(intel)

Improving Consumer Experience with vBNG Solutions from Intel and Benu Networks

Executive Summary

The Benu Networks vBNG with hardware acceleration from Intel offers the flexibility of a software solution with the performance of a custom hardware solution. The virtual broadband network gateway (vBNG), running on the Benu Networks' SD-Edge Platform, helps service providers streamline packet processing as well as gain agility, optimize network performance, and reduce costs. The vBNG separates the control plane and the data plane for increased flexibility, making it possible to deploy both centrally and at the distributed edge. The flexible, open architecture supports service stitching on top of the breadth of functionality native to the vBNG. Service providers can now consolidate functions, such as TDF/DPI, CGNAT, SG, and BNG, into a single virtualized platform for ultra-low latency and high performance. With the Benu Networks vBNG, service providers can go beyond just providing a 'dumb pipe' broadband connection and instead rapidly provision value-added services that reduce churn and increase average revenue per user (ARPU). The Intel® FPGA Programmable Acceleration Card (Intel FPGA PAC) N3000 is designed to accelerate network traffic for up to 100 Gbps. Based on Intel FPGA technology, low latency and competitive performance per watt and field programmability make the Intel FPGA PAC N3000 a strong fit for leading-edge technologies such as vBNG.

Introduction

Modern consumer expectation and demand, particularly from the lens of a managed service provider, is constantly shifting. Buying behavior and criteria have drastically changed - gone are the days when triple-play deals created great value to consumers and helped drive ARPU growth for service providers. Nowadays, residential subscribers are moving to single-play broadband access, which adds pressure for managed service providers to create customized, cutting-edge offerings that continue to impress consumers.

Business Challenge

Managed service providers are faced with the challenge of delivering a cost-effective, easy-to-use solution that will provide their residential subscribers with flexible, performant offerings at an affordable rate. However, this level of agility has proved difficult to achieve for most managed service providers, who still depend on hardware to manage subscriber sessions, authentication, and more. Plus, the need to reduce operational and capital expenses in the midst of margin erosion adds an additional layer of complexity for managed service providers to manage.

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Solution

The Benu Networks vBNG offers advanced subscriber management, dynamic routing capabilities, as well as a robust set of functionalities that empower service providers to become more agile, dynamic, and scalable to meet consumer demand.

The vBNG helps service providers rapidly achieve their vision for agility by streamlining packet processing as well as separating the control plane and data plane for dynamic scaling, added agility, optimal network performance, and cost reduction.

The flexible, open architecture supports service chaining on top of the breadth of functionality native to the vBNG. Service providers can now consolidate functions, such as TDF/DPI, CGNAT, SG, BNG, and AGF into a single virtualized platform for ultra-low latency and high performance.

With the following vBNG benefits, service providers can increase revenues:

- Service agility
- 3rd-party service stitching
- Services not limited by CPE (vCPE)

vBNG also decreases costs by

- Providing cost-effective distributed BNG architecture
- Consolidating functions (Traffic detection function (TDF)/deep packet inspection (DPI), carrier-grade NAT (CGNAT), SG, broadband network gateway (BNG), access gateway function (AGF)) in a single virtualized platform
- Leveraging hardware acceleration for enhanced performance

As a part of the Benu Platform, the vBNG provides a breadth of functionalities including:

- Device level policies
- Analytics
- Interconnect
- DPI
- CGNAT
- Authentication
- Authorization
- Accounting
- IP Addressing
- Bandwidth management
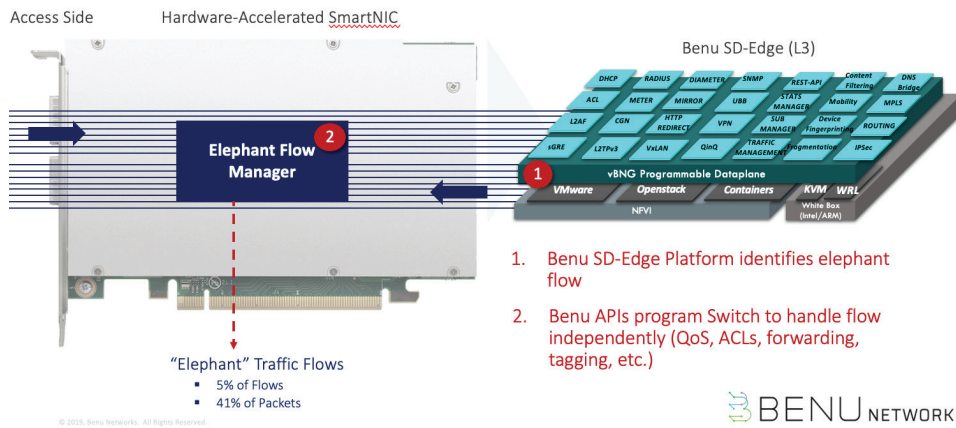- Service policies
- Lawful intercept

