# Solution Brief

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# NEXCOM FTA 5190 Offers Advanced Edge Cybersecurity Performance

**Powered by Intel® Xeon® 6 SoC with Hyperscan and data compression, the NEXCOM FTA 5190 has fast analytics and big data processing to provide real-time anomaly and threat response for CDN, NVR and storage services**

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Enterprises are facing cyber-attacks on computing resources at edge locations where more demanding workloads including AI, content delivery networks (CDN), and network video recording (NVR) are being deployed. These deployments have increased cybersecurity attack surfaces. Enterprises are also increasingly exploring placement of the latest data security solutions, including SSE, SD-WAN, zero-trust, extended detection and response (XDR) and network detection and response (NDR) at the edge to protect both critical applications and high-volume content streams.

To provide cybersecurity protection, servers for these applications need to be able to ingest and process vast amounts of data in real time and perform anomaly detection efficiently to identify threats and conduct automated remediation. NEXCOM, an Intel® Industry Solutions Builders Partner, has developed the FTA 5190, powered by Intel® Xeon® 6 SoC, to support advanced data security applications as well as secure CDN, NVR and storage workloads in edge computing deployment.

This paper will explore the FTA 5190's capabilities in edge security applications with an emphasis on analytics performance on big data generated by data security applications. To this end, the paper will also show results of analytics performance tests using the popular ClickHouse open-source column-oriented database management system. The tests will show the effectiveness of Intel® QuickAssist Technology (Intel® QAT) Gen 5 and Hyperscan technologies.

## Next Generation Edge Server

The NEXCOM FTA 5190 (see Figure 1) is a high-performance server with extensive connectivity options for edge computing. The compact 1U server (438 (W) × 399 (D) × 44 (H) mm) built with the Intel Xeon 6 SoC features PCIe Gen5 NVMe storage for seamless hot data processing, enabling efficient collaboration, big data handling, and application-centric deployments, many enabled with AI.

The server is configured with eight 25GbE fiber ports, eight 1GbE copper ports, and one LAN module extension slot. This flexibility means the FTA 5190 excels in network security, image recognition, and media analytics. Its shorter depth makes it ideal for constrained spaces such as wall-mount racks or telecom cabinets, while the built-in AI acceleration engine and Intel QAT Gen 5 deliver unmatched performance for inferencing, cryptography, advanced data analytics and data compression.

**Figure 1.** NEXCOM FTA 5190 front and back views.

## NEXCOM FTA 5190 Uses Intel® Xeon® 6 SoC

The NEXCOM FTA 5190 servers are standardized on Intel Xeon 6 SoC with 36 performance-cores (P-cores). This CPU family features 12 memory channels and double the memory bandwidth of previous Intel® Xeon® D processors. These CPUs excel at a wide range of workloads, with a focus on edge applications, delivering better performance than other general-purpose CPUs for compute-intensive workloads.[1]

Other Intel Xeon 6 SoC technologies that are integrated into the NEXCOM FTA 5190 include:

- Intel® Advanced Matrix Extensions (Intel® AMX) speeds up inferencing for INT8 and BF16, and it offers support for FP16-trained models, with up to 2,048 floating point operations per cycle per core for INT8 and 1,024 floating point operations per cycle per core for BF16/FP16.

- Intel QAT Gen 5 cryptography and compression acceleration technology that enables offload of bulk data compression tasks. With Intel QAT Gen 5, large amounts of real-time data can be en/decrypted and compressed to significantly reduce data size saving on storage space and cost.

### Performance Testing

A network traffic recorder (NTR) was used to test the data security performance of the NEXCOM FTA 5190.[i] For a typical XDR/NDR system deployed at edge, the software pipeline includes network data ingestion through a network interface card (NIC), advanced data analytics through a database, and data storage on the file system. Intel provides NTR software to demonstrate how this pipeline is enabled by Intel® architecture devices. The NTR software architecture is illustrated in Figure 2.

