Broadcom Ships Tomahawk 4, Industry's Highest Bandwidth Ethernet Switch Chip at 25.6 Terabits per Second

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World's First 64 x 400GbE / 256 x 100GbE Switching Silicon Enables Next Wave of Hyperscale Cloud Build-Out for Machine Learning and Storage Disaggregation

SAN JOSE, Calif., Dec. 09, 2019 (GLOBE NEWSWIRE) -- Broadcom Inc. (NASDAQ:AVGO) announced today that it has delivered the StrataXGS® Tomahawk® 4 switch series, demonstrating an unprecedented 25.6 Terabits/sec of Ethernet switching performance in a single device— double the bandwidth of any other switch silicon available in the market today.

Delivered in less than two years after the previous 12.8Tbps product generation, Tomahawk 4 is implemented in 7nm technology with 512 50G PAM4 SerDes. Tomahawk 4's high level of integration and highly efficient architecture delivers up to 75 percent lower power and cost compared to alternative solutions.

The growth of hyperscale cloud networks continues its unrelenting upward trend, with bandwidth increasing by 25 percent and storage by 36 percent year-over-year[1]. Workloads for deep learning, using massively distributed neural networks and alternative computing nodes, require a dramatic increase in bandwidth with dense 100/200/400GbE links spanning high-radix, ultra-low-latency network topologies.

The continued trend towards disaggregated, high-density flash storage is concurrently demanding step functions in network throughput and reduced end-to-end access times. With its market-leading switching performance, high 100/200/400GbE port density, and rich feature set optimized for cloud use cases, Broadcom's Tomahawk 4 is ideally suited to serve as the backbone for the next generation of hyperscale data center networks.

"The Tomahawk franchise is the flagship for cutting-edge, single-chip performance and integration among Broadcom's multi-vectored Ethernet switch silicon portfolio, tailored to the unique and rigorous demands of hyperscale data center operators," said Ram Velaga, senior vice president and general manager, Core Switching Group, Broadcom. "We are proud of our world-class engineering team for innovating and delivering the 25.6Tbps Tomahawk 4 chip in less than two years after we released Tomahawk 3. Broadcom is proving yet again that customers can rely on us to lead the industry on switch silicon performance and execution at every generation."

"Tomahawk 4 is an engineering tour de force, packing an unprecedented number of serdes into a monolithic 7nm chip," said Bob Wheeler, principal analyst, The Linley Group. "As a result, Broadcom is once again first in delivering the next switch density, which hyperscalers need as they deploy 400G Ethernet."

Tomahawk 4 accelerates the adoption of 100/200/400GbE Ethernet solutions at a point where optics utilizing 50G PAM4 electrical connectivity are shipping in high volumes. Products from Broadcom's Optical Systems Division, which offers a suite of optical interconnect solutions supporting 50G PAM4 and 100G PAM4 optical data rates, complement Broadcom's switch chips. The combination of switches and pluggable optics from Broadcom provides a complete system-level solution with plug-and-play functionality.

StrataXGS Tomahawk 4 Series Key Benefits:

- Enables the next generation of high-throughput, low latency hyperscale networks with 64 ports of 400GbE switching and routing.
- World's highest radix of 100GbE ports: 256 ports supported on a single chip, enabling low-latency, single-hop networks for massive alternative compute clusters.
- Robust connectivity using 512 instances of the industry's highest performance and longest-reach 50G PAM4 SerDes core, enabling long-reach East-West optical links and Direct-Attached-Copper in-rack cabling in the data center.
- The industry's most advanced 25.6Tbps shared-buffer architecture, offering up to 5X higher incast absorption and providing the highest performance and lowest end-to-end latency for RoCEv2 workloads.
- New advanced load balancing mechanisms, virtually eliminating hash polarization and providing extremely efficient, controllable link utilization.
- Advanced congestion management, enabling new traffic management paradigms.
- Industry-leading instrumentation including IFA 2.0 for inband telemetry, postcards for out-of-band telemetry, SerDes link quality meters, and visibility into all on-chip packet drops and congestion events.
- Four 1 GHz ARM processors for high-bandwidth, fully-programmable streaming telemetry and sophisticated embedded applications such as on-chip statistics summarization.

- Implemented with unparalleled power efficiency in a monolithic 7nm die.

