

Service Monetization using ASR920



The objective of this document is to showcase how “SEACOM” used Cisco ASR 920 platform to improve their service offering ROI.

Customer Testimonial

“The Cisco ASR920 router has permitted us to maintain the same level, standard and quality of service that all our customers - large and small - have come to expect of us, as we deliver our capabilities in the Enterprise market, a segment that is tightly reliant on low-cost infrastructure.

Prior to deploying the Cisco ASR920, we implemented our Enterprise strategy on the Cisco ME3600X platform. While it was up to the task, it was a very costly option for us. The ASR920 halved our deployment costs right away, and it has been a worthy replacement to the ME3600X.” – Mark Tinka, Head of Engineering at SEACOM

Brief Customer Summary

SEACOM is the preferred supplier and partner for African Enterprises, Network Carriers and Service Providers. They offer full suite of resilient and scalable data services along with a vast supply of high quality and affordable Internet bandwidth to Africa’s growing ICT community.

Business Challenge

SEACOM wanted to monetize their service offerings with L2, L3 and Internet services with minimal CAPEX budget. Offering Internet services with full routing table capability requires a high-end routing platform like ASR9000 or ASR1000 which translated to substantial increase in their CAPEX. Another challenge prevalent in the ISP world is their access network. How to reach their customers with a high quality and five 9’s availability? How to build a network that is not only scalable but also easy to maintain and operate within the limited budget?

SEACOM decided to build an IP/MPLS-based network; using a ring topology so they could utilize both sides of the backbone at the same time. This was to overcome any traffic failover or any complications due to Layer 2-based rings.

The plan was to extend features available within the data center to their Metro-E customers in order to achieve service uniformity across all their POP’s, large or small.

Business Outcome

Cisco ASR920 allowed SEACOM to use full internet routing table capability. This simplified their network design offerings with uniform services across their network. On the CAPEX front, Cisco ASR920 helped them significantly reduce their CAPEX by around 80%.

Technical Challenge

The main requirement was to be able to announce the full internet routing table (+/- 700,000 IPv4 and +/- 41,000 IPv6 routes today) to its enterprise customers using small PE routers. Small PE routers have a limited forwarding capacity (+/- 20,000 entries). Alternative option was to use eBGP Multi-Hop, or use the Access router as L2-only. However, there are multiple disadvantages with this approach. Running eBGP Multi-Hop to the edge router would make it a single point of failure and extending MPLS forwarding all the way to the access was not feasible, as an access router cannot be a small PE router.

