ADLINK
LEADING EDGE COMPUTING

Overcoming Today's Cyber Security Challenges with ADLINK High Density Network Appliances



ADLINK's carrier-grade network appliances enable next-generation networking applications that fend off increasingly challenging cyber attacks and deliver uninterrupted enterprise network services

Solution Brief

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Cyber Security Market Overview

The 2020 pandemic magnified existing cybersecurity trends. Ransomware attacks date back to the late 1980s, but their prevalence has skyrocketed, rising by 158% from 2019 to 2020 in North America alone. The Stuxnet computer worm of 2010 kicked off targeted attacks against specific operational technology (OT) infrastructure, ushering in a world wherein one recent survey found that 74% of OT organizations had been breached within the prior 12 months. The pandemic's social distancing and lockdowns fueled already-existing trends toward remote access and remote management. On one hand, remote-enabling technologies allowed industry to continue and sometimes even grow under historically challenging conditions. On the other, going remote dramatically widens an organization's attack surface and makes its need for comprehensive, effective cybersecurity more urgent than ever.

Fortune Business Insights expects the cybersecurity market to expand with a 12.0% CAGR from 2021 to 2028. Continual improvements in artificial intelligence (AI) technologies enable smarter, more capable security solutions, but ever broader and more complex cloud, big data analytics, and Internet of Things (IoT) deployments mean that enterprises must work to bring such solutions online with increasing rapidity. In short, industrial infrastructures are becoming more complex and extended, thus more vulnerable to attack, and organizations need to raise their cybersecurity game to stay ahead of potential attackers.

Cybersecurity risks are another global plague, and every region has its own challenges and market growth curve. Research and Markets pegged the U.S. cybersecurity market at $44 billion in 2020, but China, with the next-largest economy, will spend $70 billion from 2020 through 2027. The research firm expects Germany's cybersecurity market to expand at 5.8% CAGR through 2027. Japan's will expand by 4.8%, and Canada's by 7.9%.

Similarly, each market segment has its own security imperatives. MarketsandMarkets notes that "aerospace and defense is growing at an unprecedented rate in North America, Europe, and APAC." Cybercrime Magazine reports that healthcare will spend $125 billion on cybersecurity from 2020 through 2025, and Fortune Business Insights shows that healthcare cybersecurity spending roughly matches that of government, retail, and IT/telecommunications. In fact, the only larger segment is banking, financial services, and insurance (BFSI), with 19.5% of the total market.

Estimates for the worldwide damage caused by cybercrime range from nearly $600 billion to $6 trillion annually. Such costs pose a profound impediment to efforts ranging from scaling industrial manufacturing operations to the creation of smart cities. Clearly, organizations need highly optimized, scalable, and cost-effective hardware platforms for their cybersecurity solutions, and they need those platforms immediately.

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Customer Application and Challenges

One leading cybersecurity provider needed a better solution to offer its mid- to large-size enterprise clients. The provider had historically relied on appliance-type hardware, working under the common belief that specialized hardware would deliver best-in-class performance for security applications. This perception stems from the days when proprietary solutions could implement fabric and protocol optimizations that the industry had yet to realize in open source or standardized approaches. However, in cybersecurity as in so many other fields today, proprietary appliances saddle users with expensive support costs and limit scalability. The cybersecurity provider turned to ADLINK for help in devising a more flexible, cost effective, high-performance solution.

The client wanted a highly integrated solution that would enable a broad array of networking and cybersecurity functionality. The solution should support functions and applications including load balancing, deep packet inspection, network traffic analysis, next-generation firewall, intrusion detection and protection, unified threat management, anti-malware and anti-spam, and web filtering. Often, any of these applications will arrive in its own stand-alone rackmount appliance, and so a full security deployment would require dedicated space across multiple racks for various security functions. This "security sprawl" results in high consumption of datacenter installation space, excessive infrastructure complexity, higher required maintenance, and potential interoperability issues in arguably the worst possible place: the organization's data protection center.

For many years, some manufacturers have provided "all-in-one" security appliances. These seek to lower costs but often at the expense of performance, scalability, and breadth of functionality. As such, integrated appliances have typically targeted smaller businesses. Concurrently, malware continues to grow more complex and insidious, often requiring security devices to cache packets and reassemble data streams while performing deep analysis. At scale, the resource demands of this processing load can outstrip what conventional integrated appliances offer.

At this point, customers may turn to larger appliances able to support higher I/O density, such as those based on the legacy Advanced Telecom Computing Architecture (AdvancedTCA) specification. Aimed at telecom and datacenter installations, AdvancedTCA cards are 8U high and generally offer maximum backplane bandwidth of 40 Gbps. AdvancedTCA has the benefit of modular daughterboards and thus upgradeable compute resources, but that network bottleneck was choking the client's solution scalability.

The cybersecurity client needed the functionality of a full rack of dedicated security appliances, the space savings of a consolidated approach, sufficient compute and networking performance to accommodate mid- to large-scale enterprises, and a competitive cost basis. ADLINK had the solution for just such a security foundation.