NTR software is designed to achieve industry-leading "zero packet loss" solutions for network packet processing on Intel platforms. The pipeline has the following key components:

- **NTR Core**: The main component of NTR software which can be used to capture network packets and save them as PCAP files. It also generates metadata files for the packets, which are used for subsequent packet queries.

- **NTR Manager**: Manages PCAP files and metadata files. It also provides RESTful APIs for querying and configuring NTR.

- **Data Plane Development Kit (DPDK)**: DPDK is an open-source set of libraries and drivers for high performance packet processing. It was designed to run on any processor, but with focus on Intel architecture processors, and is widely used in the networking industry to accelerate packet processing workloads.

- **ClickHouse**: ClickHouse is an open-source, column-oriented database management system (columnar DBMS) for online analytical processing (OLAP) that allows users to generate analytical reports using SQL queries in real-time. In the NTR software, ClickHouse is designed to store packet metadata information.
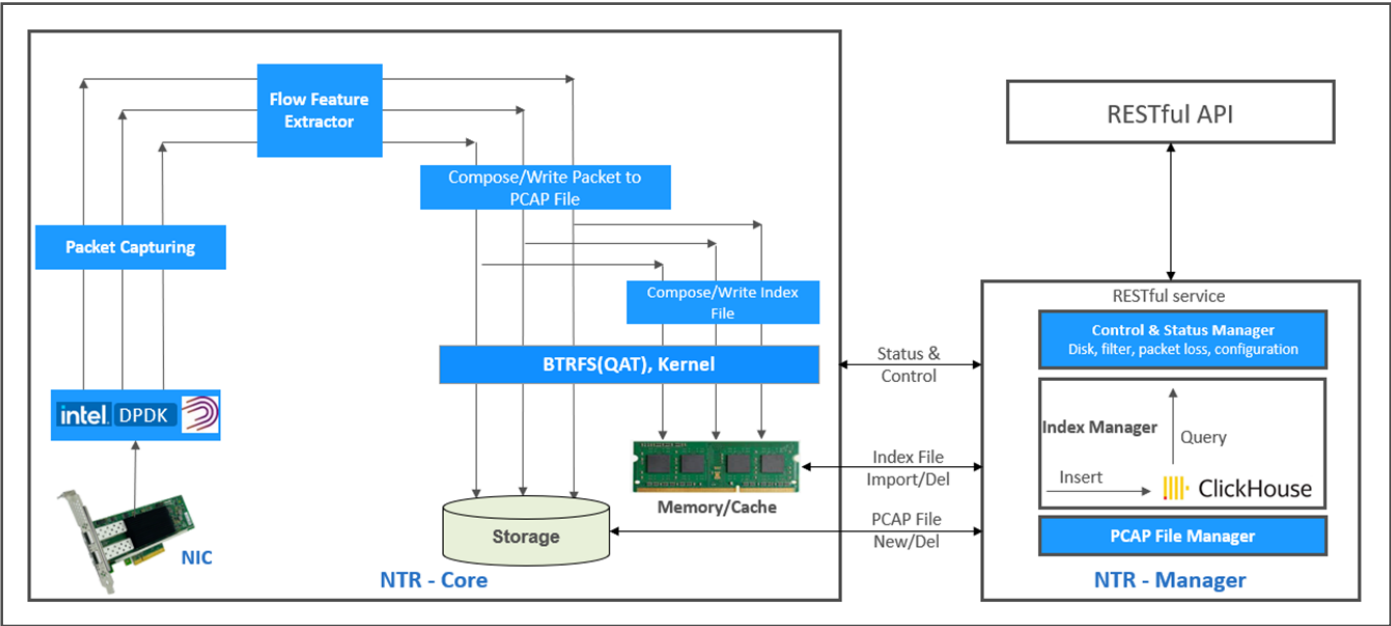
**Figure 2.** Intel network traffic recorder reference software architecture.

