

Sandvine Increases PTS Performance with Intel® Xeon® Processors

In Sandvine tests with the Intel® Xeon® Gold 6150 processor, throughput of Policy Traffic Switch (PTS) Virtual Series increased up to 60%.¹



To create new services, communications service providers (CommSPs) need an ability to set up the rules of those services and then track them on a per user, per packet basis. Policy management tools are the technologies that ensure that every data packet sent or received by a customer complies with their service plan. Policy management is very processor intensive as it needs to examine and apply rules to all subscriber data streams in real time.



Intel® Network Builders ecosystem partner Sandvine worked with Intel to see how the added processing power from the new Intel® Xeon® Scalable processors could impact the throughput of its Policy Traffic Switch (PTS) Virtual Series. The Intel Xeon Scalable processors are based on an entirely new processor architecture—Intel® Mesh Architecture—with the scalability to deliver workload-optimized performance in network functions virtualization (NFV) applications.

When using the new CPU, Sandvine achieved significant performance advances,¹ which means CommSPs have the flexibility of adding significant business rules capacity, or meeting their current capacity with fewer CPU cores, freeing up processing capacity for other applications.

The Challenge

Policy management software is used by CommSPs to provide network policy control and enable the CommSP to set rules on data packets, matching any network or subscriber condition to any enforcement action. These rules correspond to various policies that define a service. For instance, a policy manager can determine if a data stream is part of a free Internet access promotion and apply rules that track the data, but don't charge for it. The rule variabilities and possibilities are endless, when considering devices, protocols, services, applications, media, traffic sources, and security risks across tens of millions of bidirectional data flows.

CommSPs are constantly challenged with the dilemma of balancing their demand for analyzing more business rules across ever-growing and changing traffic flows, against the computing power and capacity limits of their policy systems.

The Solution

The Sandvine Virtual Series is a virtual network function (VNF) that gives CommSPs access to real-time usage and historical reports, application- and subscriber-level control over their traffic, and protection for users from malware, botnet infections, known phishing sites, and other security threats. CommSPs can deploy the PTS Virtual Series on 10 GbE, 40 GbE, or 100 GbE-enabled servers depending on complexity of business rules and network capacity. Sandvine's PTS Virtual Series uses intensive machine learning to process bidirectional data flows that yield a wealth of insights on the network's makeup and security.

The Sandvine Virtual Series is available with subscription and per-core licensing, giving CommSPs the ability to scale dynamically and apportion resources to meet their business needs at any time. CommSPs have the flexibility to add more business rules and support multiple instantiations to dedicate to specific customers. Or they can split virtual machines (VMs) across cores and subdivide hardware so machines can be reclaimed for other uses. This flexibility means CommSPs' policy resources are always right-sized for their specific and dynamic needs.

What's New in the Intel® Xeon® Scalable Processors

The Intel Xeon Scalable processors are the successors to the Intel Xeon processor E5 and E7 product lines. These new processors offer a highly advanced compute core that enables communications networks to power through compute-hungry workloads and scale to meet the dynamic performance requirements. By optimizing network applications using Intel® architecture, key communications workloads can be converged, creating a framework for agility and low total cost of ownership while laying down a stable foundation for software defined initiatives, including network functions virtualization (NFV).

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

In its evaluation, Sandvine used a reference system based on the Intel Xeon Gold 6150 processor (see Table 1). The testing showed an increase in packet inspection throughput of up to 60% when compared to reference systems based on the Intel® Xeon® processor E5-2699 v3. This dramatic performance improvement, particularly with small packets (64- and 128-byte), led to higher density, higher throughput, and a larger number of business rules supported. For CommSPs, this performance increase means they can process more rules for each PTS Virtual Series instantiation, or that they can accomplish their same workload on fewer cores, freeing up resources for other VNFs or value-add services.