Figure 1. Benu vBNG Hardware Acceleration: Optimize Scaling and Cost
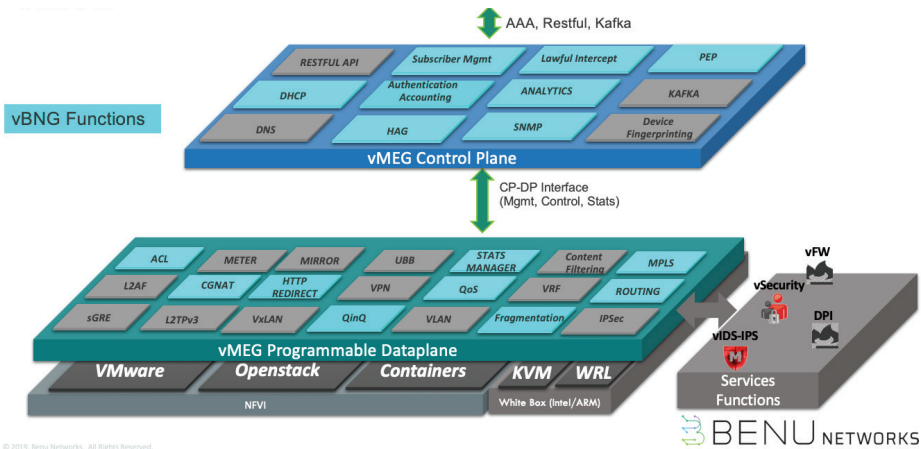

Figure 2. vBNG Functions

The Benu Networks' vBNG and SD-Edge Platform coupled with Intel FPGA PAC N3000 yields the best price performance ratio, delivering higher throughput at lower price point by dynamically offloading select functions to the hardware. With this solution, operators can become more efficient and have a compact footprint – less rack space is needed, less cooling is required, and less power consumed per bit. With this solution, operators can offload certain functions to hardware so that less cores are dedicated to BNG functions to optimize overall performance.

Using vBNG and Benu Platform with Intel FPGA PAC N3000, enables service providers to provide the following benefits:

- **Simplify network** – Eliminate dependencies on legacy equipment, plus leverage the intelligent data plane to virtualize and simplify processes
- **Increase performance** – Improved performance and unmatched capacity/box from workload virtualization ensures a highly performant network
- **Future-proof network** – Benu's vBNG empowers network scalability and agility, equipping teams with the ability to meet current and future customer demand and the Intel FPGA-based PAC N3000 allows for field programmability
- **Rapidly realize return on investment (ROI)** – Lower total cost of ownership coupled with the ability to swiftly implement new revenue streams helps teams quickly see return on their investment.
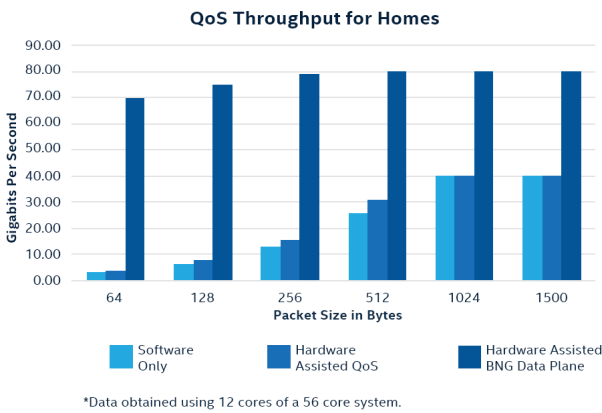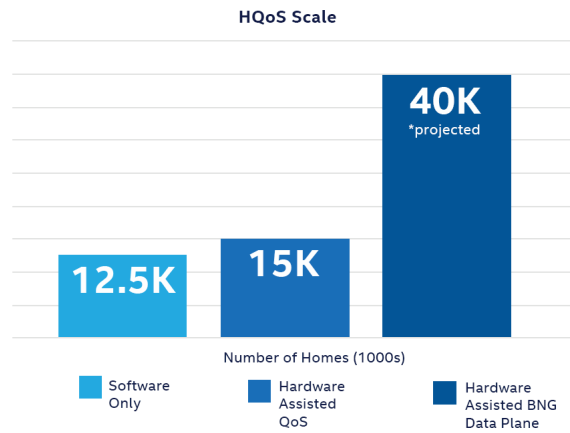

Figure 3. Bandwith

Figure 4. Expand Capacity with Hardware Acceleration

Deployment Options

The Benu Platform offers hybrid deployment options, seamlessly fitting into the network architecture already in place, for a truly frictionless virtualization option. Benu Networks' virtual Multiservice Edge Gateway (vMEG) is virtual software solution which runs Benu Networks' operating system (BenuOS) for deploying next generation IP services to the edge and core of the network. These options include:

Premises (Far Edge)
- Whitebox uCPE
- 1U Server

Access Edge (Near Edge)
- vMEG
- 1U Server
- 2U Servers

Central Office (Data Center)
- vMEG
- 2U Servers

Proof Point

"Our network has relied on Benu Networks' software for 4 years, on dedicated appliances. We're thrilled to see the addition of a vBNG to their platform," said Khetan Gajjar, CTO of VAST Networks. "One of the key challenges we face, particularly as Africa's leading Wi-Fi provider of services is our ability to be agile and dynamic with the services we offer and scaling these efficiently while retaining our standard of performance. We currently do this with the SD-Edge Platform to millions of users. Now, with the Benu vBNG, we won't have to think too hard about the scaling required to tailor services to each customer and building out new offerings and scaling to tens and hundreds of millions of users. A vBNG also allows us to deliver network scale much closer to the edge and allows us to expand into markets much more cost effectively."

Conclusion

The vBNG virtualizes integral network functionality, empowering service providers to seamlessly transition to a cloud-based 5G ready network. Benu Networks' technology simplifies the complexity of network optimization, helping service providers rapidly scale their offerings, manage their network, and ensure the service experience. By disaggregating legacy network structures and eliminating hardware dependencies, service providers are free to move towards a modern network, reduce costs, and improve customer experience. By using the Intel FPGA PAC N3000, service providers can focus lower-tier process specific workloads directly to the card while keeping the higher priority compute-intensive workloads on the CPU.

Call to Action

To schedule a demonstration, visit
https://benunetworks.com/contact-us/