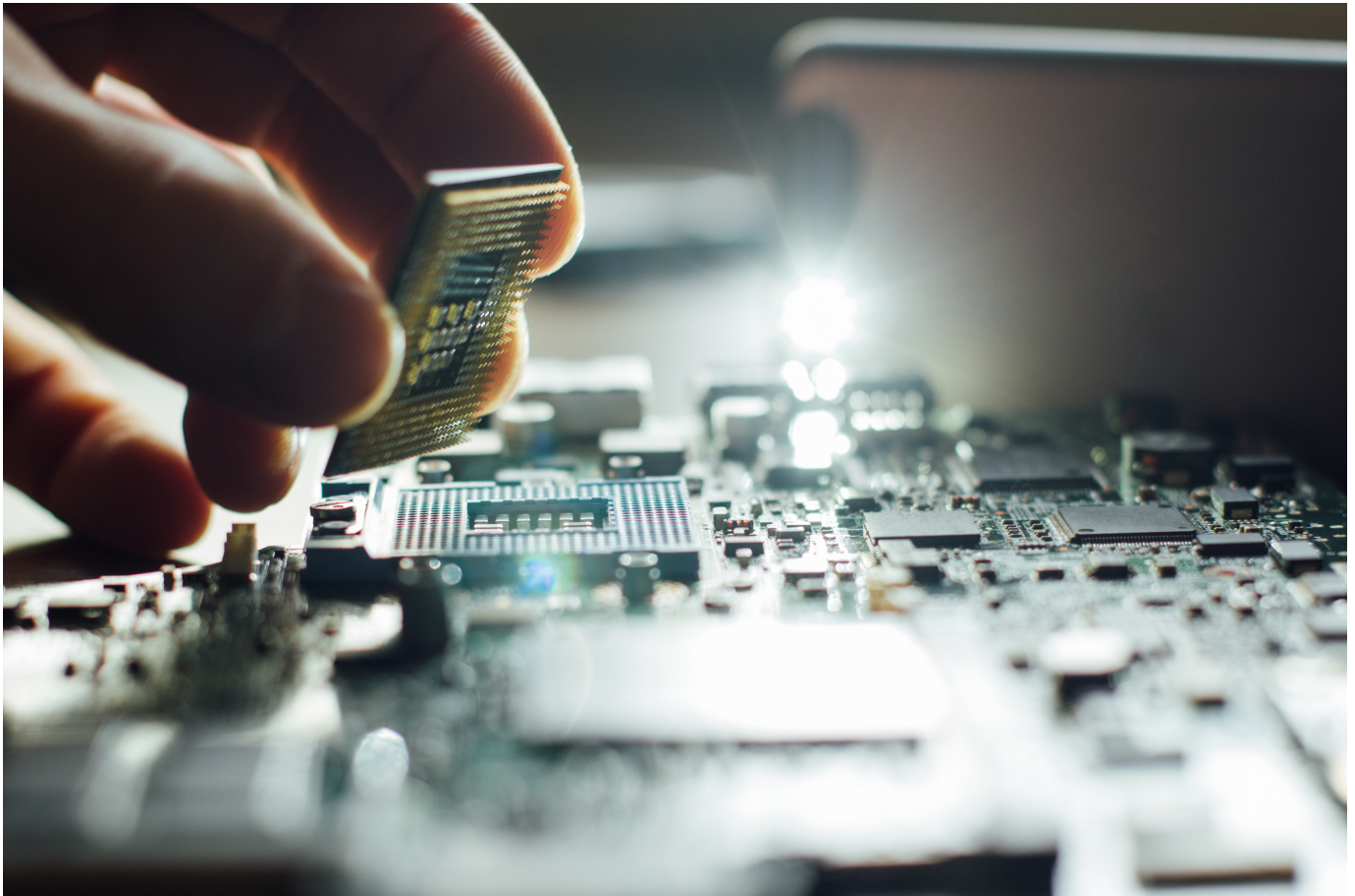


ARM CPUs for Client Machines



CPU Architecture Overview

Arm is a semiconductor company that has been designing Advanced RISC Machines (ARM), or Acorn

RISC Machines, for over thirty years. Their most recent and famous ARM family, however, only goes back about a decade. A Reduced Instruction Set Computer (RISC) processor architecture stands in contrast to a Complex Instruction Set Computer (CISC) architecture primarily by a difference in the Instruction Set Architecture (ISA). Fewer, simpler instructions can make for a more efficient processor within a System-on-a-Chip (SoC). However, this distinction is less critical today as microprocessor architectures blur the line, especially as Intel's upcoming Alder Lake utilizes a so-called "big.little" design – a mixture of powerful and efficient cores, as previously utilized by ARM-based processors on mobile devices.

