Overview

The network environment is becoming increasingly complex, data processing needs are growing, network traffic is surging, and various network applications are emerging. The demand for traffic visualization has become common.

Traditional vendors have created a series of dedicated hardware systems to meet this challenge and have imposed high dedicated equipment costs on IT infrastructure operators, greatly increasing the investment and operating costs of network infrastructure.

Asterfusion Packet Broker is a containerized network application based on AsterNOS (enterprise SONiC distribution developed by Asterfusion). It provides WEB UI to facilitate users to maintain NPB (Network Packet Broker) related rules and configuration.

Flexible Deployment Options

There is an extension for AsterNOS which can be installed as a docker container called NPB. It extends the original switching functionalities to have the capability of traffic aggregation.

After deployment, the switch can run original L2/L3 services and packet broker services at the same time (replicate the traffic by SPAN or RSPAN), or you can deploy packet broker services without running switching services to enhance ACL specifications and NPB features (forward the traffic based on policy).

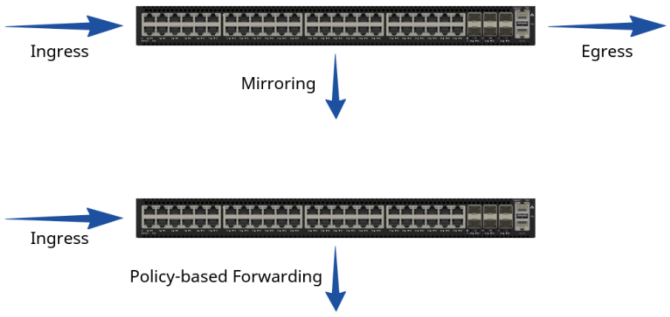

Figure 1. Different deployments on demand

Traffic Mirroring and Filtering

Traffic can be mirrored through SPAN or RSPAN. Mirrored traffic does not rely on L2/L3 protocol forwarding.

Traffic can be filtered by source MAC, VLAN, IP 5-tuple, Ethernet type and other rules to abstract traffic into different services, thereby reducing the pressure on back-end analysis tools.

Traffic Pre-processing

Supports responding to GRE and VXLAN packets, receiving remote tunnel packets, and optionally stripping tunnels, completing tunnel termination and sending them to backend tools.

VLAN tags can be added or removed for backend tools to distinguish different services or collection locations based on VLAN tags.

When multiple tools need the same traffic, traffic replication can be performed based on L2 broadcast.

SONiC based Solution

SONiC's open network architecture provides NPB with a different choice. Deploying NPB applications in a containerized environment elegantly combines the capabilities of the switching chip and the flexibility of traffic processing, achieving functions that originally required dedicated equipment systems at a low cost.

Advanced Pre-processing Option

FusionNOS is a network visualization front-end operating system developed based on ARM/x86 platform and designed based on DPDK technology.

In addition to supporting basic aggregation and distribution functions (aggregation, replication, load balancing, etc.), it also supports a variety of packet pre-processing functions, including IP defragment, TCP reassembly, packet truncation, deduplication, tunnel decapsulation, encapsulation, timestamp, and desensitization, which can improve the processing efficiency of the back-end application system and effectively reduce deployment complexity and implementation costs.

Typical Applications

In a non-SONiC legacy network (figure 2), we can add a leaf switch under the spine and deploy the Packet Broker application. The spine enables bidirectional SPAN or RSPAN on the interconnection port with the leaf, mirroring the service traffic and transmitting it to the leaf. The leaf filters and pre-processes the traffic based on the policy, and load balances or replicates the output to the downstream backend system.
Using RSPAN can specify the mirrored traffic into a specific VLAN. In this case, the leaf deployed Packet Broker can also be used as a conventional access switch of traffic forwarding.

