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 NAPT 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
- **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 is an open, SONiC-based routing OS that fuses SONiC's powerful control plane with VPP's lightning-fast data plane. Delivering routing, firewall, VPN, and NAT at line rate across hardware and virtual platforms, it empowers operators and enterprises with a next-generation routing solution that is open, scalable, and performance-driven. By substituting the libsai.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.

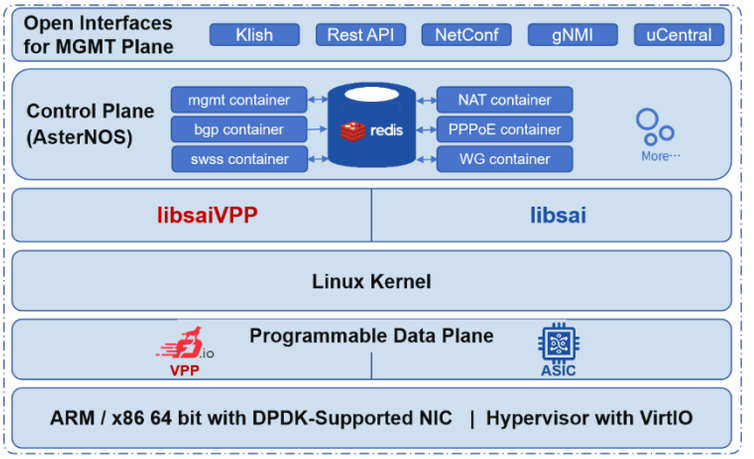


Figure 1: AsterNOS-VPP Architecture

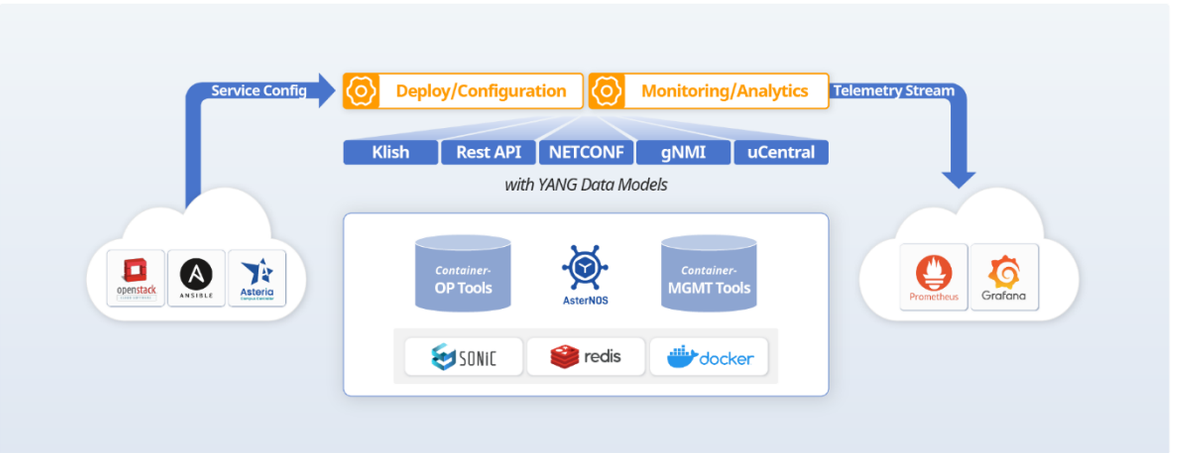
Automation

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

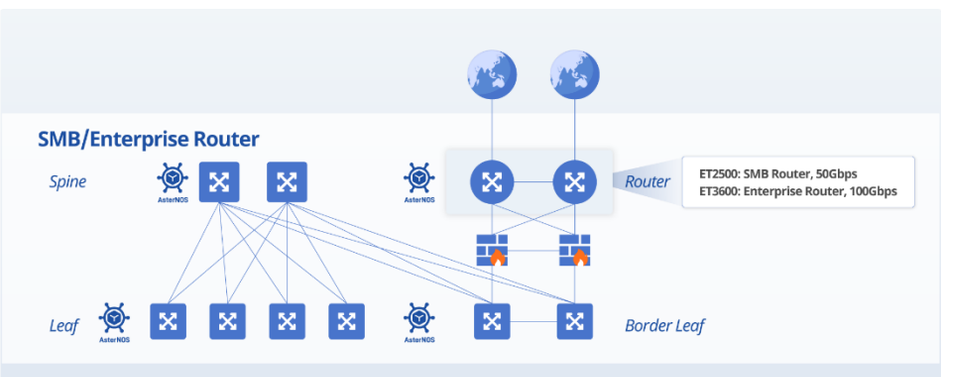
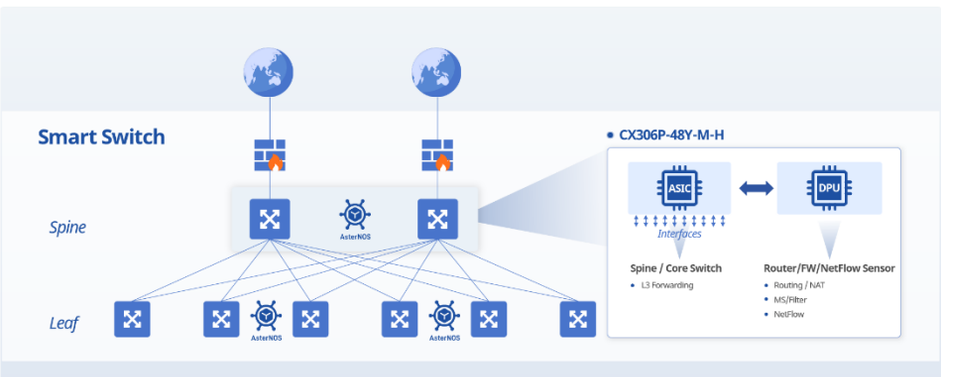


Figure 4: Smart Switch



Feature List

Interface

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

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
- 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

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
- SPI (Stateful packet inspection)
- UPRF (Unicast Reverse Path Forwarding)
- PPPoE Client
- PPPoE Server
- 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

Monitoring & Management

- SPAN/RSPAN/ERSPAN
- SNMP
- Netflow/IPFIX
- Prometheus Exporter
- User/privilege management
- Login method
- Mgmt IP address/gateway/VRF
- Troubleshooting information
- ZTP
- FTP/TFTP
- Device status summary
- Critical Resource Monitoring
- Exception alarm
- NTP
- Diagnostic tool

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*