Test results are as follows:

| Throughput | No. of Packets | Packet Loss (%) |
|---|---|---|
| 20Gbps | 4,315,324 | 0% |

## Hyperscan–Accelerating ClickHouse Data Analytics

In the typical network security platform/XDR/NDR pipeline, real-time data needs to be stored into the in-memory database to perform advanced data analytics. This workload is essential to threat detection and automated remediation as well as the performance of data analytics is critical to the security solution. With Hyperscan library from Intel, which effectively leverages the underlying Intel architecture, advanced data analytics with

ClickHouse enjoys a significant performance boost on the NEXCOM FTA 5190 platform.

The typical data analytics workload can be performed with a ClickHouse client sending advanced search queries to the ClickHouse server. The communications between the ClickHouse client and the ClickHouse server can use TCP locally or remotely. The general architecture of the ClickHouse search queries is illustrated in Figure 3.
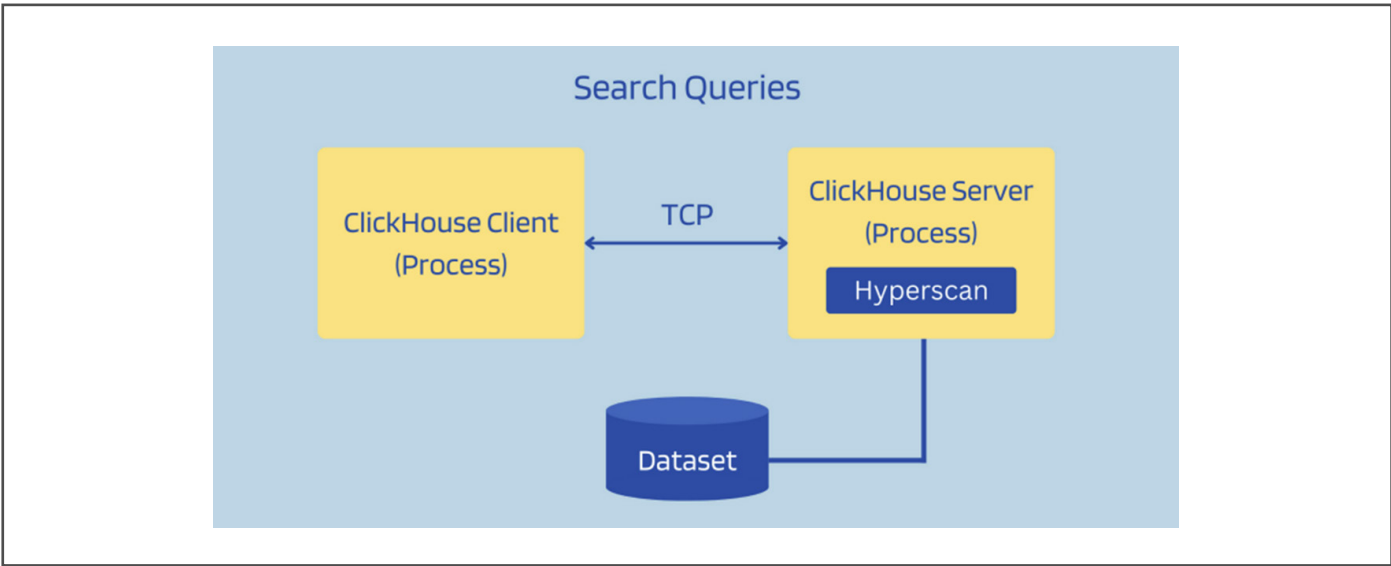


**Figure 3.** ClickHouse data analytics accelerated by Hyperscan.

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Hyperscan is a high-performance multiple regex matching library developed by Intel. Hyperscan provides a flexible and easy-to-use library that enables the matching of large numbers of patterns simultaneously with high performance and good scalability, as well as providing unique functionality for network packets processing.

