



6WIND Boosts IPsec with Intel® Xeon® Scalable Processors

Tests of 6WIND Turbo IPsec show up to a 50% performance improvement when run on a server powered by the Intel® Xeon® Platinum 8170 processor.¹



Introduction

IP security (IPsec) is a critical element for every IP network to help protect against cyberattacks and provide data confidentiality, privacy, and security. Mobile network operators (MNO) and data centers are adopting bare metal and virtualized IPsec solutions on Intel servers to realize scalability and efficiency while lowering costs.

Server performance is a critical issue in effective bare metal and virtualized IPsec solutions, and the Intel® Xeon® Scalable processors offer new options for next-generation networks. To test the new processors, Intel® Network Builders ecosystem member 6WIND set up two use cases for its 6WIND Turbo IPsec™ virtualized software.

The Challenge

To evaluate the performance of Intel Xeon Scalable processors, 6WIND selected its two most popular customer use cases to test the 6WIND Turbo IPsec VNF.

Security-Enabled Site-to-Site Virtual Private Networks (VPNs): IPsec virtual private networks (VPNs) are critical to wide area network infrastructure to create security-enabled, high-speed communications tunnels between trusted endpoints. Examples include linking data centers and remote sites in a corporate network. Since IP WANs should be considered inherently insecure, IPsec VPNs maintain data confidentiality and integrity through encryption techniques, and they must provide scalable throughput to avoid bottlenecks that can force data centers to choose performance over security. For example, poor performance can translate to a loss of customers in multi-tenant data centers.

Security Gateways (SeGWs) for Mobile Backhaul: The business case for MNOs to accelerate the transition to 5G is clear: the simplification and efficiencies gained by converging voice and data over a single IP-based network satisfy the unquenchable thirst for higher mobile bandwidth and ongoing rollout of new mobile apps. In this network, IPsec is utilized on the IP-based backhaul network that carries user, control, and management data from the base station (eNodeBs) to the Evolved Packet Core (EPC). The VPN tunnels are terminated at the SeGW.

The Solution

6WIND Turbo IPsec provides accelerated VPNs based on IPsec and Internet key exchange (IKE) for a wide range of complex networks, including those of data centers and MNOs. Key features include:

- Scalable, high-performance, full-featured data plane networking. The data plane features an extensive set of L2 to L4 networking protocols, including IP forwarding, IPsec, and more

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- CLI, XML, or Linux*-based management options
- Same software for either bare metal or virtual machine deployments

6WIND Turbo IPsec is designed to work with Linux automation, configuration, and management tools. To improve throughput performance, 6WIND Turbo IPsec supports open source Data Plane Development Kit (DPDK) libraries and drivers for fast packet processing and improved data plane throughput.

The software scales linearly with each additional CPU core added to data plane processing. Additional cores can be used to scale security performance, add more tunnels, or increase services on an existing server. Since it is software-based, 6WIND Turbo IPsec can quickly and efficiently manage network variables such as configuration changes, reducing time and management costs. 6WIND Turbo IPsec supports 10/40/100G NICs, for scalable IPsec VPN networking.



Figure 1. Overview of 6WIND Turbo IPsec software.²

The Intel® Advantage

Intel's latest advance in processing power is the Intel Xeon Scalable processors. This new processor family is based on an entirely new processor architecture —Intel® Mesh Architecture— with the scalability to deliver workload-optimized performance in NFV applications.

The Intel® Xeon® Scalable Processors

The Intel Xeon Scalable processors are the future-forward infrastructure platform for agile digital services. This processor family offers:

- High scalability for cloud-optimized and 5G-capable communications networks
- Exceptional processing of encryption algorithms and acceleration for compression and other key workloads
- Performance and efficiency to allow convergence of key communications workloads such as applications and services, control plane, packet, and signal processing

The Intel Xeon Scalable processors are the successor to the Intel Xeon processor E5 and E7 product lines. The Intel Xeon Scalable processors feature new technology for compute, network, and storage workloads. The Intel Xeon Scalable processors have also integrated a number of performance accelerators, the most important of which for NFV applications is Intel® QuickAssist Technology (Intel® QAT),

which provides hardware-assisted acceleration for critical workloads such as data compression and cryptography across server, storage, and network.

