Lanner Builds AI-Driven SD-WAN into NCA-1250 Network Appliance

The NCA-1250 is powered by Intel Atom® x7000RE processor series and delivers efficient, AI-powered SD-WAN for branch offices with flexible storage, low power, and robust performance

Branch office connectivity has evolved significantly in recent years, driven by the need for more flexible, efficient, and cost-effective networking.

Traditionally, organizations relied heavily on Multiprotocol Label Switching (MPLS) to ensure secure, reliable connections between headquarters and branch offices. While MPLS provides stable connectivity, it is expensive and inflexible, requiring dedicated lines and complex configurations.

This has pushed organizations to explore alternatives that can deliver the same level of reliability and security at a lower cost, leading to a major shift in branch office networking.

One of the key drivers of this change has been the widespread adoption of cloud services. Cloud services require branch office networks to connect directly to the internet to ensure access to email, cloud compute or online databases.

As cloud adoption continues to rise, software-defined wide area networking (SD-WAN) has become the preferred solution for modern branch office connectivity. SD-WAN enables organizations to leverage a combination of broadband internet, LTE, and other network options to create a virtualized network layer.

This approach allows businesses to dynamically route traffic based on real-time conditions, ensuring optimal performance for both cloud-based and corporate applications. SD-WAN also simplifies network management by centralizing control, offering greater visibility and the ability to rapidly deploy and configure branch networks.

SD-WAN solutions now often integrate security features such as encryption, firewall capabilities, and secure web gateways to protect branch offices from threats. This convergence of networking and security, known as secure access service edge (SASE), has become a critical component of branch office connectivity.

AI-powered SD-WAN represents the next evolution in branch office connectivity. By integrating artificial intelligence and machine learning into SD-WAN, organizations can further optimize their networks, automating tasks such as traffic management, anomaly detection, and threat mitigation. AI-powered SD-WAN enables predictive analytics, allowing the network to anticipate and adapt to changing conditions in real time, resulting in improved performance, reduced latency, and enhanced security.

Lanner Inc. has designed a network appliance based on Intel Atom® x7000RE processor series to meet the needs of the next-generation branch office network including AI-driven SD-WAN. Lanner is an Intel® Industry Solution Builders Industrial Builders Community member.

Figure 1. Front view of Lanner NCA-1250.

Performance in a Small Package

The Lanner NCA-1250 is a compact, energy-efficient network appliance designed to deliver powerful compute and networking capabilities, and enable secure, high-speed data transmission across dispersed networks. The NCA-1250 is ideal for distributed enterprises and remote locations.

Equipped with up to six 2.5GbE RJ45 ports and one USB 3.0 port, the NCA-1250 ensures that data flows seamlessly between network nodes. Powered by Intel Atom® x7000E, x7000RE, and x7000C processor series, the NCA-1250 delivers impressive performance while maintaining a low thermal design power (TDP), reducing both operational costs and environmental impact.

Storage options on the Lanner NCA-1250 are highly flexible, enabling it to meet the varied needs of different SD-WAN applications. The device offers both m.2 SATA and eMMC storage slots, providing ample room for local data storage.

This versatility allows the NCA-1250 to handle large datasets and ML models that are necessary for AI-driven SD-WAN solutions, including tasks like real-time traffic shaping, dynamic bandwidth allocation, and security threat detection.

The compact desktop physical footprint of the NCA-1250 measures 231 x 200 x 44 mm, allowing it to be easily installed in a wide range of environments, including space-constrained edge locations. Its fanless design further enhances its suitability for harsh environments or remote deployments, where maintenance access might be limited.

This compact form factor makes the NCA-1250 an excellent choice for industries such as retail, manufacturing, and logistics, where SD-WAN appliances are often deployed.

In AI-powered SD-WAN applications, the NCA-1250's configuration flexibility, networking capabilities, and high performance CPU with integrated GPU come together to create a highly capable edge appliance. The device's ability to efficiently run AI models enables intelligent traffic steering, which optimizes network performance by dynamically adjusting paths based on real-time conditions.

Moreover, its low power consumption and versatile storage options allow for sustainable, scalable AI deployments at the edge, ensuring that businesses can benefit from AI-driven SD-WAN solutions while keeping operational costs low.

Intel Atom® x7000RE Processor Series

Lanner chose the Intel Atom x7000RE processor series because it is a powerful and energy-efficient choice for modern networks. With up to eight efficient cores, this processor family excels in per core performance, offering robust processing power in compact and low-power designs with a TDP of between six watts and 12 watts.