In ClickHouse, to leverage Hyperscan optimization for search queries, the underlying Hyperscan library needs to be invoked through the "**multiMatchAny()**" function API. We recommend using the latest Hyperscan v5.6.1 (under Intel's outbound license). Intel provides the software patch to apply Hyperscan v5.6.1 to the latest stable version of ClickHouse.

Examples of how to leverage Hyperscan to accelerate SQL queries are given below:

**Query**: (without Hyperscan)

select count() from datasets.hits_v1 where (URL like '%афиукд%') or (URL like '%берлик%') or (URL like '%fab%') or (URL like '%ru%') or (URL like '%www%') or (URL like '%ьфьын%') or (URL like '%маиси%') or (URL like '%mam%') or (URL like '%amsy%') or (URL like '%маммси%') or (URL like '%амси%') or (URL like '%vfvc%') or (URL like '%/t0-%') or (URL like '%/t1-%') or (URL like '%/t2-%') or (URL like '%/questions/7777777770%') or (URL like '%faberl%') or (URL like '%febirl%') or (URL like '%фибер%') or (URL like '%фибеп%') or (URL like '%фибел%') or (URL like '%фибэр%') or (URL like '%фибэп%') or (URL like '%фибэл%') or (URL like '%фибар%') or (URL like '%фибап%') or (URL like '%фибал%') or (URL like '%/q0%') or (URL like '%/q1%') or (URL like '%/q2%') or (URL like '%/q3%') or (URL like '%/q4%') or (URL like '%/q5%') or (URL like '%/questions/0%') or (URL like '%/questions/1%') or (URL like '%/questions/2%') or (URL like '%/questions/3%') or (URL like '%/questions/4%') or (URL like '%/questions/5%')

**Query**: (with Hyperscan)

select count() from datasets.hits_v1 where multiMatchAny(URL,['афиукд','берлик','fab','ru','www','ьфьын','маиси','mam','amsy','маммси','амси','vfvc','/t0-','/t1-','/t2-','/questions/7777777770','faberl','febirl','фибер','фибеп','фибел','фибэр','фибэп','фибэл','фибар','фибап','фибал','/q0','/q1','/q2','/q3','/q4','/q5','/questions/0','/questions/1','/questions/2','/questions/3','/questions/4','/questions/5'])

Performance results for the NEXCOM FTA 5190 are shown in Figure 4.

The results show that Hyperscan acceleration available with Intel Xeon 6 SoC can achieve up to three times search latency reduction on ClickHouse, accelerating the search latency from 3.11 seconds to 1.04 seconds with Hyperscan.

