

flexiWAN Improves Networking and Security Performance with Intel® Xeon® Scalable Processors

flexiWAN* boosts performance for SD-WAN and security services; throughput doubles¹ in tests using a 3rd Generation Intel® Xeon® Scalable processor-based server.



Corporate data centers connected to the cloud, employees working remotely, and more data aggregated and processed at the network edge are trends that have driven a new paradigm for network and security requirements. The transition to the new paradigm increases the types of network connections and thereby expands possible attack surfaces and security vulnerabilities.



Remote edge sites traditionally connected using multi-protocol label switching (MPLS) services continue to transition to software-defined wide area network (SD-WAN), enabling SDN-based control and centralized provisioning of connectivity services. For enterprises, SDN-based WAN connectivity is especially valuable for branch offices and remote sites as they now can be connected to the cloud directly and obviate the need to have onsite IT administrators to manage their services.

While automated WAN connectivity is important, that connectivity needs to be secure and, as such, edge platforms supporting SD-WAN must be able to host a wide range of services that can be equally hosted remotely. This deployment strategy further streamlines the need for onsite IT administration and shifts the deployment model to an edge-hosted SaaS model.

Gartner introduced the concept of Security Service Edge (SSE) in 2021 to define cloud-delivered security services to protect users and edge sites connected to corporate data centers and cloud resources.

flexiWAN, an Intel® Network Builders member, has a high-performance SD-WAN solution that runs on Intel® Xeon® processor-based servers. The software seamlessly integrates with SSE applications. The company has recently tested the solution on 3rd Generation Intel® Xeon® Scalable processor and demonstrated almost two-times¹ increase in throughput when compared to the solution running on a server powered by a 2nd Generation Intel® Xeon® Scalable processor (see test methodology below).

flexiWAN Unlocks SD-WAN

flexiWAN was founded in 2018 and is on a mission to disrupt the SD-WAN and SSE markets. flexiWAN SD-WAN is open source SD-WAN and security software that integrates with cloud security SSE applications. This solution allows for the delivery of advanced SSE services that give more control to service providers and IT admins with regards to data routing and security policy selections.

Since flexiWAN comes with a native application-based firewall, service providers and IT administrators can decide, through application aware routing policy, which traffic type/application to send through the cloud SSE and which directly to the Internet thus improving traffic optimization by avoiding SSE delay while also controlling operational cost. The software also features support for applications including network management, orchestration, and automated platform deployment capabilities.

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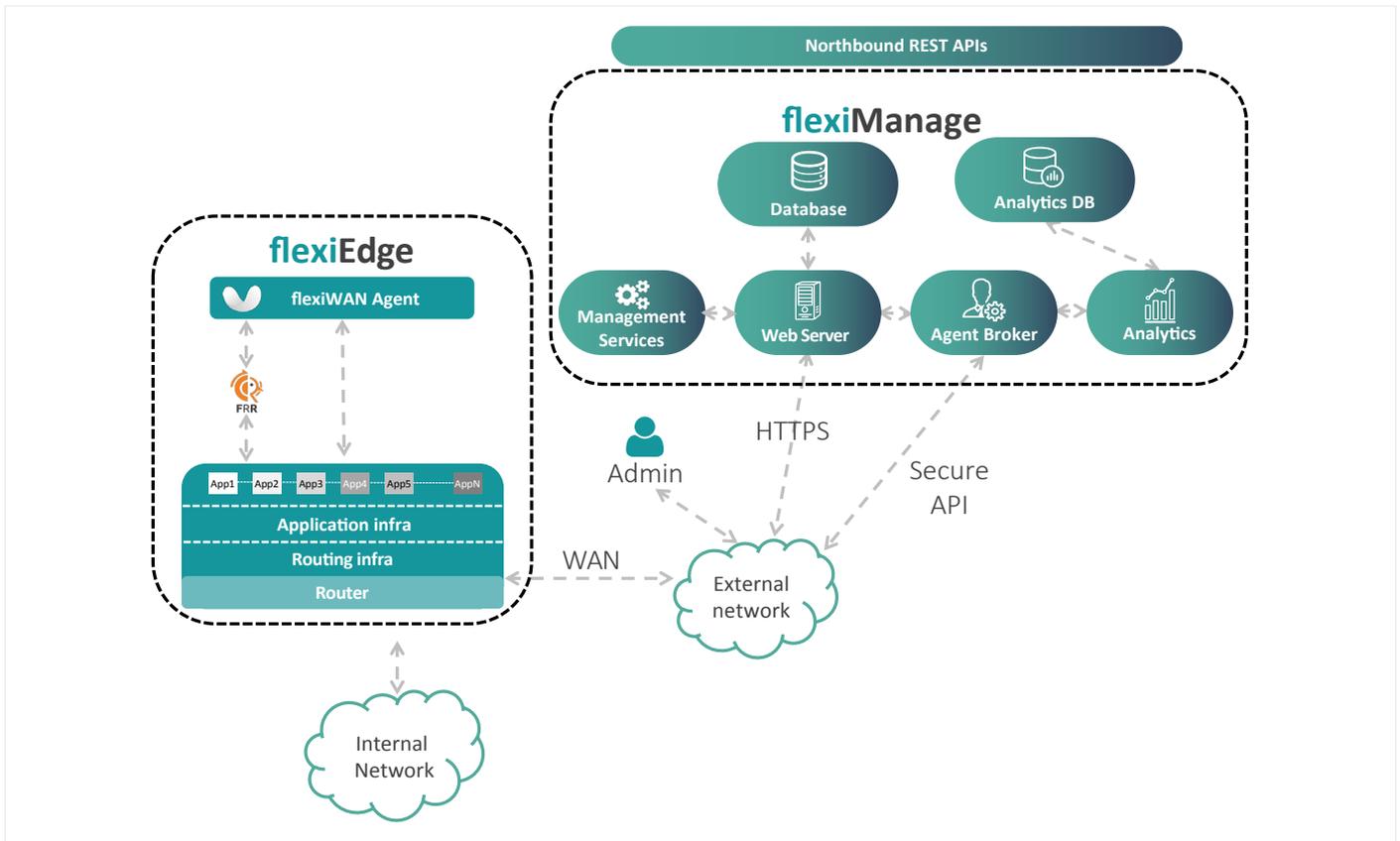