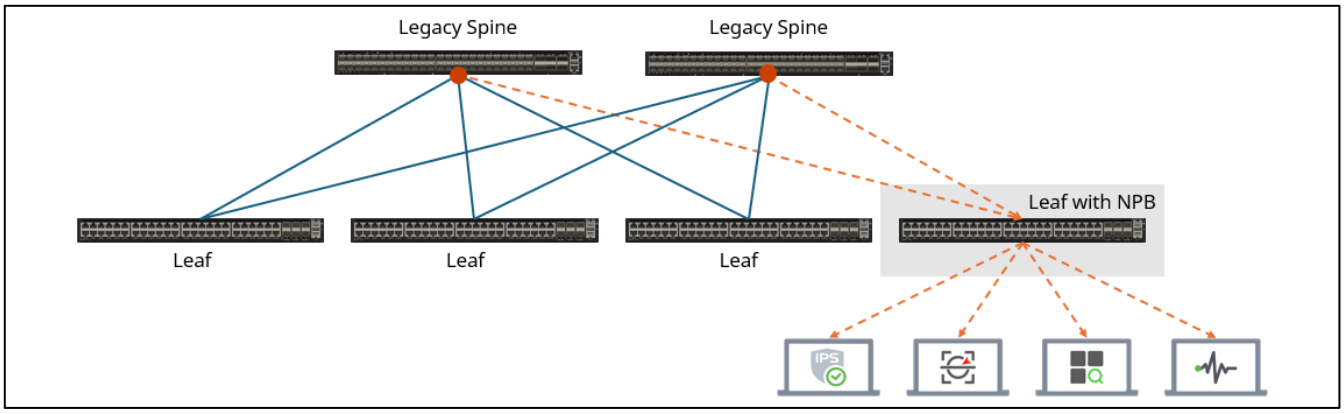

Figure 2. Deployment based on legacy network

For new networks (figure 3), deploying Packet Broker on the spine can perform the first level of traffic preprocessing while mirroring the traffic, and use the performance of the spine switch to reduce the burden on the leaf. For small-scale networks, the spine can also be directly connected to the backend system.

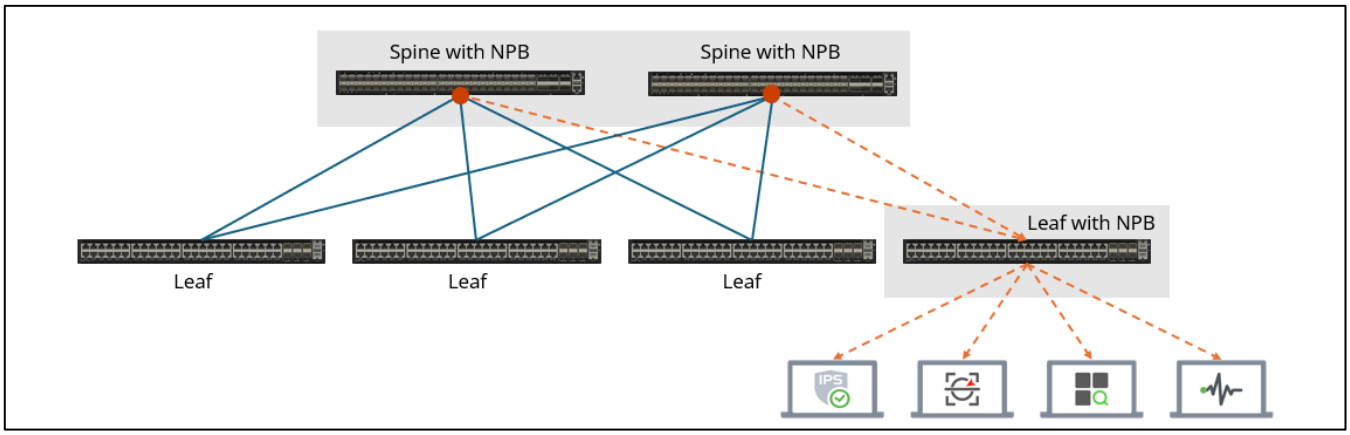

Figure 3. New network design

Hardware Compatibility

CX1/2/3/5/6/7/8 Series, see details: Enterprise SONiC Distribution-based Layer 2/3 Open Network Switches , Here are some common types of hardware.

