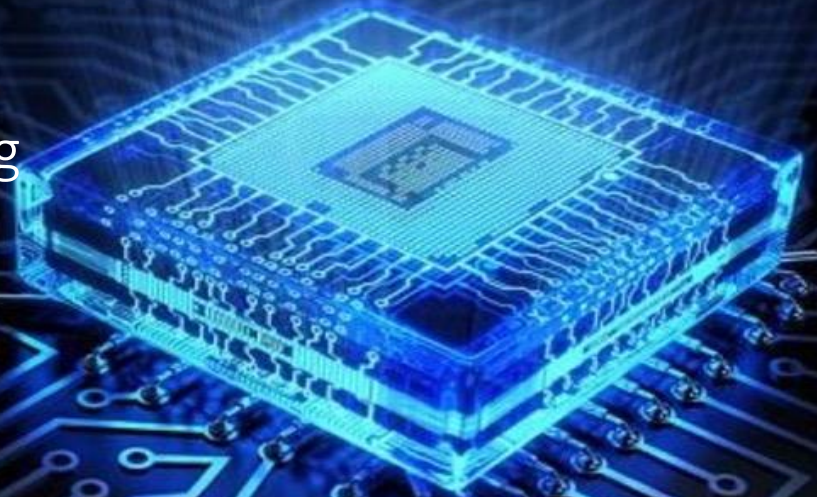


NoviFlow *NoviFabric*TM Service Chain Proxy For IPv6 Segment Routing



Features

- Integrates in an SRv6 network as a binding segment with support for SID and uSID (C-SID-NEXT) for service chaining ([END.SC](#))
- Identifies the location of a Network Services Proxy as an SRv6 C-SID hop. Identifies a specific Service Chain Policy within the same C-SID.
- Each SID represent an ordered list of network services (Service Chain), locally defined as a Service Policy
- Defines a Service Chain Policy as one or more network services, i.e. a “Basic Security” Policy could be a service chain of DDoS and Firewall services.
- Support for pools of physical (PNF) or virtual (VNF) network services
- A Service Chain Policy is implemented as a proxy service at the SRv6 C-SID location.
- Multiple Service Chain Proxies, each with a unique C-SID, are supported.
- 128-bits SID and uSID / C-SID-NEXT standards are supported
- Support for SR unaware Network services.
- Multiple instances of each network service are pooled together under a load balancing group using affinity-based load balancing with proportional allocation and service scaling management
- High availability (1+1)
- Multi-terabit throughput, flexible port configurations in a small footprint

SRv6 Service Chain Proxy

NoviFabric provides the ability to insert a Service Chain Proxy into an IPv6 Segment Route. For example, a chain of security services that a packet needs to visit - DDoS, Firewall, IPS - could be inserted early in the Segment Route to protect the rest of the network.

The SRv6 SID associated with a Service Proxy identifies both the hop location and the proxy Policy (service chain). Via this functionality of the proxy, network services become addressable resources and are available from anywhere in the network. *NoviFabric* separates the ability to access network services from their physical location, thus enabling more efficient use of valuable network services as well as optimal use of the hardware resources needed to run these services.

NoviFabric also enables the user to craft multiple Service Chain proxies within a single *NoviFabric* device. For example, two different SRv6 uSIDs could enable a DDoS-Firewall chain and a DDoS-Firewall-IPS chain managed the same *NoviFabric* device.

In addition, within an SRv6 based Service Chain, *NoviFabric* provides each network service with load balancing (proportional allocation), scaling management, affinity-based HA, and packet broker functionality.

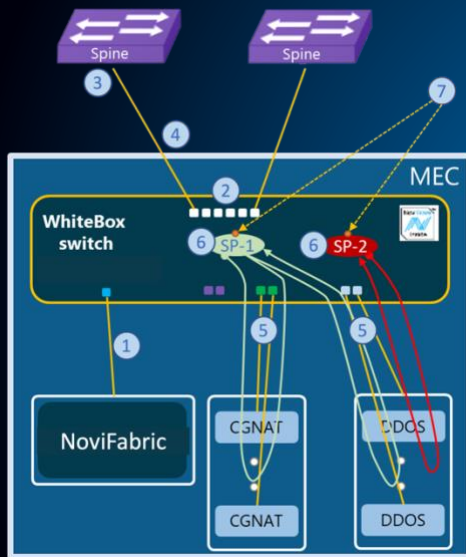
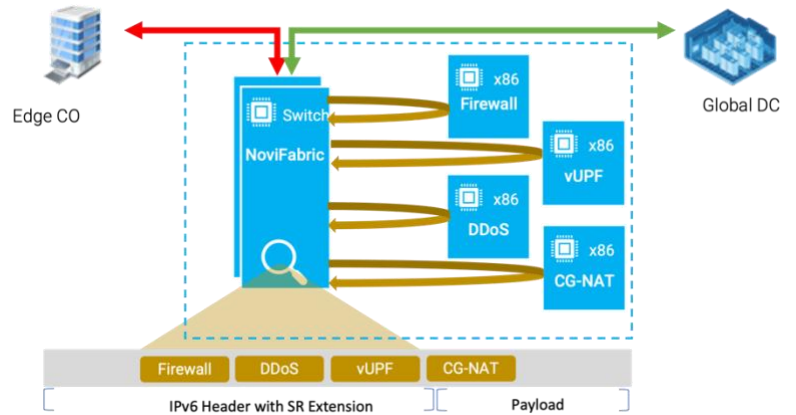
NoviFabric - SRv6 Service proxy

