

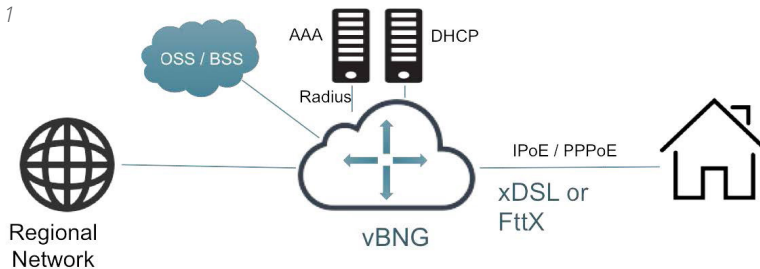
Casa Systems Axyom™

Virtualized Broadband Network Gateway (vBNG) Router

Winning and keeping Internet services customers has never been tougher. Service providers face a range of competition in a business that requires rapid response but is still capital intensive. They need partners who are fast enough to get them ahead of their competition and committed to keeping them there, which is why more and more, leading providers depend on Casa Systems.

Casa's Axyom™ Virtualized Broadband Network Gateway (vBNG) provides advanced subscriber management and routing capabilities in a virtualized solution that enables the elastic scaling and service agility today's dynamic Internet services environment requires. Built from the ground up as a cloud-native solution for both OpenStack and container-based cloud networks, Casa's Axyom vBNG delivers the performance, scaling, and flexibility needed to address the greater diversity of 5G broadband demands. Through a unique design that disaggregates network functions, streamlines packet flows, enables independent and dynamic scaling of control and data planes, the Axyom vBNG delivers superior throughput in both centralized and distributed architectures.

Figure 1



Customers who choose the Axyom vBNG can expect full BNG functionality, from a cloud-native virtualized solution.

- IPoE and PPPoE access methods and MPLS as well as direct Ethernet L2 connections for business customers
- Enhanced subscriber and session management and Layer 2 / Layer 3 edge routing for xDSL or PON access technologies
- AAA Radius and Diameter protocols
- Hierarchical QoS for subscriber traffic with traffic shaping and rate limiting for traffic management.
- Routing support for both unicast and multicast with MPLS
- CLI and SNMP management, and Lawful Intercept support

Highlights

Built for the Cloud

The Axyom vBNG was built for the cloud, from the ground up, in Casa's Axyom micro-services based virtualization framework and is deployable in OpenStack-based VM or container-based environments

Independent, Automatic Scaling of Control and Data Planes

The Axyom vBNG offers separation of control and data planes and is designed for redundancy and multi-dimensional scaling so service providers have assurance, service agility, and faster time to market

Disaggregation of Network Functions

Not only are control and data planes separated, but the data plane can also be distributed to Casa's OLT-A, reducing the traffic that has to traverse the vBNG data path, further increasing the Axyom vBNG's capacity, and giving service providers the ability to flexibly centralize or distribute functions as needed

Industry Leading Throughput

Up to 200Gbps per server, dynamically scalable to terabits per second

Advanced Subscriber Management

Advanced Subscriber Management features including per subscriber QoS and policy-based routing

Axyom Virtual Broadband Network Gateway (vBNG)

The Axyom vBNG gives service providers key benefits in the race to attract and retain high speed data customers:

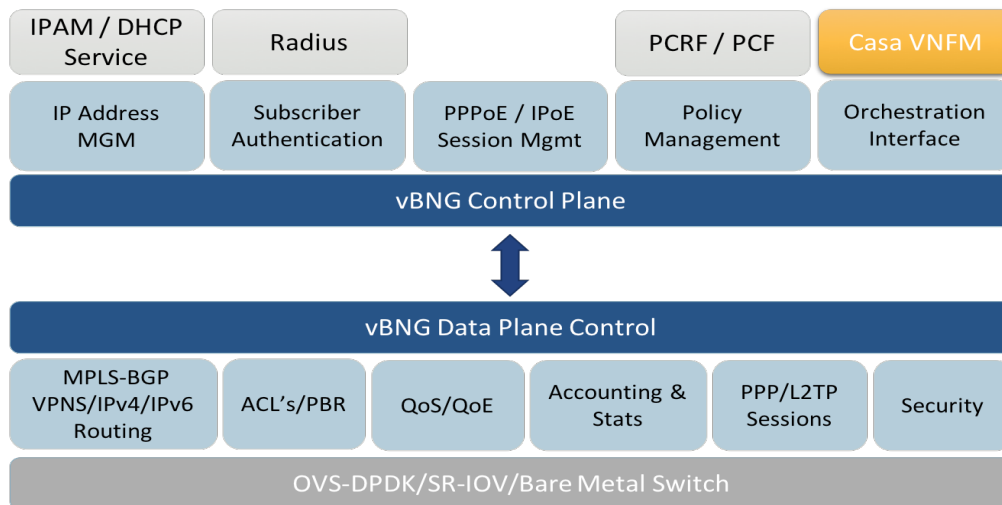
- Network simplification: reduced equipment requirements by replacing multiple legacy Broadband Remote Access Server (BRAS) and BNG chassis with Casa’s vBNG
- Network flexibility: independent, dynamic scaling of control and data planes and, uniquely, the ability to offload the data plane to the OLT-A
- Service agility: increased control over and ability to differentiate the user experience with elastic scaling, per-subscriber QoS, policy-based routing, captive portals, and DHCP relay

Control and Data Plane Separation

The Axyom vBNG software architecture separates control and data plane functions and decomposes those functions, as shown in figure 2 below. This enables not only independent scaling, but also the flexibility to put the control plane and data plane where they make the most sense - on the same server in the data center / CO, different servers, or even in different locations (e.g., the data plane can be distributed closer to the end user). The API between the control and data plane works in any of these scenarios.