Product Name	Port type	Figure
CX102S-8GT-M-S(WP)	8 x 1G RJ45 PoE++ 2 x 10G SFP+	
CX102S-8MT-M-SWP	8 x 2.5G RJ45 PoE++ 2 x 10G SFP+	
CX102S-16GT-M-SWP CX102S-16GT-DPU-M-SWP	16 x 1G RJ45 (port 1 to 8 support up to PoE++) 2 x 10G SFP+	
CX202P-16S-M-H	16 x 10G SFP+ 2x100Gb QSFP28/40Gb QSFP+	
CX202P-24Y-M-H	24 x 25G SFP28 2 x 100G QSFP28	
CX204Y-24GT-M-S(WP2/4)	24 x 1G PoE+ (port 1 to 8 support up to PoE++) 4 x 25G SFP28	
CX204Y-48GT-M-S(WP4)	48 x 1G PoE+ (port 1 to 8 support up to PoE++) 4 x 25G SFP28	
CX204P-16Y-M-E	16x 25G SFP28 4x 100G QSFP28	
CX204P-24S-M-E	24x 10G SFP+ 4x 100G QSFP28	
CX206Y-48GT-M-H(WP4/8)	48 x 1G PoE+ (port 1 to 8 support up to PoE++) 6 x 25G SFP28	

CX206P-24S-M-H	24 x 10G SFP+ 6 x 100G QSFP28	
CX206P-48S-M-H	48 x 10G SFP+, 6 x 100G QSFP28	
CX306P-48Y-M-H	48 x 25G SFP28 6 x 100G QSFP28	
CX308P-48Y-M-H	48x 25G SFP28 8x 100G QSFP28	
CX532P-M-H	32x 100G QSFP28 2x 10G SFP+	
CX564P-N	64x 100G QSFP28 2x 10G SFP+	
CX664D-N	64x 200G QSFP56 2x 10G SFP+	
CX732Q-M-H	32x 400G QSFP-DD 2x 10G SFP+	
CX864E-N	64x 800G OSFP 2x 10G SFP+	

Software Features

Feature			
Level1	**Leavel2**	**Level3**	**Level4**
Inteface	Ethernet Port	1G/10G	
		25G	
		40G	
		100G	
		400G	
		Breakout Mode	4*10G/1G
			4*100G
			4*25G
	Management	Startup & Shutdown	
		Startup delay	
		FEC	
		Loopback	
		Port Static	Packets & Bytes
			Multicasts packets
			Error & Drop & Over packets
			Speed & Utilization ratio
			V4/V6 Packets
		Port threshold alarm	
		Module Information Acquisition	In-position information
			Manufacturer information
			Optical power information
			Relevant threshold information
		Port type	Service
			Network
			Tool
			Hybrid
		Input/Output multiplexing	
		Traffic statistics export	
		Network config	MAC
			IP
		Batch port configuration	
		Show/Hide Columns	
	Hash mode	Global hash	Src-dst-ip
			Src-dst-ip-port
			Src-dst-mac
			Src-dst-mac-ip
			Src-dst-mac-ip-port