## Intel QAT Gen 5 for Data Compression

Security platforms handle vast amounts of real-time data. Intel QAT Gen 5 is designed to help accelerate data compression, resulting in reduced data size, which saves storage space and cost, and can significantly boost the performance of the write throughput.
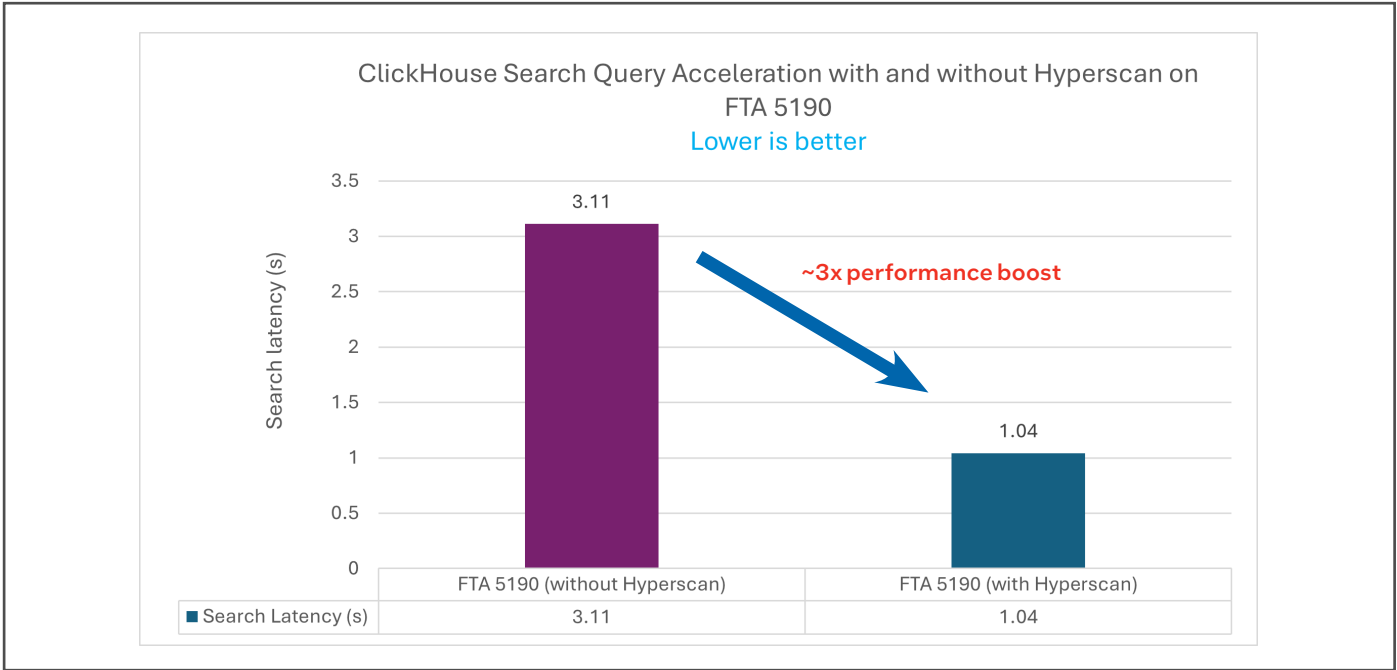
**Figure 4.** ClickHouse search query acceleration with Hyperscan (right) vs without Hyperscan (left).

Intel QAT Gen 5 is a hardware accelerator that can offload data compression using the Zlib algorithm for performance optimization. The NEXCOM FTA 5190 has built-in Intel QAT Gen 5 capability that can improve data security performance.

To test that, the open source Flexible I/O Tester (FIO) tool was used to benchmark and test the write performance of the Linux B-Tree Filesystem (BTRFS). The test compared the data write operation performance of BTRFS without compression and BTRFS with Intel QAT Zlib (level-9) compression.

The performance data is shown in Figure 5. The results show that Intel QAT compression can achieve up to 40% compression ratio, and around 27% write throughput improvement when compared to BTRFS without Intel QAT compression.