Figure 2

Cloud-Native, Decomposed Axyom vBNG Architecture Control Plane and User Plane Separation



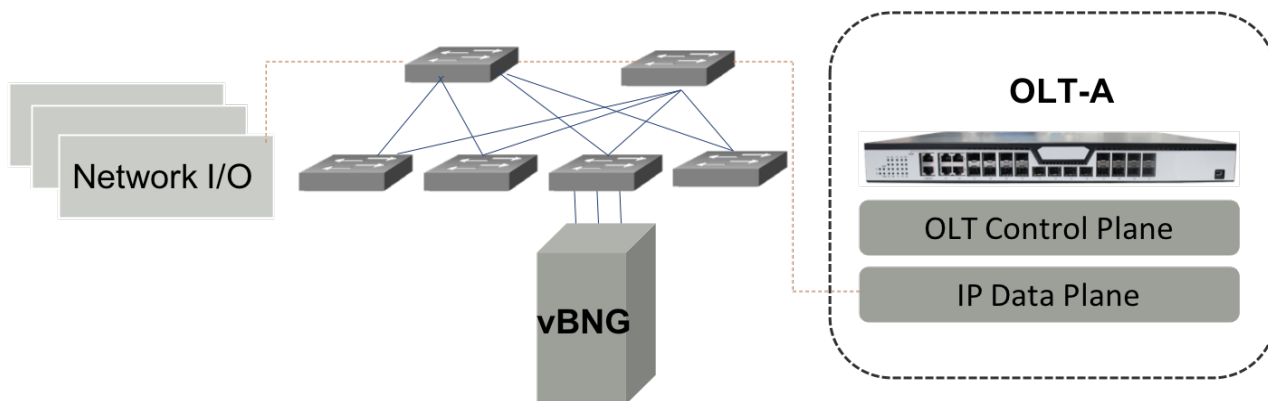
Data Plane Convergence

With data plane separation on the vBNG, service providers can more simply converge or co-host Wireline and Wireless user plane functions on the same hardware and chain the functions together to differentiate services and maximize investments.

Data Plane Offload to OLT-A

Casa's vBNG solution uniquely incorporates the ability to offload data plane traffic to Casa's OLT-A, further increasing the capacity of the vBNG. The OLT-A is a next generation OLT that supports both XGS-PON and NG-PON2, has full L2/L3 routing and QoS capabilities built in, and supports OpenFlow for dataplane and NETCONF/YANG for control plane programmability. When deployed together, the initial subscriber authentication traverses the vBNG data plane, but subsequent data packet flows go directly from the OLT-A to / from the spine switch (as shown in figure 3 below). This reduces the number of hops for the packets and also reduces capacity load on the vBNG data plane compute server. The OLT-A can reside in the same Central Office as the vBNG or be distributed to a location closer to the subscriber.

Figure 3



Axyom Virtual Management Controller

Like all of Casa's Axyom solutions, the vBNG benefits from the Axyom Virtual Management Controller (VMC) which provides simplified VNF onboarding and life-cycle management, FCAPS-facilitated integration with OSS/BSS systems, northbound interfaces (Open Source MANO and OpenO), and granular service assurance enablement, the capacity to process numerous system and application-level KPIs, and auto-scaling of VNFs to meet application level or infrastructure KPI thresholds.

Features

Access Methods	<ul style="list-style-type: none"> • IPoE / PPPoE sessions • Direct Ethernet • MPLS Pseudo-wires
Authentication and Authorization of Subscriber Sessions	<ul style="list-style-type: none"> • Authentication/Authorization/Accounting via RADIUS and Gx interface • IPoE/DHCP (Relay and local server) • IPv4 and IPv6 support • Walled Garden • PPPoE Sessions • RADIUS Change of Authorization (COA)
Traffic Management	<ul style="list-style-type: none"> • Per subscriber QoS • Traffic policing/shaping/rate limiting • H-QoS • HTTP redirect • RR and WFQ scheduling • Unicast Reverse Path Forwarding • Hybrid Access
L2/L3/MPLS	<ul style="list-style-type: none"> • 802.ad (QinQ) for 1:1 and N:1 VLAN classifications • Layer 3 routing/OSPF / BGP / RIP / IS-IS / Policy-based routing • MPLS (L2 and L3 MPLS VPNs); LAG/LACP • PIM-SM / IGMP MLDv2
Management	<p>Element Management function interfaces with OSS/BSS for provisioning, fault and performance management::</p> <ul style="list-style-type: none"> • SNMP, NETCONF/YANG • VNFM: Interface to OpenStack • Lawful Intercept
Scaling and Throughput	<p>Independent scaling of control and data planes Up to 200 Gbps per 2 RU server, scalable to Tbps</p>