

Product Highlights

AsterNOS-VPP Architecture

- **SONiC-based solution & VPP as data plane:** variant of SONiC that leverages its advanced control plane with VPP software as software-defined data plane, running on ARM/x86

Key Features

- **L3 routing:** supports line-rate performance with 2M RIBs entries, including BGP full routing tables and BGP peering capabilities
- **Multi-WAN routing:** distributes and routes traffic across different Internet Service Providers (ISPs) or network paths based on predefined policies
- **IPsec / Wireguard VPN:** provides secure, encrypted tunnels for data transmission over untrusted networks, ensuring confidentiality, integrity, and authentication
- **NAT, CGNAT, MAP-T:** allows subscribers to share a public IPv4 address via large-scale NAT and supports stateless IPv4-to-IPv6 translation
- **PPPoE client and server:** facilitates broadband access by encapsulating PPP frames over Ethernet, enabling authentication, billing, and IP assignment
- **HQoS:** implements hierarchical quality of service with multi-level traffic shaping and scheduling at subscriber and service levels
- **N-tuple wild match ACL:** enables fine-grained traffic control, allowing operators to permit, deny, or prioritize packets based on complex criteria

Management & Monitoring

- **Consistent operation model:** inherits SONiC's widely adopted management framework, originally designed for switches, including ZTP,

Klish, RESTful API, gNMI, NetConf and uCentral

- **Monitoring:** based on NetFlow/IPFIX, prometheus exporter delivering network visibility and troubleshooting

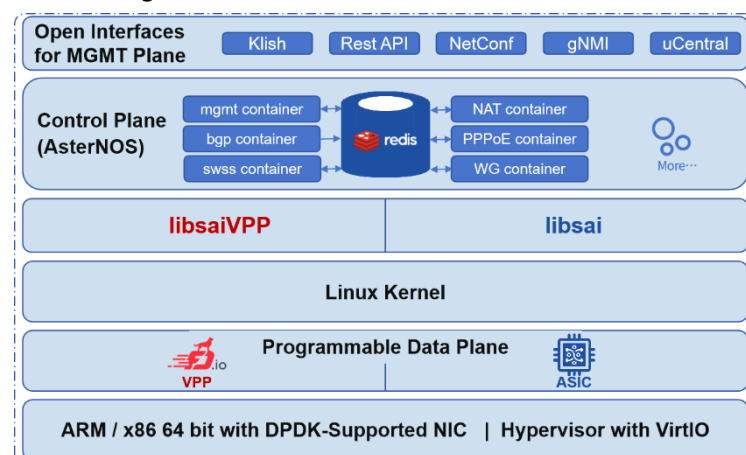
Performance & Platform Supported

- **Line-rate network critical function:** L3 routing, NAT, PPPoE, and VPN service
- **Broad platform compatibility:**
 - Hardware accelerating VPP
 - Marvell OCTEON CN102/CN103
 - x86 with DPDK-Supported NICs
 - Hypervisor with VirtIO
 - KVM
 - VMware ESXi

Overview

AsterNOS-VPP leverages SONiC's robust routing features and management capability with VPP's high-performance data forwarding, delivering next-generation router and firewall functionalities. By substituting the libsaio.so with libsaivpp.so shared library, it translates SAI commands into VPP API calls, enabling VPP to handle data forwarding on DPU or CPU with high efficiency.