One of the key features of the Intel Atom x7000RE processor series is its support for Intel® Advanced Vector Extensions 2 (Intel® AVX2). Intel AVX2 significantly enhances the processor's ability to handle compute-intensive tasks such as data encryption, decryption, and network traffic optimization, all of which are critical for SD-WAN solutions.

Additionally, the integrated Intel® UHD Graphics within the Intel Atom x7000RE processor series delivers up to 32 GPU execution units (EU). This integrated GPU can offload AI workloads from the CPU, contributing to greater throughput and overall system efficiency. This is particularly advantageous in SD-WAN environments where multimedia data and real-time analytics are becoming increasingly important for decision-making and operational efficiency.

By combining low power consumption, advanced processing features, and integrated graphics, the Intel Atom x7000RE processor series is well-suited for the dynamic and demanding nature of edge SD-WAN applications.

AI Model Tests

To prove the performance of the system, Lanner tested[1] performance of the NCA-1250 with three AI models.

One test measured the latency of BERT with Intel® Distribution of OpenVINO™ toolkit. Phishing detection can use BERT to analyze the content of emails, messages, or websites to identify malicious intent. The BERT inference time is one of

the critical metrics for phishing detection. By utilizing OpenVINO and Neural Network Compression Framework (NNCF) the inference time can be significantly reduced, allowing for faster analysis of potentially harmful content. NNCF provides a suite of post-training and training-time algorithms for optimizing the inference of neural networks in OpenVINO with a minimal accuracy drop. Further, these tests demonstrated a dramatic reduction in latency by offloading AI workload from the CPU to the integrated GPU. Latency was also dramatically less when INT8 quantization was used vs. FP32.

BERT			
Platform		BERT base case of OpenVINO model latency (ms)	
		FP32	INT8
Lanner NCA-1250D	CPU	2188.12	1161.6
	iGPU	208.85	131.19

Two other tests were run with MalConv open source software for malware detection. One test was run using the ONNX framework and the other test with TensorFlow.

MalConv ONNX model single core latency (ms)				
Framework	Platform		ONNX FP32	INC2.2 qat INT8
onnxruntime (1.16.0)	Lanner NCA-1250D	CPU	111.07	48.35
		iGPU + CPU	34.02	50.79

MalConv						
MalConv TensorFlow model single core latency(ms)						
Framework	Platform		H5 w/o oneDNN	FP32 w/o oneDNN	FP32 w/ oneDNN	INC2.2 QAT INT8
TensorFlow (2.14.0)	Lanner NCA-1250D	CPU	173.21	125.83	116.25	52.1
		iGPU + CPU			18.96	9.55

Conclusion

The evolution of branch office connectivity reflects the growing need for more flexible, cost-effective, and high-performance networking solutions. Cloud services have emerged as a driving force behind this transformation. This shift has paved the way for SD-WAN, which offers dynamic traffic routing, centralized management, and enhanced security and networking through SASE, enabling enterprises to embrace cloud-first strategies and streamline their network operations.

Lanner's NCA-1250, powered by Intel Atom x7000RE processor series, is uniquely positioned to support AI-powered SD-WAN applications. Its combination of flexible networking capabilities, energy-efficient design, and AI optimization makes it ideal for enterprises looking to deploy intelligent edge solutions. The NCA-1250's ability to handle real-time traffic management, threat detection, and multimedia data processing ensures that it can meet the demands of modern, distributed networks, while maintaining low operational costs.

AI-powered SD-WAN represents the future of branch office connectivity. By leveraging the advanced processing power of Intel Atom x7000RE processor series and Lanner's robust design, businesses can achieve smarter, more adaptive networks that respond in real-time to changing conditions. This integration of AI-driven analytics and automation promises to deliver greater efficiency, security, and performance for the next generation of SD-WAN deployments.

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[1] Lanner NCA-1250 DUT: 1-node, 1x Intel Atom® x7835RE processor with 8 cores and 1 thread. Total DDR5 memory was 16 GB (1 slots/ 16GB/ 4800 MHz); microcode M11B06E0_00000015. pdb; BIOS version: T001. Software: OS was Ubuntu; kernel was 6.8.0-45-generic. Compiler was GCC 11.4.0. Test conducted by Lanner on October 15, 2024.

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