|  | BTRFS without Compression | BTRFS with Zlib-9 Intel QAT Compression |
|---|---|---|
| Write Throughput (MiB/s) | 1680 | 2132 |
| Throughput Speed Up | 1.00 | 1.27 |
| Compression Ratio/% | 100.00 | 40.00 |
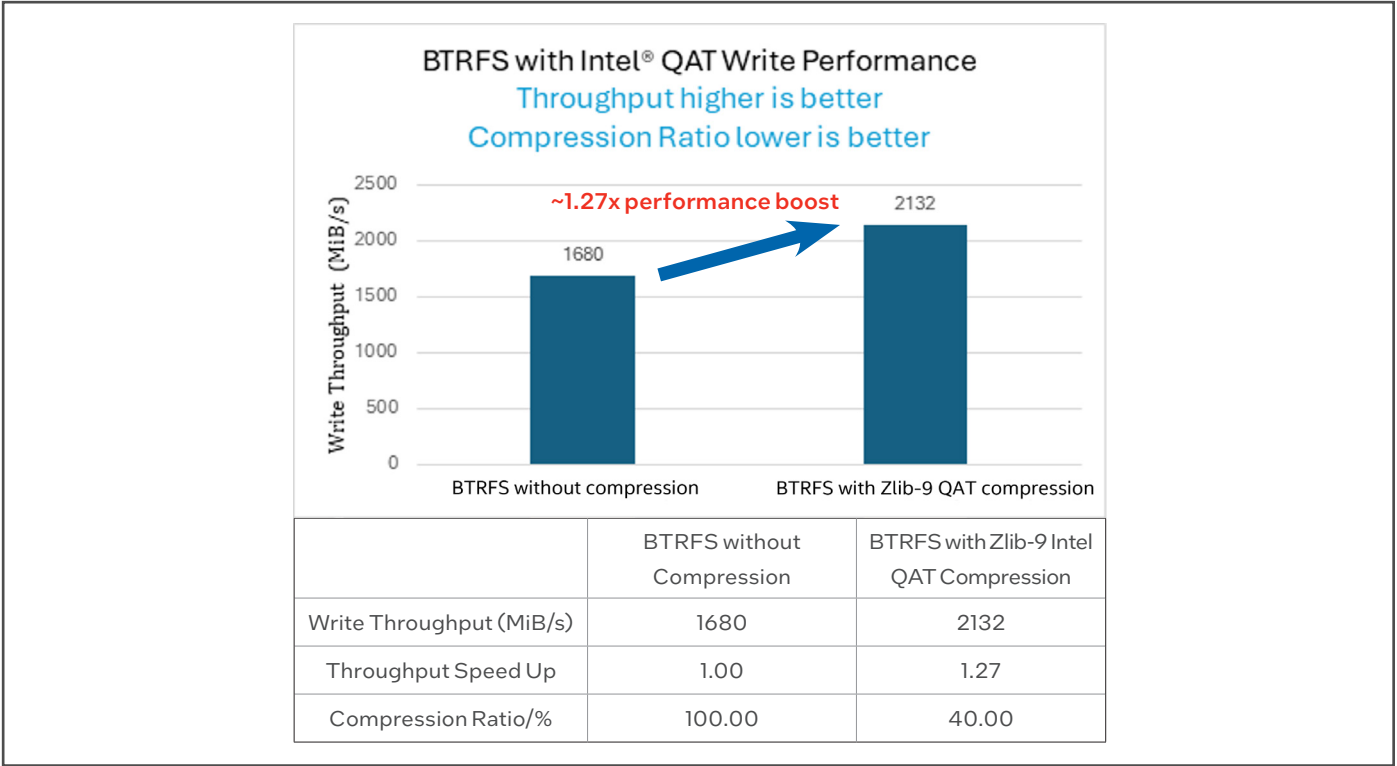
**Figure 5.** Intel QAT compression performance (right) vs. no compression (left) on Intel Xeon 6 SoC.

## Conclusion

The NEXCOM FTA 5190, based on the Intel Xeon 6 SoC, is designed with the throughput and form factor that are essential for edge data-intensive applications. In tests done by Intel and NEXCOM, the NEXCOM FTA 5190 showed smooth processing of network traffic with zero packet loss. In addition, data analytics with ClickHouse enjoyed acceleration by Hyperscan, and data compression acceleration from Intel QAT Gen 5 to achieve better write throughput.

These key optimizations can help improve the throughput for secure SD-WAN, SASE, XDR, and zero-trust network architectures, as well as for high-performance content delivery and video management, reducing latency and increasing overall system efficiency. With the FTA 5190, NEXCOM and Intel deliver the next evolution in advanced edge computing infrastructure for intelligent, secure, and scalable services.

## Learn More

NEXCOM FTA 5190

ClickHouse

Intel® Xeon® 6556P-B processor

Intel NetSec Software Package

Intel® Ethernet E810 Network Adapter

Intel® Advanced Matrix Extensions (Intel® AMX)

Intel® Industry Solutions Builders

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