Figure 1: AsterNOS-VPP Architecture



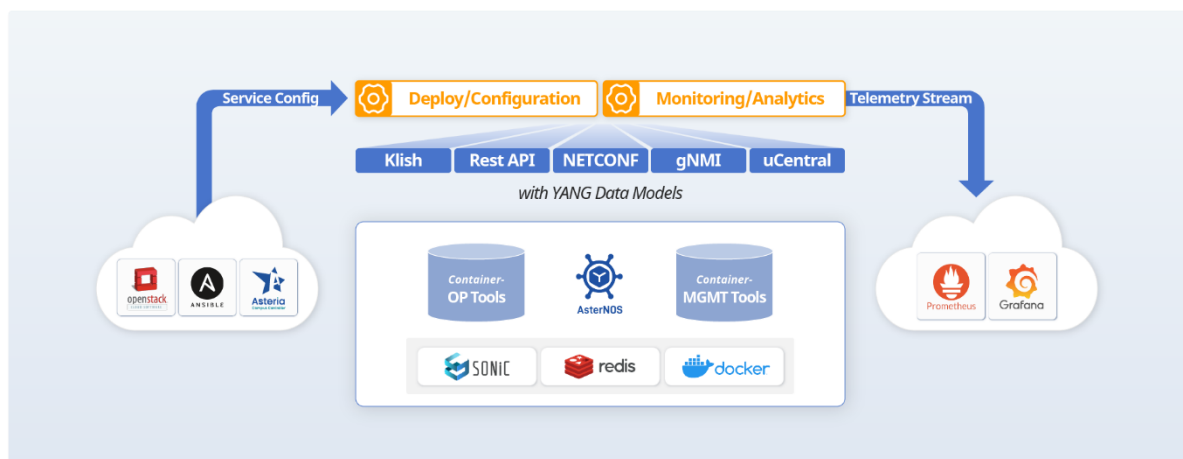
Automation

AsterNOS-VPP, as an integral component of the SONiC ecosystem, supports a diverse set of automation frameworks and tools, enabling network administrators to efficiently configure, deploy, and manage network infrastructure.

Key automation capabilities include:

- NetDevOps with Klish via SSH
- Standards-Based RESTful API, interoperable with OpenStack and other orchestration platforms
- uCentral compatible with OpenWiFi AP/OpenLAN Switch
- NetConf/YANG
- gNMI

Figure 2: AsterNOS-VPP Automation and Monitoring



Monitoring

AsterNOS-VPP integrates with various monitoring solutions, delivering visibility into network health, traffic patterns, and performance metrics.

Key monitoring capabilities include:

- NetFlow/IPFIX: scalable network traffic sampling and analysis, providing real-time visibility into network flows
- Prometheus Exporter: collects system and network metrics in a format compatible with Prometheus
- SNMP: supports SNMP v1/v2/v3 for device information, network health and performance monitoring
- SPAN / RSPAN/ ERSPAN: replicates network traffic from one or more source ports to a destination for analysis, providing deep packet visibility

Deployment Models

AsterNOS-VPP's flexibility enables tailored networking solutions by deploying on diverse hardware platforms, each optimized for specific roles within network topologies. For instance, with Asterfusion's physical appliance:

SMB/Enterprise Router: Asterfusion's ET2500 offers 4 x 10GE, 4 x 2.5GE and 8 x 1GE interfaces, powered by the Marvell OCTEON 10 CN102 chip. Integrated with AsterNOS-VPP, it delivers a SMB Router capable of 50Gbps intelligent data processing for routing. Asterfusion's ET3600 provides 2 x 100GE, 4 x 2.5GE and 8 x 1GE interfaces, powered by the Marvell OCTEON 10 CN103 chip. The integration of AsterNOS-VPP enables it to serve as an Enterprise Router that delivers 100 Gbps of intelligent data processing for routing.

Smart Switch: Asterfusion's CX306P-48Y-M-H is a smart switch platform equipped with 48 x 25GE, 6 x 100GE interfaces, powered by the Marvell Falcon switch ASIC and OCTEON 10 CN103 DPU. Integrated with AsterNOS-VPP, it offers versatile functionality for enterprise and data center environments. The ASIC, driven by SONiC's control plane, operates as a Spine/Core Switch, delivering L2/L3 forwarding. Concurrently, the DPU-hosted AsterNOS-VPP functions as router, firewall or NetFlow processor, supporting sophisticated Layer 3 routing, NAT, microsegmentation filtering, stateful firewall and NetFlow capabilities.

Figure 3: SMB/Enterprise Router

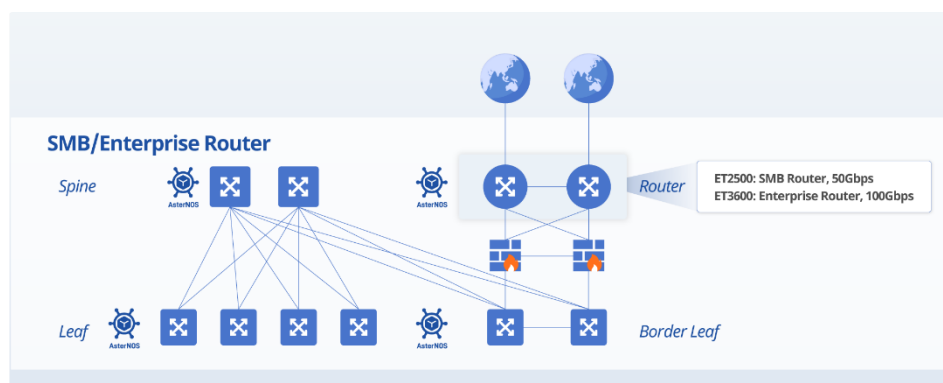
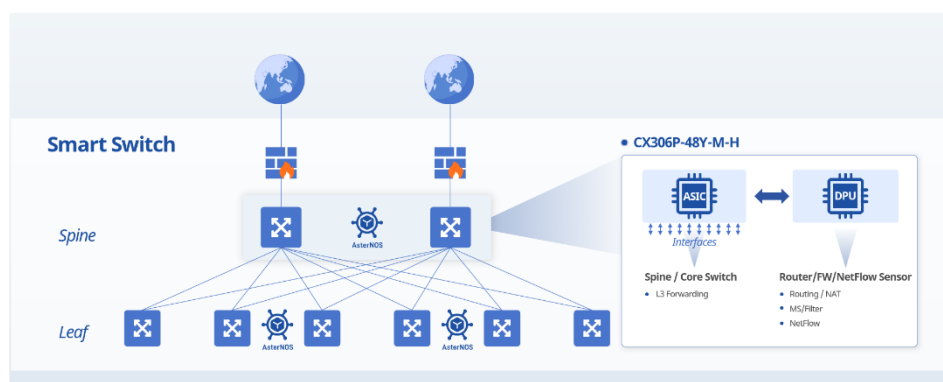