The growing complexity and power of ARM cores, and particularly the move to 64-bit, has made the architecture a lot more enticing than x86 – Intel's original microprocessor instruction set – for many applications. ARM can be found in many embedded devices and of course in the mobile world, but increasingly these chips have become prominent in the server space and, now, the client realm as well. The x86 family is famous for also being utilized by Advanced Micro Devices (AMD), having a long history of legacy support in software on platforms like Microsoft's Windows Operating System (OS). Windows has actually had a history of supporting ARM with Windows RT and Windows 10, but it will have more dedicated support in Windows 11. Other OS, including those that are Linux-based as well as with Apple's macOS/iOS, have longer and more fully supported the architecture.

ARM Armv9

The most recent ARM architecture to be announced, Armv9 in March of 2021, is specifically aimed at client computing products. There has specifically been a move to go fully 64-bit by 2023 with a desire to build a client foundation "for a decade": a move at capturing market share with laptops, desktops, and more. This includes the evolution of the Mali integrated graphics processing unit (GPU) and so-called CoreLink Interconnect. CoreLink is designed to provide a "Total Compute solution," a holistic design philosophy, for devices from mobile phones to notebooks. CoreLink as such is a memory management system, or Memory Management Unit (MMU), coupled with an ARM system IP. This allows for

scalability and a common platform between ARM's Cortex Central Processing Units (CPU) and Mali Multimedia IP.

Client Laptops

ARM's Personal Computing (PC) market share has grown from 2% to about 7% within the last year, according to Mercury Research. This is significant growth that will likely continue as the need for affordable, efficient hardware has become a sticking point due to pandemic-related shortages and supply chain issues. This is especially true as Windows 11 will have an ARM64 version with an ecosystem that should become larger and more reliable than what has existed in the past. Microsoft, for their part, utilized ARM-based CPUs in their Surface Pro X with the SQ1 and SQ2. In the future, the company will license and create its own ARM-based processors for its Surface line.

So-called "Chromebooks" – lightweight notebooks utilizing a form of Linux developed by Google – have long used ARM chips to be cheaper, lighter, and more efficient. This is unlikely to change, even as there are other devices running various forms of the Android OS. More newsworthy is Apple's M1 line of MacBooks which has the most powerful client ARM chips on the market. Performance results have been astounding, including for gaming and graphical work. Reviewers have seen it outpace Intel i9 CPUs while being cooler, quieter, and more efficient.

Advantages & Disadvantages of ARM

This is precisely what Arm has been emphasizing about their processors: improved battery life with a simplified but powerful ISA. Admittedly, ARM still has some issues with gaming and overall software support is lacking versus x86. However, particularly for client machines, there's a lot to like. For example, higher efficiency means better battery life with a cooler-running machine, which translates to a thinner and lighter Form Factor (FF). The overall architecture also allows for scalability, including through hardware with cores and clusters, which ensures that all machines based on ARM architecture

will work similarly down the road.

Arm is also focusing on what they call the “trusted mobile experience” through improved, integrated security. This goes beyond Trusted Computing (TC) with encryption and includes a Confidential Compute Architecture (CCA) and TrustZone. Specifically, Arm wants to bring the superior security of mobile devices, such as smartphones, to client machines. This is possible by locking down the architecture and designing for security from top to bottom. This of course will be particularly attractive to organizations who have been tangling with x86 vulnerabilities.

Storage & Summary

Solid State Storage Technology Corporation’s range of M.2 drives make a good pairing with client machines, particularly notebooks, by being reliable and power-efficient. This is particularly true with ARM-based machines which offers organizations flexibility moving forward. While Apple’s computers tend to lack direct storage expansion capabilities, it is possible to add Solid State Drives (SSD) through enclosures for portable usage. Many Chromebooks and laptops have storage expansion options, and lightweight desktops also tend to be good candidates for upgrading. As ARM grows in market share, the move to SSDs and particularly M.2 FF SSDs makes more sense.

The Armv9 architecture has laid a foundation for future client devices, centered on scalability and a trusted computing experience. This pairs well with our Self-Encrypting Drives (SED) but also with other features like Secure Boot (see our blogs on these features). ARM’s scalability also means you can get the most of our more-powerful Non-Volatile Media Express (NVMe™) drives with higher IOPS and queues for efficient storage usage. In the future, it will be possible for organizations to have a singular basis for client machines, regardless of OS, a common ground that will keep data secure while facilitating Information Technology (IT) deployment. Here at Solid State Storage Technology Corporation, we want to ensure our customers know that we’re ready for this revolution.

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Gen 4

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- Random read/write up to 1000K/1000K IOPS
- Low latency
- LDPC technology



CL4 Series | PCIe™
Gen 4

- Slim form factor— M.2 2230/2242/2280
- Random read/write up to 450K/400K IOPS
- Low latency
- 256GB - 1TB

Please contact our [Solid State Storage Technology Corp. expert](#) for more information.

*Specifications and features are subject to change without prior notice. Images are samples only, not actual products.

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