Introduces a new variant of binding segment: **Service Chain Segment (End.SC)**

- Acts as an orchestrator and enforcement point for a Service policy.
- Invokes, in order, the services listed in the service policy
- Support for a mix of different service types (see side box)

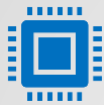
End.SC benefits

- Greater scalability
- Reduced overhead of SRH header
- Network opacity (e.g. opaque execution of security services)
- Service independence



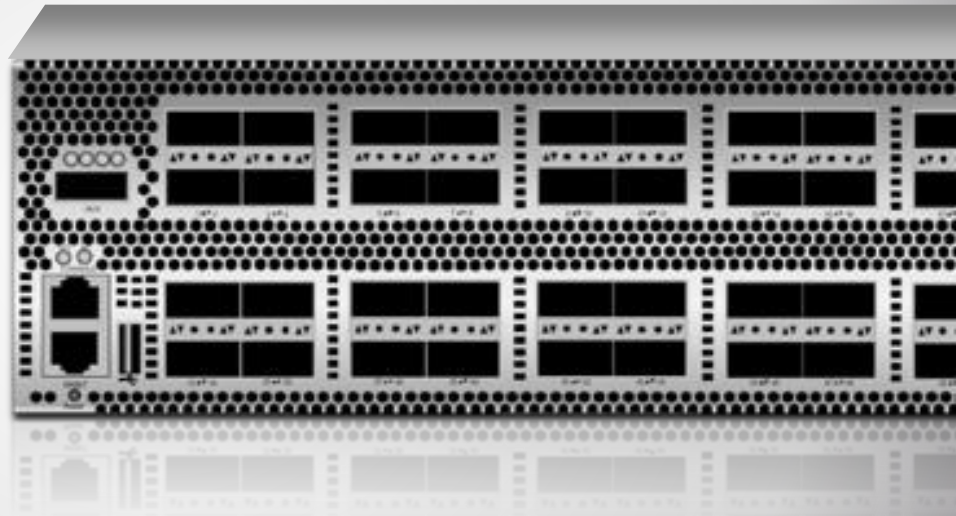
NoviProxy – API's

1. Switch communication
 - Define and connect to white-b0x switches controlled by NoviFabric
2. Interfaces
 - Specify MAC for each port of the switch
3. Neighbors
 - Specify neighbor configuration (MAC, IPv6) for each port facing the network
4. Routes
 - Specify routing information (IPv6 route) through each remote gateway node
5. Load balancer
 - Define targets (VNF instances, e.g. DDOS-1, DDOS-2), how they are connected (port, port/vlan) and weight
 - Group targets of the same type (DDOS) into a load balancer and its associated parameters
6. Service policies (service chains)
 - For each policy, specify an ordered list of services
7. SRv6 uSID / C-SID-NEXT segments
 - Define uSID segment by associating a uSID value with a service policy



The power of programmable silicon in a white-box switch

NoviFabric was designed for deployment on Tofino, the latest switching silicon from Intel. Tofino offers up to 6.4Tbps of core throughput and interfaces from 256 ports of 10G up to 64 ports of 100G. The hardware can be sourced directly with from hardware vendors or bundled with NoviFlow's software. Flexible licensing options are available for NoviFabric including perpetual licenses and annual subscriptions.