Figure 4: Smart Switch



Feature List

Interface

- Port Speed
- Port configuration
- PoE Interface
- Interface Statistics
- Module information acquisition
- Interface Bandwidth Utilization Alert
- Port batch configuration
- Loopback Interface
- LAN Interface
- WAN Interface
- PPPoE Client
- PPPoE Server

Layer 2 Features

- MAC
- VLAN
- QinQ
- LAG
- STP/MSTP
- LLDP
- MVRP
- Port Isolation

IP unicast routing

- Static routing
- VRF
- Policy Based Routing
- BGP/MP-BGP
- OSPF v2/v3
- RIP v1/v2
- Routing policy
- ECMP/UCMP

IP Service

- L3 Interface
- ARP/NDP
- ARP/ND to host
- DHCP Server (IPv4/v6)
- DHCP Relay (IPv4/v6)
- DNS
- NAT
- CGNAT
- MAP-E
- MAP-T

IP Multicast

- IGMP Snooping
- MLD Snooping
- PIM

MPLS

- Basic MPLS
- VPN

Tunnel

- GRE
- VXLAN
- L2TPv3

Security

- BUM packet policy based on Interface
- Storm Suppression based on Interface
- System user access control policy
- DHCP v4/v6 Snooping
- ND Snooping
- ND policy
- DAI (Dynamic ARP Inspection)

- IPSG v4/v6
- ACL (GeoIP/GeoSite)
- SPI (Stateful packet inspection)
- UPRF (Unicast Reverse Path Forwarding)
- IPsec VPN
- Wireguard Security VPN

High Availability

- MC-LAG
- VRRP
- BFD
- Monitor Link
- SLA
- Routing Track
- Hash

Quality of Service

- Priority mapping
- Queue schedule
- Speed limit
- Shaping
- Flow classify
- Show QoS status
- HQoS

Monitoring & Management

- SPAN/RSPAN/ERSPAN
- SNMP
- Netflow/IPFIX
- Prometheus Exporter
- User/privilege management
- Troubleshooting information
- ZTP
- FTP/TFTP
- Exception alarm
- NTP

Deployment Options

AsterNOS-VPP software can be deployed on Asterfusion's physical appliance, ARM and X86 architecture. Below are the minimum hardware specifications to ensure the system works.

Attributes	Requirements
Minimum Requirements	64-bit ARM or x86 architecture with DPDK-Supported NICs 4 cores 4GB RAM
Hypervisor with VirtIO	- KVM - VMware ESXi

AsterNOS-VPP Supported Asterfusion's Hardware Platform.

Deployment Option	Part Number
Asterfusion's Hardware portfolio	ET2508-4S4M8-SWP
	ET3608-2P2S
	ET3616-4P4S
	CX306P-48Y-M-H

Ordering Information

Part Number	Description
AsterNOS-RT-VPP-LIC-E2	Enterprise Network Operating System SONiC distribution, running on Octeon 102, 50Gbps performance
AsterNOS-RT-VPP-LIC-M3	Enterprise Network Operating System SONiC distribution, running on Octeon 103, 100Gbps performance

Warranty and Service Support

Asterfusion AsterNOS S/W comes with 1 -year major version upgrade and online technical support during the active license period.

Asterfusion hardwares are preloaded perpetual licensed AsterNOS and 1-year AsterNOS upgrade subscription.

To acquire more info about company, products, and solutions: www.cloudswit.ch

Sales: bd@cloudswit.ch

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