

Advancements in New CPUs Will Enhance Harmonic's Virtual CMTS for Broadband Network Operators

To meet rapidly growing demand for broadband data, Harmonic's software-based CableOS® Broadband Platform and vCMTS application will run on 4th Gen Intel® Xeon® Scalable processors for high-performance and agility



The number of cable multisystem operators (MSOs) embracing virtualized cable modem termination systems (vCMTS) is growing to handle traffic from new bandwidth-intensive video-based user generated content (UGC) applications, including YouTube, TikTok, Reels and others. With increased network agility, flexibility, updated features, and expanded bandwidth, vCMTS enables operators to meet bandwidth requirements and easily deliver ultra-fast connectivity to subscribers. This paper details how Harmonic's CableOS® Broadband Platform and vCMTS application will take advantage of new features and higher performance available in 4th Gen Intel® Xeon® Scalable processors.



vCMTS Helps MSOs Meet Demand for Bandwidth

The ever-growing demand for consumer broadband applications is consuming more and more bandwidth. And it isn't just an explosion of video traffic; new use cases and services include cloud gaming and augmented and virtual reality.

According to the Q3 2022 OpenVault Broadband Insights (OVBI) report¹, the average monthly broadband usage was 495.5 GB. That was up 13.9% from the average of 434.9 GB consumption that was measured in 3Q 2021. This increase was partially driven by growth in higher bandwidth services. The same Q3 2021 OVBI highlighted 35% growth in percentage of users choosing Gigabit tier services. In addition, the percentage of subscribers on plans offering speeds of between 200-400 Mbps doubled to 54.8% from 27.4% in 3Q21.

To meet this exploding consumer demand for more broadband bandwidth, network providers need infrastructure investments to stay ahead of demand. Cable MSOs also face challenges to reduce their total cost of ownership and future-ready their networks for next-generation service innovations. Furthermore, innovation cycles for legacy CMTS providers are notoriously slow.

Virtualization of CMTS to Increase Scale and Agility

For MSOs, deploying a vCMTS on a CableOS virtualized broadband platform delivers significant network scaling and service agility improvements along with a dramatic reduction in power and rack space.

Adopting a virtualized broadband platform infrastructure improves an MSO's ability to meet consumer demand for higher bandwidth, and to better compete against fiber and fixed wireless access providers. The virtualized broadband platform uses container-based microservices running on Intel® architecture processor-based servers and replaces a legacy single-function CMTS chassis-based appliance. In comparison, CableOS supports not only vCMTS, but virtual broadband network gateway (vBNG) and virtual optical line terminal (vOLT) applications for fiber services.

The potential benefits of this approach include increased network capacity, better signal quality, fewer hub sites, and reduced power and cooling costs. New analytic tools for proactive problem identification and remediation can reduce network maintenance. Real-time telemetry of system health data means a faster response to trouble spots when compared to legacy CMTSs that return network health information every 15 to 20 minutes.

Harmonic's Emmy Award-Winning CableOS® Platform and its vCMTS High-Performance Software

Intel® Network Builders ecosystem member Harmonic's CableOS® vCMTS software deploys on Intel architecture processors as a cloud-native application on the CableOS Broadband Platform that can be deployed in various locations in the network, including options such as a datacenter, a headend or a hub. The high-performance vCMTS software works with standard-based Remote PHY Device (RPD) and performs full DOCSIS functionality above the RF and physical layer. MSOs can deploy both centralized and distributed architectures and be ready for the next-generation 10G passive optical network (PON).

Common control, easy scaling, and IP traffic forwarding boost MSOs' network efficiency with over 100 Gigabytes of capacity per rack unit to efficiently power next-generation broadband speeds.

CableOS® vCMTS software scales fast to deliver high-speed data services, including video, and adapt to changing consumer demands. It reduces hardware expenditures and significantly lowers power, cooling, and cabling requirements. It allows for faster upgrades to maximize performance and deliver faster broadband to all locations served. Smart and connected, it drives corrective activities with constant data collection and support. With this versatile deployment, networks can be transitioned over time with complete interoperability.

CableOS® Optimized for 4th Gen Intel® Xeon® Scalable Processors

4th Gen Intel Xeon Scalable processors offer a new microarchitecture designed to address dynamic and demanding workloads, including AI, delivering fast query throughput, data movement, and data compression with better CPU utilization.

The 4th Gen Intel Xeon Scalable processors can have up to 52 cores in addition to six built-in accelerators to help maximize performance efficiency (see Figure 1).