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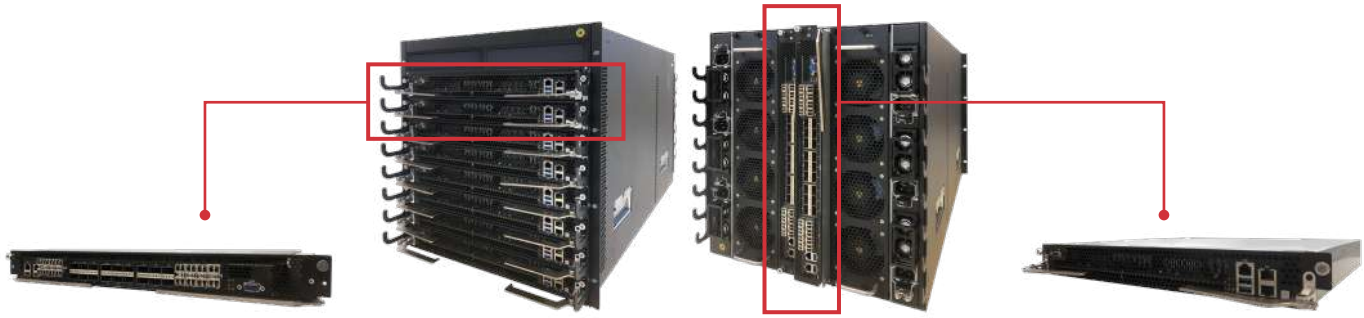


ADLINK's Solution

In its pursuit of an all-in-one, highly scalable cybersecurity hardware platform, the solution provider client had several core demands, including:

- The shortest possible rack depth to conserve floor space and promote datacenter airflow efficiency
- The highest possible I/O density accompanied by corresponding networking fabric bandwidth
- Variable size configurations to suit different environments and cost/performance scenarios
- Heterogeneous architecture able to balance compute with acceleration technologies, such as Intelligent Ethernet Card, FPGA or NPS

ADLINK's CSA-7608, a 12U CLOS architecture orthogonal system that improves on the already-successful CSA-7200 and CSA-7400 lines, proved to be the perfect fit. Networking performance and flexibility drives much of the CSA-7608's appeal, anchored by integration of the Intel® Tofino™ programmable Ethernet switch. Tofino switch silicon delivers up to 6.4 Tbps performance and is optimized for software-defined network implementation, which can be pivotal to cybersecurity cost-effectiveness and configuration adaptability. The CSA-7608 leverages Intel's switch to provide stable, programmable 100 Gbps bandwidth across the orthogonal connector directly, a 10x improvement over conventional AdvancedTCA solutions. ADLINK enables this cutting-edge performance while maintaining compatibility with an open-source ecosystem spanning applications, network function virtualization, smart NIC drivers, and a range of open-source network stacks (including Intel/Barefoot's own P4 programming language). Thus, customers with open-source software will enjoy more choice in their CSA-7608 deployments and full preservation of their existing software investments.



Barefoot Tofino P4 Programmable 6.4T Switch Blade *High-throughput & Performance Security Platform CSA-7608* *Intel® Xeon® Scalable Processors 100G Processor Blade*

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The client selected the CSA-7608 to serve as a "network distributor," the front-end system within a larger cybersecurity solution. The front end aggregates traffic and load balances to subsequent back-end servers. An inadequate or poorly configured network distributor will bottleneck the entire network's performance. Being a highly integrated solution, the CSA-7608 forsakes limited, 1U "pizza box" approaches and utilizes an orthogonal, 12U architecture, with full-sized management, accelerator, and service boards. The system also has an 800mm depth format, which strikes a valuable balance between space savings relative to many legacy approaches and sufficient space for efficient cooling and system maintenance.



The CSA-7608's core specifications showcase its power and flexibility for demanding cybersecurity applications:

- 8x front computing nodes
- 2x rear Intel® Tofino™ software programmable switch nodes with I/O
- 2x management nodes (optional)
- Supports dual-star, 200-400G Fabric, 1G Base, and IPMI
- Supports up to 6x AC/DC/HVDC (260-400V) PSU with N+2 redundancy
- Supports Intelligent Chassis Management Module
- Intelligent fan module & FRU monitor

All nodes/modules (also referred to as blades or cards) are hot-swappable for ease of maintenance and minimal downtime. The CSA-7608 service/application modules and switch modules are built for high-end performance. Each front slot supports up to 1000W of cooling capability and 200Gbps board-to-board data transmission with 64 fiber connections. Switch cards integrate Tofino silicon, which delivers 6.4Tbps of switch capability per module in an approximately 600W power envelope.

In contrast to AdvancedTCA, orthogonal architecture does not require a high-speed backplane. This makes ADLINK's orthogonal approach more cost-effective. Additionally, compared to 1U to 4U network appliances, ADLINK's CSA solutions offer higher resource density, thus lowering the need to maintain as many devices. Both factors result in lower CapEx investment.



Rewards Realized

ADLINK's network cybersecurity OEM client implemented the CSA-7608 as the foundation of its new product offerings. The increasingly problematic bandwidth constriction that had beset its previous AdvancedTCA solutions, caused by clients' ever-climbing data loads, vanished with the shift to ADLINK's 100 Gbps switching architecture. This was a necessary evolution given how the client had seen increasing demand from its customers to shift from distributed security processing in private networks to centralized processing in cloud networks.

The modularity and scalability of ADLINK's CSA-7608 ensure that the cybersecurity client will continue to be able to meet rising network traffic demands without sacrificing any of the compute capability needed to counter today's and tomorrow's cybersecurity threats. The client achieved their goal of having a smaller total solution footprint while maintaining full functionality, serviceability, and adherence to open standards. In the months to come, the CSA-7608 will help the client become more competitive, delivering even better value to existing customers and increasing value proposition to attract new cybersecurity business.

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