

The Future-Ready Session Border Controller

Introduction

Service providers of all types are experiencing significant challenges causing them to re-evaluate existing business models and look for more innovative ways to transform themselves both technically and commercially.

Confronted with declining average revenue per subscriber (ARPU), and competition from new cloud-based entrants, along with the constant change in technology, service providers are seeking new ways to reverse the impact from the downward pressure on revenue with both new and non-traditional sources. Opportunities from SIP trunking, IMS/VoLTE services, 4G roaming, and competitive IP and WebRTC-based, white labeled real-time communications services are helping to transform their traditional minutes-based business model.

Moving from basic TDM-VoIP interconnect and termination services to IP exchange (IPX) services, SDN WAN transport, and hosted value added services delivered over an “all-IP” interconnection appeals to mobile and fixed operators, MVNOs, next gen service providers, and multi-national enterprises looking for connectivity, security, cost transparency, CAPEX conservation, and rapid time to market.

The Evolution of the Session Border Controller

The Session Border Controller (SBC) has evolved over the past several years to solve a diverse and complex set of challenges in securely and reliably interconnecting all types of IP-based real-time audio and video services. As traditional high-scale mobile and fixed line voice networks have evolved to IP Multimedia System (IMS) networks, the SBC has become an essential network function providing security and interconnection between the IMS and other IP-based networks. SBCs also provide accessibility at the network edge to enable end-to-end IP service continuity for all types of mobile and desktop devices. The SBC also provides security for both service provider core networks and enterprise networks:

- For service provider networks, SBCs secure and enable interworking between IMS/VoLTE and NGN interconnection points as well as core network functions including application servers (AS)
- For service providers connecting enterprise networks with SIP trunks, SBCs provide security to mission critical enterprise applications and end devices

Due to the heavy processing and media handling demands placed on SBCs, they have historically been built and deployed as purpose-built platforms on customized hardware. High reliability and high availability are typically architected directly into these platforms to ensure continual service delivery even under fault conditions. Service provider engineering staffs use capacity planning and conservative deployment models to ensure continual service delivery under high network load conditions. Real-time telecommunication infrastructure elements like SBCs are typically underutilized by 30-50% on purpose to make sure that the individual devices are never overwhelmed by network-degrading traffic spikes that can impact customer quality of experience (QoE).

As service providers begin migrating to virtualized infrastructure, virtual SBCs are expected to provide high quality performance and deterministic operational characteristics like its purpose-built alternative. Many of today’s virtual SBCs are perpetuating past architectures used in purpose-built implementations to maintain performance and high QoE as well as to facilitate the porting to a virtualized environment with a minimum of code change in two different fundamental ways:

- Media and signaling handling are separated onto different virtual network functions in separate virtual machines
- Statically pre-allocating compute platform virtual CPUs (vCPUs) for different flow types to ensure virtual network infrastructure is not overwhelmed by any single high-intensity packet flow or processing requirement, such as management, signaling, media, transcoding, and encryption

Unfortunately, this attempt to maintain performance and high QoE when porting to a virtualized environment can have the reverse effect and can lead to potential inefficient use of vCPU resources. Cloud native capabilities are needed that make optimal use of virtualized computing resources to better handle diverse traffic profiles without creating static silos of either stranded vCPU capacity or overload conditions.