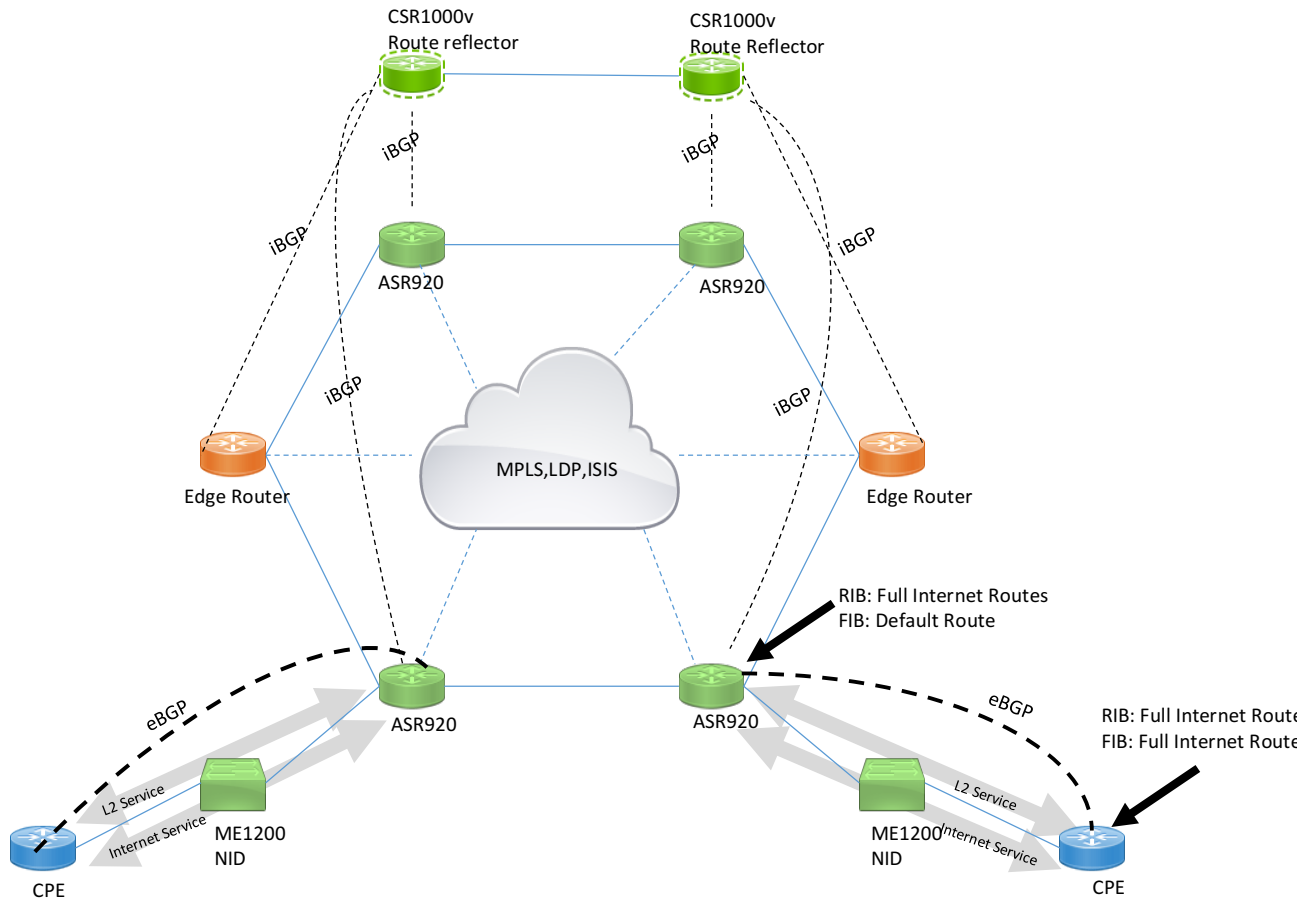
Solution Description

The solution uses the feature called BGP Selective Download on the ASR920. This feature enables the ASR920 to function as a small PE router and simultaneously announce the full internet routing table with the customer premises router. BGP Selective Download enables the BGP routes to be installed in the software (RIB) and avoid using the scarce hardware (FIB) resource.

Below is the network architecture of SEACOM's Metro-E rings. The Metro-E networks are connected to edge routers. In the MPLS Metro network, the traffic from the customers on the ASR920 rings is forwarded over the MPLS data plane to the edge routers. The edge router holds the full BGP routing table and also runs MPLS for other edge customers in the data center. ASR920 being an access router with limited FIB scale cannot hold the full internet routing table. So, a pair of route reflectors are used to announce a default route to each ASR920 in the Metro-E network.

The Cisco CRS1000v platform, placed in the data center, is used as the route reflector. Since the default route is learned from the route reflector, the ASR920 would forward the traffic towards the route reflector in the core using an MPLS forwarding paradigm. But these route reflectors do not handle the traffic as they are purely out-of-path. When the traffic reaches the edge routers in the data center the route reflectors are not running MPLS so there is no MPLS path from edge to the route reflectors. So the MPLS packet is popped and the edge router will do a traditional look-up on the IP packet, for a specific egress router. It could be a peering router, edge router or an upstream router. For return traffic the edge router will re-encapsulate the IP packet into MPLS and forward it so the packet never reaches the route reflector.

Network Architecture



Below is the snapshot of customer configuration applied on ASR920 which enables the BGP Selective Download feature on the ASR920. The configuration allows the default route to be installed in the FIB table, keeping rest of the routes in the RIB table.

```

ip prefix-list default-route-in description Accept The Default Route
ip prefix-list default-route-in seq 10 permit 0.0.0.0/0
ip prefix-list default-route-in seq 65535 deny 0.0.0.0/0 le 32
!
ipv6 prefix-list default-route-in6 description Accept The Default Route (IPv6)
ipv6 prefix-list default-route-in6 seq 10 permit ::/0
ipv6 prefix-list default-route-in6 seq 65535 deny ::/0 le 128
!
router bgp 1234
 address-family ipv4
  table-map BGP-TO-RIB-SELECTIVE-DOWNLOAD filter
!
 address-family ipv6
  table-map BGP-TO-RIB-SELECTIVE-DOWNLOAD6 filter
!
 route-map BGP-TO-RIB-SELECTIVE-DOWNLOAD permit 10
  match ip address prefix-list default-route-in
!
 route-map BGP-TO-RIB-SELECTIVE-DOWNLOAD deny 65535
!
!
 route-map BGP-TO-RIB-SELECTIVE-DOWNLOAD6 permit 10
  match ipv6 address prefix-list default-route-in6
!
 route-map BGP-TO-RIB-SELECTIVE-DOWNLOAD6 deny 65535

```

More About SEACOM

SEACOM has the best and most advanced data network in Africa and has earned trust from carriers, MNOs and ISPs to deliver their international data connectivity through its ownership of Africa's most extensive ICT data infrastructure - including multiple subsea cables and a resilient, continent-wide IP-MPLS network – SEACOM provides flexible, scalable and high-quality communications services that enable the growth of the continent's economy.

SEACOM Business division leverages its infrastructure and last-mile partnerships to provide the African enterprise market with best-in-class connectivity and cloud services at highly competitive prices. SEACOM Business now delivers data connectivity directly to corporates.

SEACOM is privately owned and operated, allowing it the agility to rapidly deploy new services, commercial structures and infrastructure in response to customer requirements.

Conclusion

The Cisco ASR920 allows Service Providers to monetize their service offerings and reduce their CAPEX spend. Cisco ASR920 allows service providers to offer services typically offered by a small/medium/large Data Center PoP. This enables them to achieve complete service uniformity and deliver the same service anywhere in the network regardless of the platform or size of the PoP.