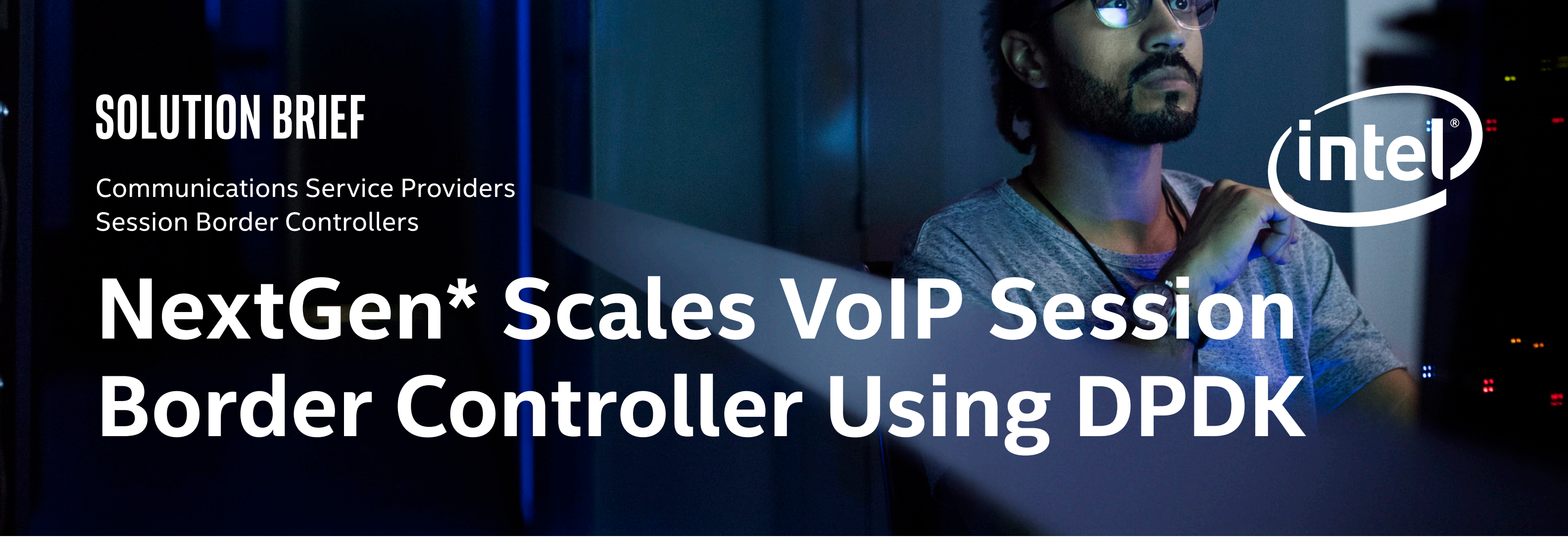

SOLUTION BRIEF

Communications Service Providers
Session Border Controllers

NextGen* Scales VoIP Session Border Controller Using DPDK

Tests show that NextGen's virtualized NX-B5000 SBC, running on Intel® Xeon® processor-based servers can deliver up to 30,000 concurrent sessions with improved packet processing performance from implementing Data Plane Development Kit.[1]

Introduction

Virtualizing the technologies utilized in communication service provider (CommSP) networks requires engineering the new virtualized solution to have the same or better performance than its legacy appliance-based predecessor. For virtual session border controllers (SBCs), the challenge lies in scaling up support for concurrent sessions to ensure they meet the call volumes of service provider networks.

NextGen Inc.* is an Intel® Network Builders ecosystem member. The company's NX-B5000 is a network functions virtualization (NFV)-based all-software SBC that has solved its session scalability challenge by implementing Data Plane Development Kit (DPDK) software for a dramatic increase in the number of sessions it can support.[1]

The Challenge

SBCs are integral to communication service provider (CommSPs) networks that support IP-based voice and video services. SBCs process call signaling and session initiation services that also include protocol interworking and network security. When a voice over IP (VoIP) call is made, a session is created between the caller and call recipient. The SBC will manage the call signaling and the data flow, quality of service (QoS), and session state of the call across the network borders—that is, the demarcation between the enterprise and CommSP and other networks that are involved in completing the call.