To evaluate Turbo IPsec on the Intel Xeon Scalable platform, 6WIND built an IPsec platform using Intel Xeon Platinum 8170 processors running 6WIND Turbo IPsec VPN software. In their tests, 6WIND saw up to a 50% gain in throughput performance over previous generations of Intel Xeon processors.¹

SITE-TO-SITE VPNS IPSEC PERFORMANCE¹

	INTEL XEON PROCESSOR E5-2680 V4	INTEL XEON PLATINUM 8170 PROCESSOR
Raw	12 Gbps per core	18 Gbps per core
VRF + IPinIP + Filtering	7 Gbps per core	10.5 Gbps per core

SECURITY GATEWAYS FOR MOBILE BACKHAUL PERFORMANCE¹

	INTEL XEON PROCESSOR E5-2680 V4	INTEL XEON PLATINUM 8170 PROCESSOR
Performance scales with number of cores	12 Gbps per core	18 Gbps per core
IKE	Up to 100,000 tunnels 1,000 tunnels established per second	Up to 100,000 tunnels 1,000 tunnels established per second ³

Conclusion

For data centers and MNOs, fully virtualized 6WIND Turbo IPsec VPN appliances can deliver high performance, flexible, scalable, and low-cost VPN solutions. With the increase in performance realized with the Intel Xeon Scalable processors, 6WIND Turbo IPsec VPN appliances can deliver thorough and effective IP network security with increased scalability, so data centers and MNOs don't have to compromise between network protection and performance.

About 6WIND

6WIND's software solves performance challenges for network vendors in telecom, enterprise, and cloud infrastructure markets. The company's 6WINDGate packet processing software is optimized for cost-effective hardware running Linux with a choice of multicore processors to deliver a wide variety of networking and security protocols and features. Based on 6WINDGate, 6WIND Virtual Accelerator™ provides accelerated virtual networking infrastructure and 6WIND Turbo Router™ and 6WIND Turbo IPsec™ are software appliances for bare metal or virtual machine environments. 6WIND is based near Paris, France. For more information, visit <http://6wind.com>.

About Intel® Network Builders

Intel Network Builders is an ecosystem of independent software vendors (ISVs), operating system vendors (OSVs), original equipment manufacturers (OEMs), telecom equipment manufacturers (TEMs), system integrators (SIs), enterprises, and service providers coming together to accelerate the adoption of network functions virtualization (NFV)-based and software-defined networking (SDN)-based solutions in telecom networks and in public, private, and hybrid clouds. The Intel Network Builders program connects service providers and enterprises with the infrastructure, software, and technology vendors that are driving new solutions to the market. Learn more at <http://networkbuilders.intel.com>.



¹ Testing conducted by 6WIND using its 6WIND Turbo IPsec 1.4.2 running on Ubuntu Linux 16.04 kernel 4.4.0-77-generic. Configurations: Baseline: 1S Intel® Xeon® processor E5-2680 v4, 2.1GHz, 14 cores, turbo and HT on, Dell® PowerEdge® Server R530 BIOS 1.6.2, 64GB total memory, 4 slots / 16GB / 1600 MT/s / DDR4 LRDIMM; 2 x Intel® Ethernet Converged Network Adapter X520, 1 x 500GB. New: Intel® Xeon® Platinum 8170 processor 2.1 GHz, 26 cores, turbo and HT on, BIOS PLYDCRB1.86B.0131.R09.1704, 4GB total memory, 1 slot / 4GB / 2133 MT/s / DDR4 RDIMM, 2x Intel® Ethernet Connection X722, 1 x 500GB.

² Image provided courtesy of 6WIND.

³ Tunnel count and setup rate and other control plane actions are independent of IPsec throughput performance testing.

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