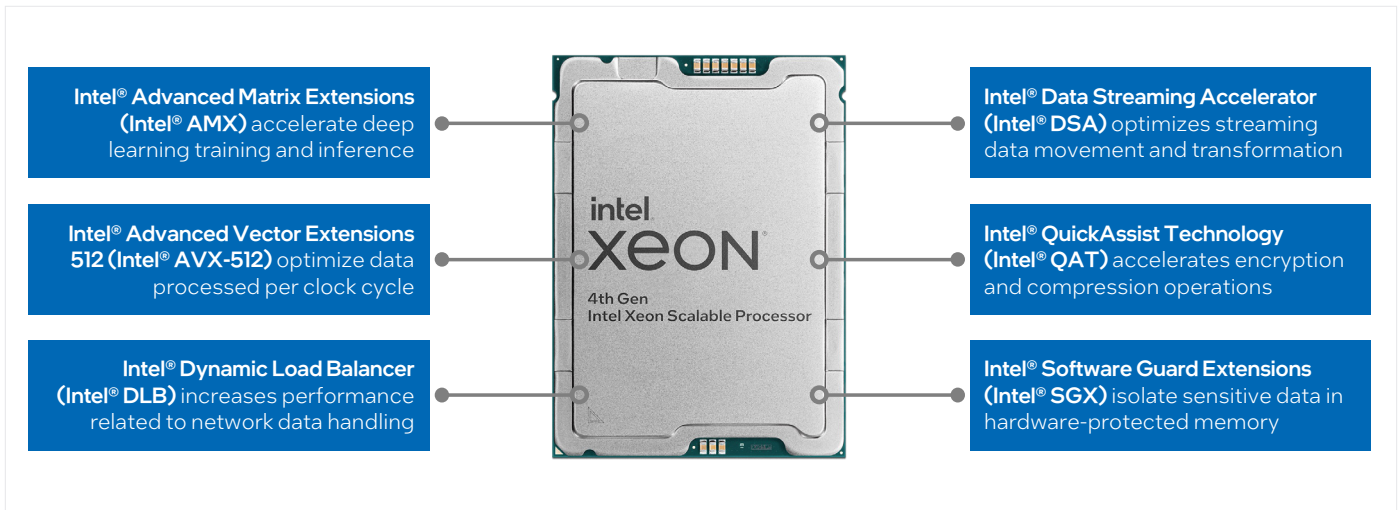


Figure 1. The 4th Gen Intel Xeon Scalable processor features six accelerators and up to 52 cores for performance.

Some of these accelerators are uniquely beneficial to meet DOCSIS standards.

First, Intel® QuickAssist Technology (Intel® QAT) accelerates data encryption and compression. Intel® QAT saves cycles, time, space, and cost by offloading compute-intensive encryption workloads to free up capacity. Crypto packet processing dominates workflows for broadband; when Intel® QAT offloads encryption workloads, the broadband pipeline is faster.

Additionally, Intel® Advanced Vector Extensions 512 (Intel® AVX-512) is an instruction set that can accelerate performance for the most demanding computational workloads, such as video processing. For cable MSOs in particular, Intel® AVX-512 accelerates cyclic redundancy check (CRC) calculations, a function that is required for every network packet.

Furthermore, the Data Plane Development Kit (DPDK*), an Intel-developed open-source application with software libraries to accelerate virtualized packet processing, comes built in. And the 4th Gen Intel Xeon Scalable processors also have new instructions for better performance per watt for networking applications, including the WAITPKG instruction set.

Using Harmonic's CableOS Platform and vCMTS software on 4th Gen Intel Xeon Scalable processors results in performance gains that ultimately delivers the best quality of experience and provides a more fault-tolerant system of distributed processing.

Conclusion

As the demand for broadband data services increases, cable MSOs must upgrade their network infrastructure to keep up. vCMTS delivers significant network scaling and service agility improvements along with a dramatic reduction in power and rack space. Harmonic's CableOS[®] vCMTS software is being optimized for the latest 4th Gen Intel Xeon Scalable processors, which offer a new microarchitecture designed to address the most dynamic and demanding workloads and have built-in accelerators to meet DOCSIS standards, including Intel[®] QAT, Intel[®] AVX-512, and DPDK.

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[Intel[®] QuickAssist Technology](#)

[Intel[®] Advanced Vector Extensions 512](#)

[Data Plane Development Kit \(DPDK^{*}\)](#)



¹<https://openvault.com/ovbi-broadband-speeds-shifting-into-high-gear/>

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