In many cases, these different networks support different session protocols, including session initiation protocol (SIP), H.323, media gateway control protocol (MGCP), and others, requiring the SBC to transcode the packets. The last major category of SBC function is security, which includes helping to protect the network from denial of service attacks and encryption of signaling data.

SBCs are a relatively new addition to the CommSP network, and the market for virtual SBCs is growing as the VoIP and IP video services they support expand in terms of users and amount of data. CommSPs seek agile service deployment to support these IP services without sacrificing the scalability of concurrent data flows needed to meet the call volume.

By integrating its NX-B5000 SBC with DPDK technology, NextGen has been able to meet the increased session demands of one of Japan's largest communications service providers.

The Solution

The NextGen NX-B5000 SBC is a carrier-grade, virtual SBC that supports VoIP network interconnection with a network-network interface (NNI) for CommSP network interconnection and a user-network interface (UNI) for provisioning enterprise VoIP services. Two key components make up the NX-B5000:

- NX-B5000 Session Controller: Provides SIP signaling, session set up and tear down
- NX-B5000 Media Controller: Provides real-time transport protocol (RTP) voice packet control

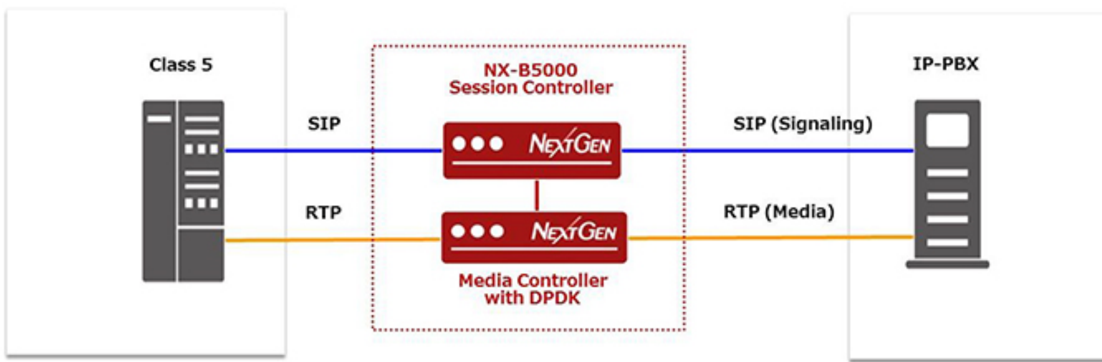

Figure 1. Architecture of the NX-B5000 showing the role of the Session Controller and Media Controller[2]

The NX-B5000 is also equipped with security features, including encryption, firewall, and denial of service (DOS) detection. Other features include voice logging, transcoding, and jitter buffering. The NextGen SBC has been implemented in some of Japan's largest domestic CommSPs and enterprises.

To meet these customers' requirements for increased capacity, NextGen recently updated the NX-B5000 to support DPDK to increase the number of concurrent sessions supported. DPDK is an open source technology of libraries and drivers that support fast packet processing by routing packets around the OS kernel and minimizing the number of CPU cycles needed to send and receive packets. DPDK libraries include multicore framework, huge page memory, ring buffers, and poll mode drivers for networking and other network functions.

10X Concurrent Session Support with DPDK[1]

In tests conducted by the company, the session capacity of the NX-B5000 Media Controller increased to 30,000 concurrent audio sessions after the integration of DPDK (v16.11.3).[1] The tests were conducted on RTP sessions and the test setup included an external RTP stream generator and receiver, which generated sessions and transmitted them to the NX-B5000 device under test (DUT), where the packets were processed and then transmitted on to another RTP stream generator and receiver where turnaround time and stream connection statistics were logged.

The DUT machine was a server based on dual Intel® Xeon® processors E5-2630 with 10 cores per processor (20 cores per server). Figure 2 presents the results of the test. Eight cores were used, with the packet processing pipeline consisting of six of those cores. The test connection range was configured at between 12,000 and 30,000 sessions. As the connection load increased, CPU usage also increased, but turnaround time remained steady.