		Custom hash	Src-ip
			Dst-ip
			Src-port
			Dst-port
			Src-mac
			Dst-mac
			Symmetry MAC
			Symmetry IPv4
			Symmetry IPv6
			Symmetry L4
			Custom Symmetry Src IPv4
			Custom Symmetry Dst IPv4
			Custom Symmetry Src IPv6
			Custom Symmetry Dst IPv6
	Tunnel stripping	CFP	
		ERSPAN	
		GRE	
		GTP	
		IPinIP	
		PPPoe	
		MPLS	
		VXLAN	
	Rule type	L2 rule filtering	Adjust priority based on a specific policy
			Source MAC
			Outer VLAN
			EtherType
			Any combination of the above fields
		L3/L3V6 rule filtering	IP Version
			Outer VLAN
			Source IP Support Mask
			Destination IPv6Support Mask
			Destination IPv4 Support Mask
			Source Port
			Destination Port
			IP Protocol
			IPv4 Frag
			DSCP
			ICMP-Type
			VLAN Priority
			Source MAC
			Any combination of the above fields
		EX rule filtering	Destination MAC
			Source MAC

			Source IPV4
			Outer VLAN
			EtherType
			VNI
			TCP Flag
			Any combination of the above fields
	Port range matching		
	Match mode	Inner layer matching after tunnel stripping	
		Inner Layer Matching in MPLS Tunnels	
		Filtering in the TX direction at the port	
	action	Add/Modify/Delete outer vlan in forward mode	
		Add timestamping	
		Dst MAC modification	
	Rule Management	Rule search	
		Rule hit num reflush/clean	
		Rule hit bytes reflush/clean	
		Show/Hide Columns	
		Select all rules	
		Deselect all rules	
		Select range rules	
		Adjust priorities	Highest Priority
			Lowest Priority
			Adjust priority based on a specific policy
Forward policy	Mirror	Ports SPAN to ports	
		Ports RSPAN to port	
		Ports ERSPAN to L3 port	
		Ports/LAG SPAN to ports with ACL	
		Ports/LAG RSPAN to port with ACL	
		Truncation of 128 bytes	
	Replication	Ports/LAG Copy to LAG with ACL	
		Ports/LAG Copy to ports witch ACL	
		Ports/LAG Copy to ports +LAG with ACL	
	forward	Ports/LAG forward to LAG with ACL	
		Ports/LAG forward to port with ACL	
		Ports/LAG forward to drop with ACL	
	management	Enable/Disable policy	
		Set color for policy	
		Copy a set of forwarding policies for re-editing	

		Policy hit num reflush/clean	
		Policy hit bytes reflush/clean	
Load balancing	Mode	flex mode	
		static mode	
		weight mode	
		standby mode	Port priority
			LACP port preemption
			Rate-first
			priority-first
			Port preemption delay configuration
	Management	Fixed load balancing members	
		hash seed	
Management & Monitoring	Device Management	User interface	Console
			SSH
			Telnet
			CLI
			RESTful API
			WEB UI
	Online update		
	Time synchronization	PTP	
		NTP	
	License		
	Devops	Ansible	
	LLDP		
	File Transfer	FTP	
		TFTP	
	Condition Monitoring	Temperature information	
	Alarms	Fan information	
		Power supply information	
		Version information	
		System time	
		Displaying Management Port Information	
		Display CPU/Memory usage status	
		Temperature alarms	
		Power out of position alarms	
		Fan out of position alarms	
		Traffic overflow alarms	
		SNMP	
		Syslog	
		Exporter to Prometheus	

Ordering Information

Part Number	Description
AsterNOS-APP-PB-LIC-CX1S	Packet broker software application on CX1 switch family
AsterNOS-APP-PB-LIC-CX2Y	Packet broker software application on CX204Y/CX206Y switch family
AsterNOS-APP-PB-LIC-CX2P	Packet broker software application on CX202P/CX204P/CX206P switch family
AsterNOS-APP-PB-LIC-CX3P	Packet broker software application on CX306P/CX308P switch family
AsterNOS-APP-PB-LIC-CX5P	Packet broker software application on CX532P switch family
AsterNOS-APP-PB-LIC-CX6D	Packet broker software application on CX664D switch family
AsterNOS-APP-PB-LIC-CX7Q	Packet broker software application on CX732Q switch family
AsterNOS-APP-PB-LIC-CX8E	Packet broker software application on CX864E switch family