Figure 1. flexiWAN functionality.

flexiWAN pushes routing decisions to the edge (policy is centrally configured in the cloud and executed at the edge) by offering both SD-WAN and an application aware security firewall at the edge, as well as easy integration with cloud SSE applications. The result is a hybrid, optimized, and cost effective SASE deployment where some of the traffic can exit to the internet directly from the branch while other traffic is transported over a dedicated backbone to the cloud security SSE. The result is more control and differentiation in the hands of the service provider, system integrator and IT staff.

The architecture for the flexiWAN solution (see Fig. 1) includes the flexiEdge software that provides routing, SD-WAN and security services in a branch office and runs on servers powered by a full range of Intel Xeon Scalable processors.

As depicted in the flexiWAN architecture diagram (see Fig. 1), the network layer includes three software-based networking components: a Fast Data Project (FD.io) vector packet processor (VPP), which provides a routing data plane. VPP is a Unix user-space router that speeds up layer two / layer three switch-routing by processing multiple packets at a time.

For the routing control plane, the flexiEdge features an instance of Free Range Routing (FRR). This software makes routing and policy decisions and communicates these decisions to other layers and to other routers. FRR implements standard routing protocols such as BGP, RIP, OSPF and IS-IS.

In addition, the networking layer features a flexiWAN agent for communicating system status with the central flexiManage instance. flexiManage enables remote and central configuration as well as life cycle management to the system.

Above the networking layer is the application framework that runs flexiWAN or third-party applications. The application framework is a general framework for managing applications that can run in the data flow of the flexiEdge router, as Linux applications in flexiEdge or even in the flexiManage cloud management system together allowing for real-time policy processing applications, management and monitoring applications and other types of services to be easily added to the system.

The next layer upholds the RESTful APIs that enable communication with the flexiManage unified central management and can be used for integration with other management or orchestration systems. Every function available in the flexiManage cloud management system can also be performed through these APIs.

The flexiWAN router, flexiEdge, can be installed on bare metal hardware devices as well as on virtual machines as virtual network functions (VNFs), and also on Kubernetes pods using Kubervirt and in the cloud instances from major cloud providers.

flexiManage provides central configuration, zero touch provisioning (ZTP), software upgrade, and orchestration of flexiEdge devices and applications. The software's interface lets a network admin manage devices and the network. flexiManage also collects statistics from each device for analysis and provides reports on system health and throughput.