Features and Benefits

Feature	Benefit
<p>NoviFabric implements full SRv6 Service Gateway and Service Proxy functionality, with built-in packet brokerage, load balancing and network telemetry services</p> <ul style="list-style-type: none"> • Separates the advertisement of the service policies from the network service policies themselves • May be used in the mobile backhaul and GiLAN to support service chaining • Supports Terabit/s throughput capacity at each SRv6 network services proxy via white-box hardware deployed anywhere in the network with unlimited linear scalability • Leverages Open Standards such as gRPC and P4-Runtime for maximum economies of scale • Traffic engineering, service chaining of addressable service resources 	<ul style="list-style-type: none"> • Allows network services to be addressable and reachable from anywhere in the network rather than being hard-wired to a specific physical location in the network • <i>NoviFabric</i> filters and balances traffic across arrays of network appliances or virtual machines without the cost of external load balancing appliances and it Improves performance of security applications by moving policy enforcement into network fabric itself • Protects investments in network hardware and allows for faster introduction of new features because the entire stack from the switch silicon to the application is programmable • Significantly reduces complexity, latency, • OPEX and CAPEX
<p>Multi-terabit throughput, flexible port configurations in a small footprint</p> <ul style="list-style-type: none"> • Up to 6.4Tbps non-blocking core switching • Supports a wide range of interface speeds, including 10G, 25G, 40G, 50G, 100G with QSFP and QSFP28 modules • 1U 32x100G (WB-5132) and 2U 64x100G (WB-5164) options 	<ul style="list-style-type: none"> • Replace multiple existing load balancers, packet brokers and network taps with a single unified and programmable network fabric • Support a wide range of media speeds from 10G to 100G for ultimate compatibility with existing TAP and SPAN ports • Compact footprint, utilizes less rack space and power consumption
<p>Easy to Use</p> <ul style="list-style-type: none"> • Supports both remote API calls and a browser based GUI for configuration • Supports encryption for a secure control plane connection between NoviFabric and the switch hardware 	<ul style="list-style-type: none"> • Lowers barriers to deployment • Reduces the need for special skillsets to program traffic aggregation • Program once when deployed or create dynamic orchestration of traffic flows via north-bound APIs
<p>Competitive Price point</p> <ul style="list-style-type: none"> • Based on white-box OCP compliant hardware you can source through NoviFlow or your own supply channels • Perpetual and annual software licensing is available for the <i>NoviFabric</i> software 	<ul style="list-style-type: none"> • Leverage products from a leader in commercial-off-the shelf white box hardware, Edgecore • Flexible software licensing allows you to select the best way to deploy, with a perpetual license or annual licensing
<p>We can do what your current vendor won't</p> <ul style="list-style-type: none"> • Software Programmable Parser • Rapid response to customer requirements 	<ul style="list-style-type: none"> • If you have a special requirement, contact NoviFlow, we can rapidly add support for new protocols and features

NoviFabric Service Chain Proxy Software - hardware requirements

- NoviFabric software runs on a standard server (4-core X86 with minimum 16GB RAM, or better)
- One or more NoviWare capable switches (Intel/Barefoot Networks Tofino-based white-box devices running NoviFlow's NoviWare NOS.

See www.noviflow.com for list of certified white-box devices.)

- One NoviFabric Right-to-Use license for each switch being managed by NoviFabric.

Supported White-box Switching Hardware

Ports (Up to)	32x 40/50/100G (WB-5132) / 64x 40/50/100G (WB-5164) 128x 10/25G (WB-5132) / 256x 10/25G (WB-5164)
Core Bandwidth	3.2Tbps (WB-5132) / 6.4Tbps (WB-5164)
Rack Units	1RU (WB-5132) / 2RU (WB-5164)
Power Input	WB-5164: AC: 100-127 VAC, 50-60Hz, 11A; 200-240 VAC, 50-60Hz, 6A DC Input: 200-300 VDC, 6A WB-5132: AC: 100-240 VA, 50-60Hz, 3A to 8A 200-300 VDC, 4A
Power Consumption	WB-5164: 1100W WB-5132: 512W
Fan and PSU Redundancy	Fans: Hot-swappable and accessible on rear panel, 4+1 for WB-5132 and 9+1 for WV-5164 PSUs: 2 redundant, load-sharing, hot-swappable AC/DC
Temperature	Operating: 5°C to 45°C (41°F to 113°F) Storage: -40°C to 70°C (-40°F to 158°F)
Weight	WB-5164: 20.4 kg (45 lb) WB-5132: 9.8 kg (21.61 lb)
Dimensions	WB-5164: 440 x 507 x 89 mm (17.32 x 19.97 x 3.50 inches) WB-5132: 440 x 507 x 44 mm (17.32 x 19.97 x 1.73 inches)

Ordering Information

NoviFabric with WB-5164 64x100G Switch

Sourcing	License Type	Part Number	Description
NoviFlow Direct	Perpetual license	800-007-005	NoviFabric for WB-5164 Perpetual License
		200-100-100	NoviWare NOS for 64x100G Perpetual License
		100-001-101	Tofino WB-5164 Switch Hardware (AC, Front-to-Back Cooling)
	Annual Subscription (Hardware not included)	850-007-005	NoviFabric annual software subscription
		301-100-000	NoviWare NOS for 64x 100G annual software subscription

NoviFabric with WB-5132 32x100G Switch

Sourcing	License Type	Part Number	Description
NoviFlow Direct	Perpetual license	800-007-004	NoviFabric for WB-5132 Perpetual License
		200-100-104	NoviWare NOS for 32x100G Perpetual License
		100-001-108	Tofino WB-5132 Switch Hardware (AC, Front-to-Back Cooling)
	Annual Subscription (Hardware not included)	850-007-004	NoviFabric annual software subscription
		301-100-004	NoviWare NOS for 32x 100G annual software subscription

Compatible Whitebox Hardware

Sourcing	Model Number	Part Number	Description
Edgecore	Wedge100BF-32X-O-AC-US	FP3ZZ7632413A	Wedge100BF-32X, 32 port 100G QSFP28 Switch, dual AC PSU
	Wedge100BF-65X-O-AC-US	F0PCH7664400S-C	Wedge100BF-65X, 65 port 100G QSFP28 Switch, dual AC PSU

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