Broadcom also announced the introduction of Broadcom Open Network Switch APIs (OpenNSA), opening its SDK APIs for StrataXGS and StrataDNX products. Multiple open source network operating system initiatives are underway in the disaggregation ecosystem, focused on hyperscale and service provider markets. OpenNSA enables these initiatives on merchant silicon and allows the larger community to build on top of these efforts. OpenNSA also expands Open Compute Project efforts, like Switch Abstraction Interface (SAI), by simplifying the process of translating SAI APIs to Broadcom SDK APIs. Moreover, OpenNSA accelerates the SDN ecosystem by enhancing the toolset available for the developer community.

Industry Quotes:

Yiqun Cai, Vice President of Network, Alibaba Cloud Intelligence

“Alibaba Cloud has worked closely with Broadcom on Tomahawk 4 products. With Broadcom’s Tomahawk 4, Alibaba Cloud is able to accelerate the adoption of 100/200/400GbE Ethernet solutions and provide faster and better solutions to our customers.”

Amin Vahdat, Fellow and Vice President, Systems Infrastructure, Google Cloud

“We are excited to collaborate with Broadcom to bring the Tomahawk switch series to market to support the scaling requirements of modern data center networks."

Yuval Bachar, Principal Hardware Architect, Azure Platforms, Microsoft

“With the exponential growth of network capacities and high-volume deployments of 100G and 400G the 25.6T Tomahawk 4 will be a major building block for that evolution. Broadcom has demonstrated with its sampling of Tomahawk 4, yet again, the leadership in delivering the cutting-edge technology for networking, with a focus on end-user requirements optimization, feature set optimization, and integration in a single chip as a base building block for the next wave of data center build-outs. The enhanced forwarding, load balancing, buffering, and congestion control capabilities will address essential needs for hyperscale workloads and will enable the next generation of platforms and networks to be built.”

Wen Temitim, Chief Technology Officer, StackPath

“The build-out of the intelligent edge is underway, and StackPath is thrilled to see the availability of Tomahawk 4. With the edge being premium, but limited real estate, Tomahawk 4's monolithic design is the best architecture for power, performance, and economics. The doubling of bandwidth is a significant advancement in the industry, and we are excited to take advantage of Broadcom's latest innovations.”

Wade Shao, Deputy Director, Network Architecture Center, Tencent

“Tencent applauds Broadcom for achieving yet another industry first with the release of the Tomahawk 4 25.6Tbps. Broadcom’s consistent engineering execution to their Ethernet switch roadmap has enabled Tencent to continuously upgrade our network infrastructure, while achieving economies of scale thanks to the broad ecosystem enabled by Broadcom's merchant silicon strategy."

Jason Black, Head of Global Network Infrastructure, Uber

“At Uber, we have been deploying leading-edge Ethernet speeds and feeds to guarantee the highest possible network performance for the best end-user experience. Broadcom's StrataXGS Tomahawk product line has been a key technology component in our worldwide data center design. With the arrival of Tomahawk 4 25.6Tbps, it ushers in the era of 400GbE leaf-spine CLOS deployment, and enables Uber to support ever-increasing workloads for autonomous vehicle, SaaS, and big data applications.”

John McCool, Chief Platform Officer, Arista Networks

“The Arista 7060X and 7368X4 Series running EOS ® provide a broad range of solutions for Mega-Scale Cloud datacenter environments, powered by multiple generations of the Broadcom Tomahawk architecture. Tomahawk 4 delivers an impressive 25.6T of bandwidth in a high-radix, power efficient design. These innovations enable tomorrow’s Cloud datacenter architectures that collapse network layers, provide improved host-to-host performance, while reducing the complexity of the network.”

Tom Burns, SVP and GM, Dell EMC Networking and Solutions

“Broadcom is making important, impressive advancements with Tomahawk 4 that enhance our PowerSwitch open networking capabilities. The advanced shared buffer architecture enables high bandwidth scale-out networking infrastructure with low port-to-port latency for deep learning and hyperscale environments. The new telemetry features will enable a much needed and highly transparent physical layer, supporting our vision of the autonomous data center.”

Anand Athreya, EVP and Chief Development Officer, Juniper Networks

“Juniper is excited to partner with Broadcom and double the capacity of DC platforms with Tomahawk 4. Broadcom’s sustained execution allows Juniper to keep providing an extensive routing and switching portfolio, one that combines best-of-breed silicon technology with JunOS, the industry’s most advanced network operating system, and addresses the leading-edge requirements of our customers.”