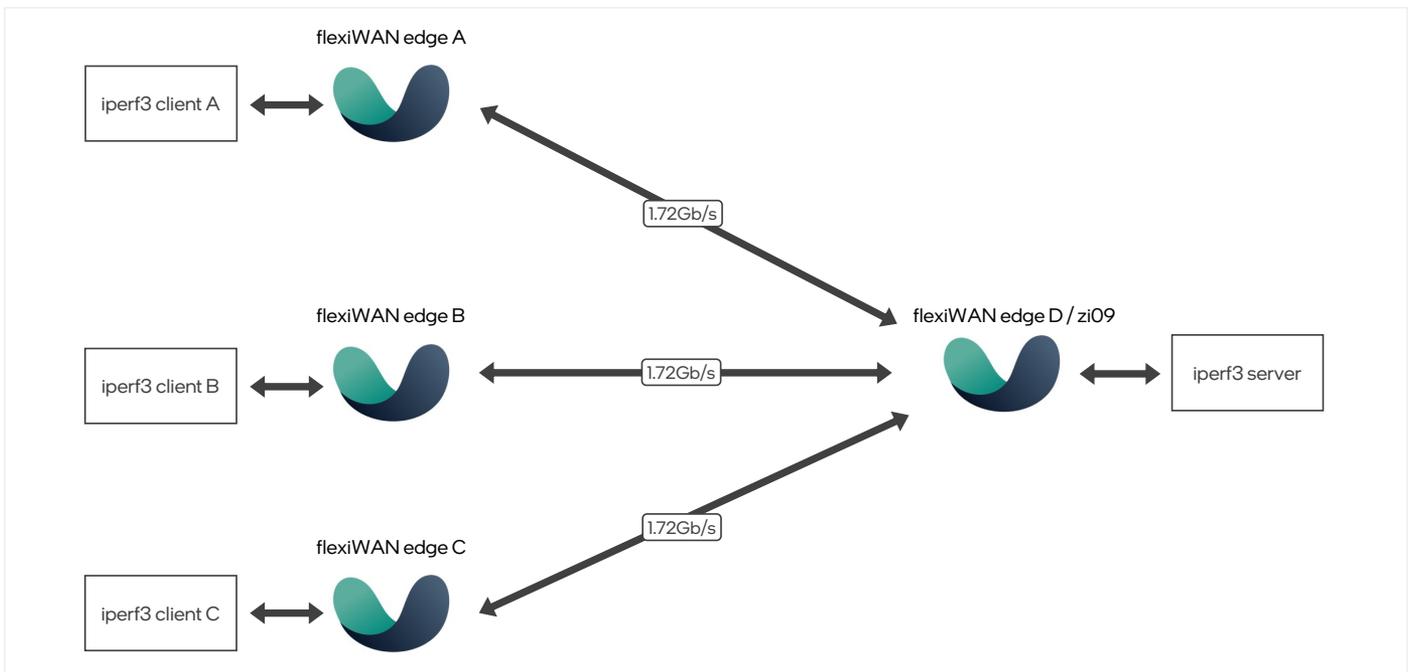


Figure 2. flexiWAN test configuration showing 1.72 Gbps throughput on servers running 3rd Generation Intel Xeon Scalable processors.

Testing Shows Gen-over-Gen Performance Increases

Using the Intel Network Builders Edge and Networking Testbed, a flexiWAN team has tested flexiWAN performance on servers powered by both 2nd Generation Intel Xeon Scalable processors and 3rd generation Intel Xeon Scalable processors.

The tests were conducted a year apart and involved not only newer processors but also new software features. The most recent test was conducted in February 2022 and used a server powered by dual Intel® Xeon® Gold 6342 processors - which are 3rd Gen Intel Xeon Scalable processors - operating at 2.80GHz. The previous test was conducted in March 2021 and utilized a dual-processor server powered by Intel® Xeon® Gold 6230N processors - which are 2nd Gen Intel Xeon Scalable processors - operating at 2.30GHz.

In both tests, the flexiWAN software was used, but in the February 2022 test a new version of the software was used which had multi-threaded CPU support.

As seen in Figure 2, the testing involved creating a hub and spoke network design connecting three flexiWAN edge servers based on Intel Xeon Gold 6230N processors to a centralized flexiWAN edge server (zi09 in Fig. 2) The zi09 server features two Intel Xeon Gold 6342 processors connected by 25 GbE Intel® Ethernet Network Adapter E810. Each spoke server was connected to an iPerf 3 traffic generator that generated wire speed traffic.

Using the multi-core capability, each tunnel was assigned to its own core. A core supports up to 1.72 Gbps data traffic. The testing team experimented with adding new tunnels and found that this had no performance effect.

The March 2021 testing shows performance of 2nd Gen Intel Xeon Scalable processors with a similar test configuration (See Fig. 3). Intel Xeon Gold 6230N processor-based servers were used at both the hub and spoke locations. The single threaded version of the flexiWAN software was used which required a core in the hub server for every spoke. Servers using the remote flexiWAN installations generated an encrypted (AES-CBC-128) tunnel with 853 Mbps of throughput – just about half the performance per tunnel of the more recent tests.

