Data Sheet

5x9 vBBRAS system

Virtual Form Broadband Edge

Highlights

5x9 vBBRAS is a turnkey broadband edge solution based on virtual form factor. From scratch developed and highly optimized, it enables operators to seamlessly move network edge from dedicated hardware to cloud with maximal efficiency and flexibility.

Key Features

- Turnkey solution consists of all elements required for fast and easy broadband edge deployment and production
- Extremely simplified system design which ensures performance, stability and fast feature delivery
- Includes provisioning, management, redundancy, scalability and elasticity tools
- Innovative built-in feature approach that enables easy system every day operation and automated workload distribution
- Designed to work on COTS x86 hardware and with all major virtualization platforms
- Single vBF instance (single VM) supports over 10 Gbps of traffic for 500 bytes packet size, 20k users and 150 cps
- Over 200 Gbps and 50 Mpps performance per compute node for 500 bytes packet size
- Answer to forwarding plane challenges is simple and automated horizontal vBF scaling
- Clearly visible CapEx and OpEx savings via fair licensing and SLA policies

Product Overview

5x9 vBBRAS system is designed with the goal to deliver two major SDN/NFV promises, reduction of network complexity and investments – both capital and operating. vBBRAS system is intended for operators that are looking for fast and easy-to-integrate turnkey solutions.

Solution is consisted of five essential elements - Virtual BBRAS Controller (vBC), Virtual BBRAS Forwarder (vBF), Virtual DashBoard (vDB), Radius (R) and Radius DataBase (RDB). First three elements are mandatory for vBBRAS system implementation; last two elements are operator dependent.

5x9 vBBRAS differentiates from competitors by extremely simplified design and unique vBC component that enables fully automated system provisioning and management. vBC component is responsible for all intelligent system tasks like control plane handling, dynamic system and customers addressing, routing, workload distribution, redundancy, scalability and elasticity.

Architecture and Key Components

5x9 vBBRAS system is designed to work on COTS x86 hardware and supports all major virtualization platforms as multiple Virtual Machines (VMs) that are either connected via internal (virtual) or external (hardware based) L2 switch towards operator network.

Minimal non-redundant 5x9 vBBRAS system installation with existing operator Radius and DataBase instances requires three VMs for vDB, vBC and vBF deployment (single instance of each element).

Minimal redundant 5x9 vBBRAS system installation with external operator Radius and DataBase instances requires at least six VMs for redundant vDB, vBC and vBF deployment (two instances of each element). Redundant system deployment ensures seamless operation during single server HW failure within the virtualization system. After hardware failure remedy and upon failed VM boot, vDB and vBC elements will ensure fully restored system operation via automated provisioning and management.

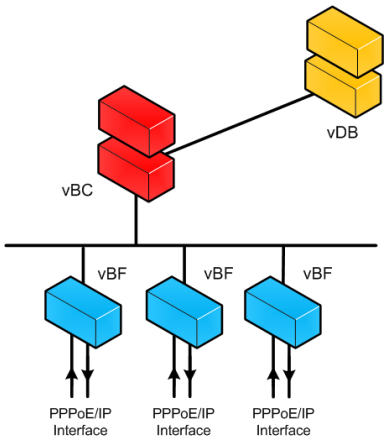
Answer to 5x9 vBBRAS system forwarding plane challenges, like high traffic demands and/or terminating a high number of broadband customers, is simple and automated via vBF horizontal scaling. Control plane related system challenges are easily addressed via vBC CPU and memory expansion.

Virtual BBRAS Forwarder (vBF)

Virtual BBRAS system component is dedicated for forwarding plane related tasks. vBF is responsible for PPPoE and IPoE (future) user session termination, Ethernet and IP traffic forwarding and generation of low-level user statistics that are sent towards vBC and vDB.

Single vBF instance (single VM) performance is over 10Gbps half duplex traffic forwarding for 500 bytes packet size, 20k simultaneous PPPoE/IPoE user sessions termination and 150 PPPoE/IPoE user session creation/deletion per second (cps – connections per second).

vBF VM has at least two Ethernet interfaces – one L2 interface facing Ethernet/MPLS Aggregation network for PPPoE/IPoE user traffic termination and one L3 interface towards IP Core network for IP traffic forwarding. vBF supports multiple simultaneous L2 and L3 interfaces.



vBBRAS Controller (vBC)

Virtual BBRAS Controller system component is dedicated for control plane related tasks. vBC is responsible for system provisioning and management (together with vDB component), internal system component and external user addressing, system routing (ExaBGP), redundancy, scalability and elasticity.

vBC is also responsible for system forwarding plane load distribution that is managed with unique 5x9 approach using on-the-fly configurable PADO Delay, Max subs and Open for Business vBF dynamic parameters.

System forwarding plane load distribution possibilities are numerous and could be easily achieved, e.g. on vBF bandwidth, vBF terminating user number, vBF VM CPU load or vBF VM memory consumption basis.

vDashBoard (vDB)

Virtual DashBoard system component is application with web frontend and underlaying SDN capabilities that is dedicated for system configuration, management and load/health overview. Majority of 5x9 vBBRAS System intelligence resides in vDB component:

- Start and complete configuration of new vBF instance in case of
  - VM failure (due to HW failure, redundancy mechanism) or
  - increased capacity demand (automated elasticity mechanism)
- Coordination with virtualization platform for elasticity/redundancy assurance
- Fully automated system addressing – vDB handles all System IP addresses and will perform subnetting of continuous or discontinuous (more smaller IP prefixes) IP pool with goal to automated address new vBF instance
- Automated workload distribution in-between numerous started vBF instances

vDB is also responsible for system performance and log data collection, processing, visualization and data export to external NSM systems via SNMP.

vDB also provides simple but, at the same time, detailed system health and load overview via internal portal. Some of the collected and displayed information are:

- System health check – redundancy status, load distribution, system capacity, system and user addressing, etc.
- System performance – total subscribers, subscribers per vBF, total terminating BW, terminating BW per vBF,
- CPU load, Mem and Disk usage of each virtualized system component (vBF, vBC, R and RDB).

Technical specifications

L2 Protocols
PPPoE (RFC 2516)
Ethernet
802.1q
L2TP LAC (RFC 2661)

Subscriber Management
RADIUS authentication and accounting
PAP/CHAP
PPPoE termination (single and dual stack)
IPv4 support (RFC 791, 1812)
IPv6 support (RFC 2460, 8200)
PPPoE Intermediate Agent string
Session rate limit
MRU (Max Receive Unit)
Local and Radius IP address assignment
Static IP via Radius
Network behind IP
Session timeout
CoA (RFC 3576) for ACL, QoS and disconnect
hQoS (4 classes, policing and shaping)
L3VPN
CGN (Carrier Grade NAT)

IP Routing
RIP
OSPF
IS-IS
BGP
LDP
MPLS
BFD

Security
uRFP (Unicast Reverse Path Forwarding)
DAD (Duplicate Address Detection)
ACL (Access List)

Future:
IPoE termination (in development)

Management
Zero-touch provisioning via vDashBoard (vDB)
User statistics
System element statistics
System statistics
NTP
Lawful Intercept
SNMPv1/v2/v3
SNMP traps
TACACS+ for vDB authentication and accounting
ISSU
REST
NetConf/Yang

Innovative 5x9 System Features:
vBF adaptive PADO delay
vBF open for new PPPoE sessions
Max subscribers per vBF
Multiple vBF L2 and L3 interfaces
Smart vBF stop
Automated forwarding plane elasticity
Automated forwarding plane IP addressing
PPPoE session to vBF instance affinity

5x9 networks