Liu Zhongdong, President and CEO, Ruijie Networks.

“Ruijie is dedicated to providing a broad portfolio of advanced networking equipment to our Cloud customers. With Tomahawk 4’s bandwidth doubling existing switch silicon, and rich cloud-optimized feature set, including best-in-class instrumentation, we will be able to provide our customers with the capabilities demanded by next-generation Cloud networks.”

Edgar Masri, CEO, Accton Technology Corporation

“Tomahawk 4, 25.6Tbps, is an exciting achievement for Broadcom as many of our hyperscale customers are upgrading their network infrastructure to support their ever-increasing application demands. At Accton Group, we have collaborated closely with Broadcom on a rich portfolio of networking platforms, and we look forward to offering this new wave of Tomahawk 4-based solutions in the very near future.”

Allen Cheng, General Manager, Alpha Networks Inc.

“Alpha has been working with Broadcom's StrataXGS product family for several generations. We congratulate Broadcom for being first-to-market with Tomahawk 4, and we look forward to offering a new portfolio of platforms based on this groundbreaking 25.6 Terabit switching ASIC.”

Steven Dorwart, Vice President, Service Provider Solutions, Celestica Inc.

“As a leader in the disaggregated Ethernet networking ecosystem, Celestica knows the importance of time-to-market. Broadcom is setting the pace with the delivery of Tomahawk 4, and Celestica is excited to develop platforms based on this latest 25.6Tbps switching ASIC.”

Jeff Chen, CEO, Delta Networks
“The pace of innovation in the Ethernet networking space is driven by the hyperscalers. With the latest Tomahawk 4 from Broadcom, Delta can expand our portfolio offering to our customers and deliver state-of-the-art 64x400G and 256x100G platforms.”

Jack Tsai, SVP and General Manager, Inventec Corporation
“Broadcom has maintained a torrid pace of innovation and execution for its Tomahawk product line. The newest addition to the product family, Tomahawk 4 25.6T, is well suited for many of our customer’s use cases. We are proud to participate in this revolutionary product development, and we look forward to great mutual success through our cooperation with Broadcom.”

Mike Yang, Senior Vice President of Quanta Computer Inc. and President of Quanta Cloud Technology, Quanta
“Once again, Broadcom has executed flawlessly and maintained its leadership position in the Ethernet switch market. Tomahawk 4, 25.6Tbps, is an engineering marvel, as the 7nm ASIC provides the highest bandwidth in the industry, and provides flexibility to support 50, 100, 200, and 400GbE ports. QCT is very proud to be Broadcom's ecosystem partner for this flagship product.”

Joshua Yeh, General Manager, Transmission Network and Equipment Business Unit, Applied Optoelectronics Inc.
“The 25.6T bandwidth point represents an important incremental upgrade for datacenter users. Its ability to leverage an existing high volume, qualified broad optics portfolio as provided by AOI's QSFP-DD and OSFP modules, is critical to enable cost effective time deployment of next generation datacenter networks.”

Osa Mok, Chief Marketing Officer of Innolight Technology Corporation
“Broadcom's Tomahawk 4 is well positioned to support the needs of hyperscale users. While it delivers 2x the bandwidth, it still preserves the industry standard 8x50G interface for 400G connectivity. This is well aligned with Innolight's OSFP and QSFP optical transceiver products which are already in mass production, and are qualified at major datacenter operators.”

Availability
Broadcom is now shipping Tomahawk 4 BCM56990 devices to qualified customers. For more information on the Tomahawk 4 and all Broadcom products and solutions please click here.

About Broadcom
Broadcom Inc. (NASDAQ: AVGO) is a global technology leader that designs, develops and supplies a broad range of semiconductor and infrastructure software solutions. Broadcom’s category-leading product portfolio serves critical markets including data center, networking, enterprise software, broadband, wireless, storage and industrial. Our solutions include data center networking and storage, enterprise, mainframe and cyber security software focused on automation, monitoring and security, smartphone components, telecoms and factory automation. For more information, go to www.broadcom.com.

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[1] Cisco Global Cloud Index: Forecast and Methodology, 2016-2021 White Paper, https://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.pdf

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