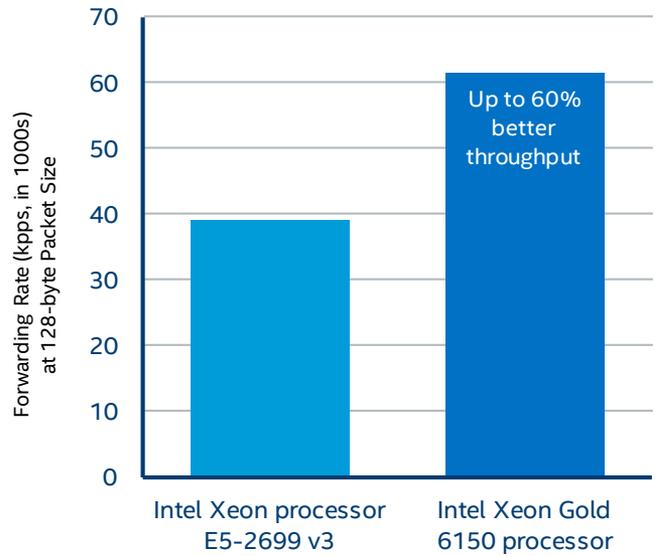


Figure 1. Performance improvements with the Intel Xeon Gold 6150 processor

Sandvine credits the L2 cache handling capabilities and DRAM addressing matrix of the new Intel® Mesh Architecture for the performance improvement. Although not a part of this test, Sandvine expects the Intel® Advanced Vector Extensions 512 (Intel® AVX-512) to play a role in future performance increases as well as performance improvements in the machine learning improvements of the PTS Virtual Series. The Intel AVX-512 is a 512-byte instruction set that allows the copying of the instruction set in and out of memory very quickly, caching of large amounts of instruction sets, and performance of very fast lookup.

| | REFERENCE SYSTEM 1 | REFERENCE SYSTEM 2 |
|-------------|--|-------------------------------------|
| PLATFORM | Dell* Poweredge* R630 | Intel Reference Platform |
| CPU | 2 x Intel Xeon processors E5-2699 v3 | 2 x Intel Xeon Gold 6150 processors |
| BIOS | 2.0.1 | PLYDCRB1.86B.012 8.R08.1703 24226 |
| DRAM | 128 GB DDR4 2400 MHz (8 x 16 GB) | |
| NIC | 4x Intel® 82599ES 10 Gigabit Ethernet Controller | |
| OS | CentOS* Linux* release 7.3.1611 | |
| KERNEL | Linux 3.10.0-514.6.2.el7.x86_64 | |
| HYPERVERSOR | qemu-kvm-1.5.3-126.el7_3.3.x86_64 | |
| VNF SIZING | 3vCPU (6 pCPU threads), 64 GB RAM | |

Table 1. Specifications of the two reference systems used to test the performance of the Sandvine PTS Virtual Series.

Conclusion

The processor-intensive nature of the Sandvine PTS Virtual Series means it can leverage all of the additional compute power provided by the Intel Xeon Gold 6150 processor. This means CommSPs can utilize that added performance to track newly defined services or reduce the number of processor cores needed for their tracking, which would allow use of those resources to other VNFs on their NFV servers.

About Sandvine

Sandvine's network policy control solutions add intelligence to fixed, mobile, and converged communications service provider networks to increase revenue, reduce network costs, and improve subscriber quality of experience. Sandvine's networking solutions perform end-to-end policy control functions, including traffic classification, policy decision, and enforcement. Deployed as virtualized network functions or on Sandvine's purpose-built hardware, the products provide actionable business insight and the ability to deploy new consumer and business subscriber services, optimize and secure network traffic, and engage with subscribers. Sandvine's network policy control solutions are deployed in more than 300 networks in over 100 countries, serving hundreds of millions of data subscribers worldwide. <http://www.sandvine.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 Sandvine using its Sandvine PTS Virtual Series. Configurations: The tests compared a reference system based on two Intel Xeon processors E5-2699 v3 with 128GB DDR4 RAM and four Intel® 82599ES 10 Gigabit Ethernet Controllers with a reference system based on two Intel Xeon Gold 6150 processors with the same RAM and network controllers. Full details for the systems under test are available in Table 2.

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