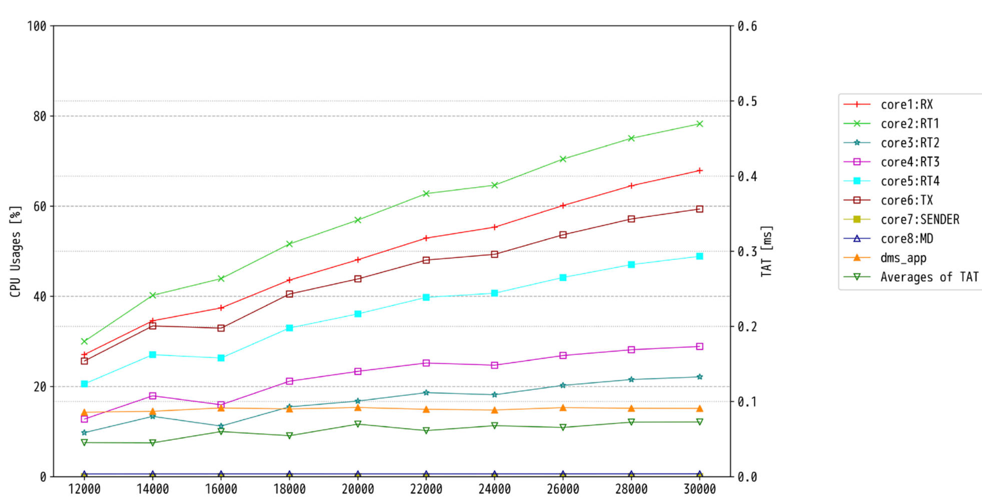

Figure 2. Results of NextGen's testing of the DPDK-enabled session capacity of the NX-B5000 Media Controller[1, 2]

Intel Xeon Processors E5-2600 v4

NextGen has standardized on servers that utilize Intel Xeon processors E5-2600, a processor platform for networking applications. Manufactured on Intel's 14 nm processor technology, the devices feature memory bandwidth for fast data transfers for compute-intensive applications. The CPUs support Intel® Virtualization Technology (Intel® VT) for IA-32, Intel® 64 and Intel® Architecture (Intel® VT-x), which allows them to be abstracted to a virtual machine with little or no performance impact.

Conclusion

As IP voice services grow in popularity, CommSPs need higher capacity SBCs to manage the sessions across network borders. With its DPDK integration, NextGen has expanded the session capacity of its NX-B5000 SBC to support the needs of its CommSPs customers throughout Japan.[1]

About NextGen

NextGen Inc., founded in Tokyo in 2001, is known for SIP/VoIP expertise and for pioneering the session border controller market in Japan. The company has expanded to include security, voice logger, IP PBX, and other communications solutions for enterprises and communications/cloud service providers. More information (in Japanese) is at: https://www.nextgen.co.jp. For information in English, go to this URL: https://www.nextgen.co.jp/english.

About Intel® Network Builders

Intel® Network Builders is an ecosystem of infrastructure, software, and technology vendors coming together with communications service providers and end users to accelerate the adoption of solutions based on network functions virtualization (NFV) and software defined networking (SDN) in telecommunications and data center networks. The program offers technical support, matchmaking, and co-marketing opportunities to help facilitate joint collaboration through to the trial and deployment of NFV and SDN solutions. Learn more at http://networkbuilders.intel.com.

[1] Testing conducted by NextGen. Base configurations: Dual Intel Xeon processors E5-2630 v4 operating at 2.2 GHz and 65Gb of RAM. Virtualization was enabled utilizing Intel® Virtualization Technology (Intel® VT) for IA-32, Intel® 64 and Intel® Architecture (Intel® VT-x). Connectivity was provided using Intel® Ethernet Converged Network Adapter X540. Compared base configurations test with DPDK version 16.11.3 enabled.

[2] Figures provided courtesy of NextGen Inc.

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