



Subscriber-Aware Load Balancing (SALB) on NVIDIA BlueField-3 DPU

Subscriber-aware traffic steering for full visibility at scale

By Aviz Networks

Why This Matters

Mobile operators must correlate **control- and user-plane traffic (GTP-C, PFCP, N11 vs GTP-U)** to maintain full subscriber visibility. Traditional x86-based probe architectures struggle to keep traffic coherent per subscriber while scaling throughput efficiently. Aviz solves this with **Subscriber-Aware Load Balancing**

(SALB) — part of the Aviz Service Node (ASN) running on the **NVIDIA BlueField-3 DPU**. SALB ensures subscriber context is preserved and both control- and user-plane packets are directed to the right analytics tools — at line-rate performance.

What We Built Together

Aviz validated the **ASN with SALB** on the **NVIDIA BlueField-3 DPU**, achieving subscriber-coherent traffic steering at 200 Gbps line rate.

Control Plane:

ASN processes GTP-C, PFCP, and N11 packets on the BlueField-3 ARM cores.

Hybrid Offload Model:

Control handled in software; user flows handled in P4 hardware for maximum performance and minimal CPU load.

User Plane:

Subscriber context extracted → programmed into P4 tables for DPU datapath processing.

Proactive Programming:

ASN uses the DPU SDK to dynamically install fast-path rules.

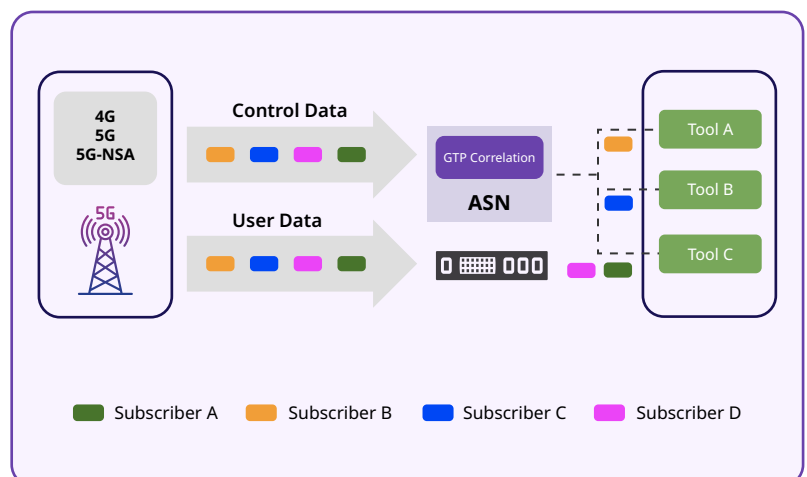


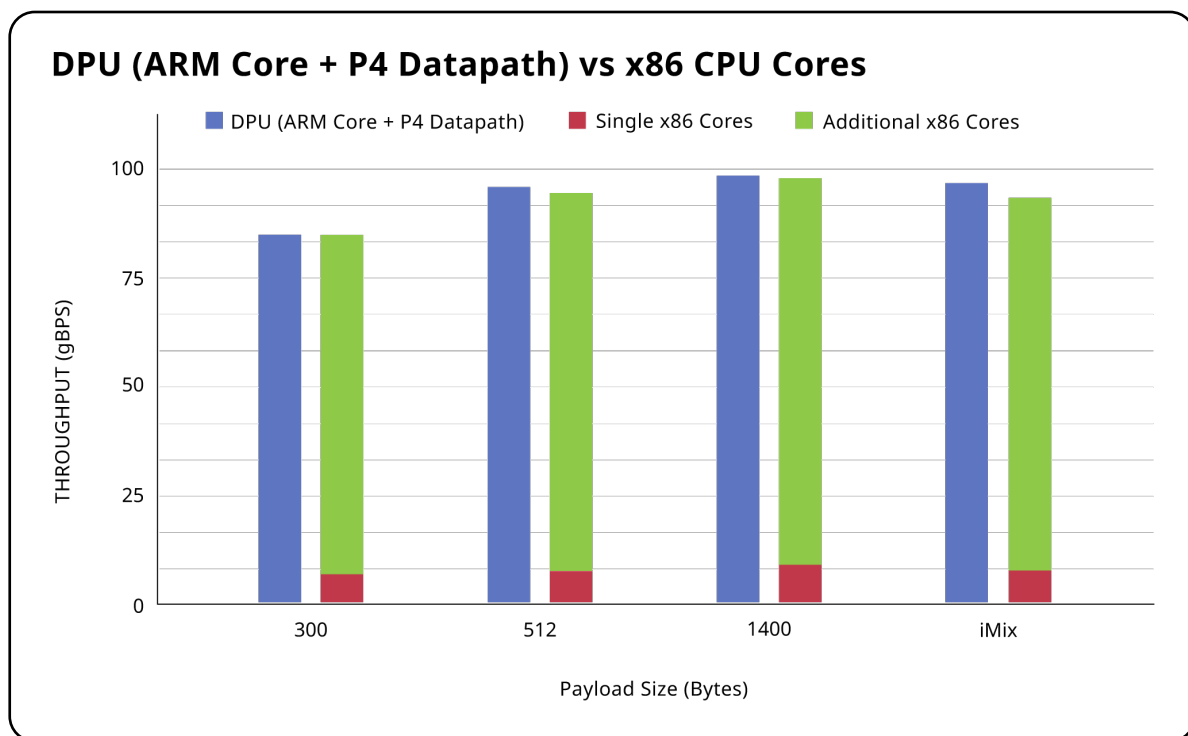
Figure 1: Aviz Service Node Architecture on NVIDIA BlueField-3 DPU



Validated Results

Metric	NVIDIA BlueField-3 DPU	x86 Baseline
Throughput	200 Gbps (line rate)	~6–7 Gbps for single x86 core
CPU/Core Efficiency	1 ARM Core + P4 Datapath	~40 cores for 200 Gbps
Power Efficiency	~80% less power vs CPU-based processing	Requires 560W to process 400G of traffic.

A single BlueField-3 DPU replaces 40 x86 cores while preserving fidelity — dramatically lowering TCO and power consumption.



What Operators Gain

- **Subscriber-coherent analytics** – correlate both planes per subscriber.
- **Balanced probe utilization** – avoid overload and data loss.
- **High performance per watt** – offload CPU-intensive tasks to DPU.
- **Design flexibility** – run ASN inline or host-based.

Experience Subscriber-Aware Load Balancing on NVIDIA BlueField-3.

Benchmark Aviz Service Node in your network or request a live demo at
aviznetworks.com