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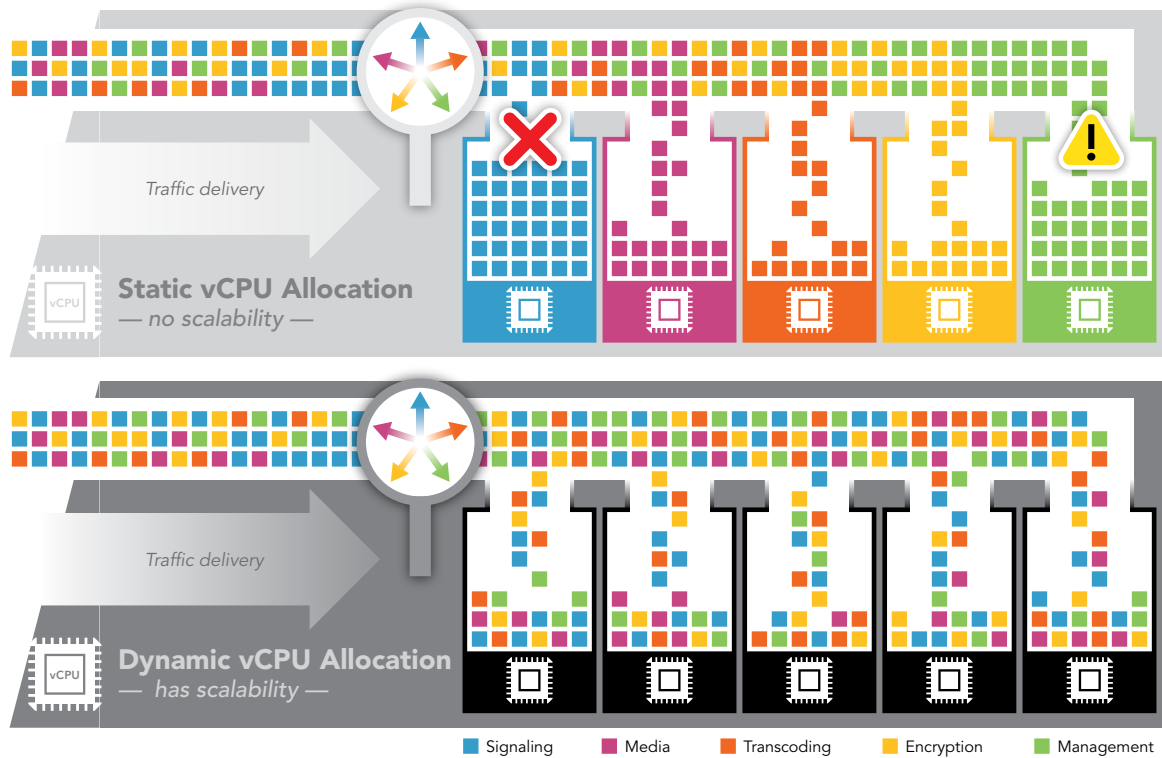


Figure 1. The Dialogic® BorderNet™ SBC efficiently utilizes all virtual CPU resources available while dynamically and elegantly preventing system overload. Other SBCs typically pre-allocate vCPUs to handle specific processing loads which can quickly restrict a virtual SBC’s ability to scale under load. The result is costly with underutilized compute resources sitting idle. The BorderNet SBC allows dynamic sharing of all resources across all traffic and processing profiles providing a highly attractive price/performance curve across all types of network infrastructure.

An architecture that is not inherently designed to efficiently scale in the cloud can negatively impact the transition from hardware appliance-based SBCs to virtualized SBCs and raises questions regarding the long-term viability of the business case of moving SBCs to cloud deployment models. Static resource pre-allocation models drive higher operational and capital costs and put the engineering and monitoring burden on the SBC operator. Simultaneously it creates the likelihood for significant resource under-utilization as traffic profiles and associated processing requirements vary over time across specific virtual SBC compute infrastructure.

Today’s real-time communication service providers are looking for ways to sustain their existing businesses by reducing capital and operational costs while simultaneously building new lower-cost cloud-based services that can scale geographically with traditionally high customer QoE. The architectures and associated business models of the past are under significant pressure to evolve.

Dialogic® BorderNet™ Session Border Controller Overview

The BorderNet SBC provides comprehensive and secure signaling, call control, and media termination for both VoIP and IMS-based mobile and fixed line network operators. The BorderNet SBC is typically deployed on network edges to securely interconnect service provider networks core functionality and infrastructure. It is also used as a demarcation between service providers and enterprises for SIP trunking services and other access services. The BorderNet SBC manages incoming and outgoing signaling and media traffic for peering between all types of mobile and fixed core networks, as well as for access service delivery to mobile subscribers, consumer and business VoIP users, and enterprise networks.

Efficient Use of Virtualized Resources

The BorderNet SBC software delivers industry-leading performance while simultaneously reducing service provider virtual SBC total cost of ownership (TCO) by efficiently and effectively leveraging today’s powerful multi-core compute platforms in a way that automatically enables superior network infrastructure resource utilization. BorderNet SBC software has been architected to dynamically distribute processor loads across all platform vCPUs while simultaneously protecting each vCPU from overload. The highest level of performance is achieved without the

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typical manual, tedious, and recurring engineering costs associated with designing, deploying, and operating today's current virtual SBCs. The virtual BorderNet SBC enables operators to achieve maximum financial benefit from their network compute infrastructure investment by supporting a dynamic compute resource allocation model.