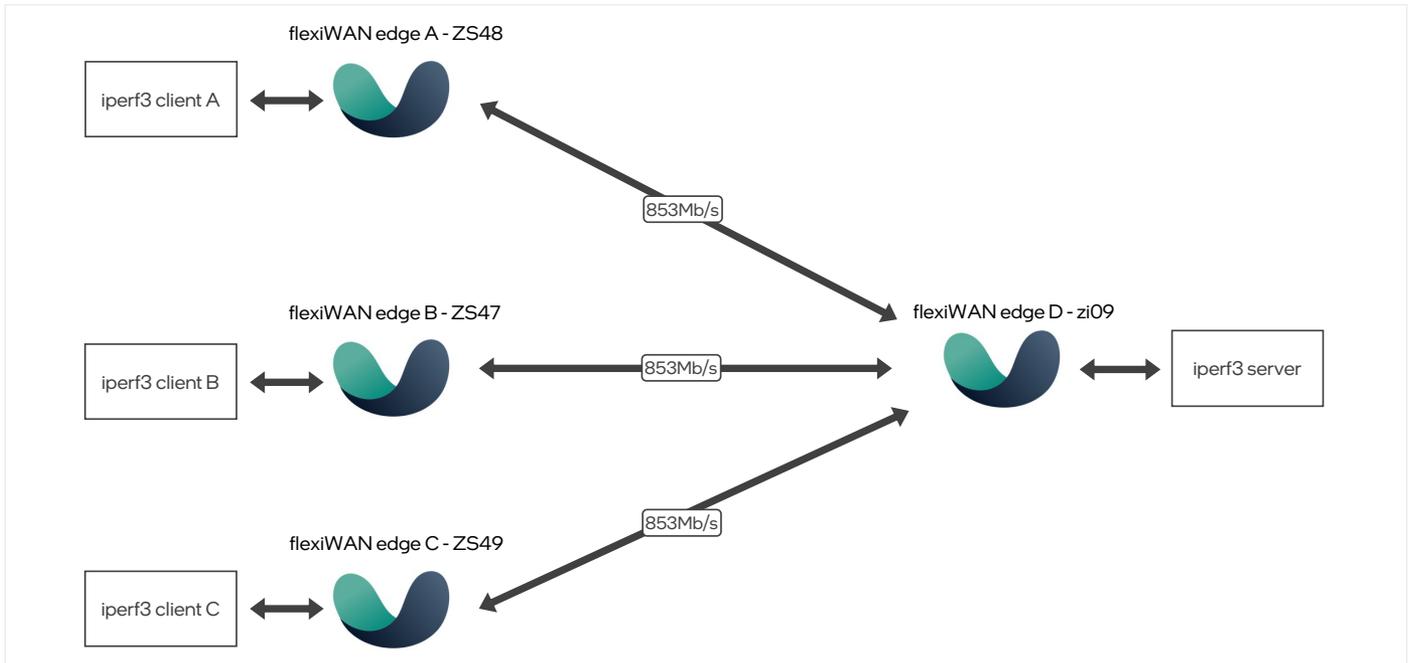


Figure 3. flexiWAN test configuration showing 853 Mbps throughput on servers running 2nd generation Intel Xeon Scalable processors.

Conclusion

Cost effectiveness and performance are two important features for branch office networking systems. The ability to double SD-WAN performance while supporting security functionality strengthens the flexiWAN solution for these branch office applications. Working with 3rd Generation Intel Xeon Scalable processors and a new version of the flexiWAN software that supports multi-threaded operations, the system was able to support up to 1.72Gbps WAN throughput per single CPU core. This level of performance – combined with the ability to support security applications – will help branch offices to keep networking and data security challenges from impacting user experience.

Learn More

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- [Intel® Xeon® D Processors](#)
- [Fast Data Project](#)



Notices & Disclaimers

¹3rd Generation Intel® Xeon® Scalable processor testing done by flexiWAN in February 2022. SUT featured dual-processor server utilizing the Intel® Xeon® Gold 6342 processors each with 24 cores. The server featured 384 GB of RAM. Network connectivity was provided by two 25 GbE Intel® Ethernet Network Adapters E810. The operating system was Ubuntu Linux release 18.04.6. The workload was multicore enabled version of flexiWAN.

²2nd Generation Intel® Xeon® Scalable processor testing done by flexiWAN in March 2021. SUT featured dual-processor server utilizing the Intel® Xeon® Gold 6230N processors each with 20 cores operating at 2.30GHz. The server featured 384 GB of RAM. Network connectivity was provided by two 25 GbE Intel® Ethernet Network Adapters E810. The operating system was Ubuntu Linux release 18.04.6. The workload was flexiWAN, without multicore function available at the time of testing.

Performance varies by use, configuration and other factors. Learn more on the [Performance Index site](#).

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

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