Revenue and Network Protection

The BorderNet SBC helps protect revenues by securing and protecting application servers from malicious entities. It does this by blocking the malicious traffic as well as concealing private network topology from potential attacks. It enables new revenue opportunities and speeds time to market by providing extensive protocol normalization and interworking for both interconnect and access networks, thereby ensuring that VoIP networks and applications of all types can communicate and interwork with each other. It also optimizes service delivery by managing bandwidth usage and prioritizing call sessions for both network interconnections and for service delivery to individual UEs.

COTS and Cloud Scalability

The BorderNet SBC is a software-centric solution that can be deployed using the same software in a virtual machine in a private or public cloud, or using a Commercial-Off-The-Shelf (COTS) X86-based multi-core server depending on the application. A wide variety of virtualization technologies are supported including Xen, VMware, and KVM to help service providers implement their Network Function Virtualization (NFV) strategy. This increases service provider agility by supporting unparalleled scalability (25 to 100,000 sessions) and high performance across a wide range of traditional and next generation deployment models with the same SBC software.

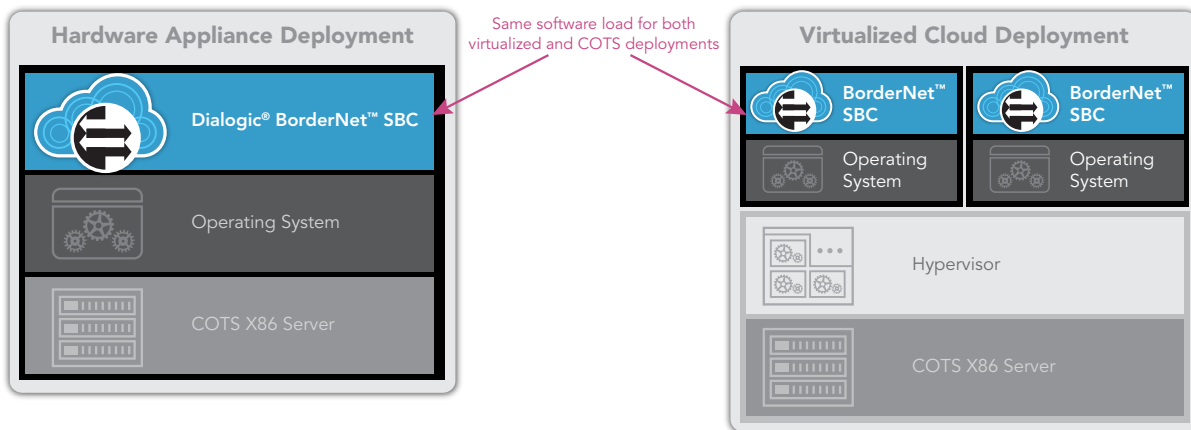


Figure 2. The Dialogic BorderNet SBC is a single-software solution. The same SBC can be deployed on either a COTS or virtualized appliance providing scalability from low to high session volume traffic scenarios.

Native Software Transcoding

Agile media interworking is achieved by highly efficient codec transcoding and transrating, which can be performed both natively within the BorderNet SBC software or through on-board DSP resources in the COTS deployment model. All integrated BorderNet SBC media handling is based on decades of DSP and in-house media expertise, resulting in industry leading efficiency and quality with a highly attractive cost model that lowers the performance and cost barriers to implementing software-based transcoding in forward looking cloud and NFV environments.

Summary

The software-centric BorderNet SBC, whether deployed on a COTS platform or as a virtual cloud-based element, creates owner value through increased agility, lower TCO, and investment protection. Its unique architecture, single code base, and unparalleled native software media transcoding and transrating capabilities protect operator investments with a future-ready solution that can be deployed on COTS today and gradually evolve through virtualization to a private, public, or NFV-based cloud without losing the investment in software licensing or operational knowledge. The all-software BorderNet SBC is designed to meet today's VoIP network access and peering challenges while seamlessly evolving to support cloud models of all type.



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