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Spirent™

PLUGFEST REPORT

Introduction to ASN

Achieve unmatched network application efficiency with Aviz Service Nodes, which integrate smoothly with your chosen packet broker networks. Built to run on general-purpose hardware, they offer substantial savings on service nodes. This solution ensures peak performance while eliminating reliance on vendor-specific hardware, thus preventing budget spikes with network speed upgrades.

Gain crucial metadata insights for 4G-LTE, 5G-NSA, and 5G-SA networks. ASN specializes in correlation analysis using Interface protocols such as S11 (GTP-C), S1-U (GTP-U) for LTE/5G-NSA, and N4 (PFCP), N3 (GTP-U), along with N11 (SBI-HTTP2) for thorough network analytics.

Ref :
https://aviznetworks.com/service-nodes/

Open for Integration

Easy integration with open-source and commercial tools for performance and security analytics

Improved price and performance ratio

Allows for the choice of commodity servers and NICs to leverage available speeds (from 10GbE to 100GbE).

Data Driven and AI-Ready

AI-Enabled application Data-driven networking for 5G deployments

50% TCO Savings

Software defined Aviz Service Nodes solution on Commodity Servers eliminates proprietary parts significantly reducing the CapEx and OpEx.

Introduction to Spirent Landslide

Content from Spirent Japan Team - Takemura-San

Landslide is a scalable platform to test and emulate 5G and O-RAN mobile networks built on traditional or cloud-native infrastructure. It generates real-world control and data plane traffic of millions of mobile subscribers as they move through the network to comprehensively test the 5G core in both standalone and non-standalone configurations. Virtualized test functions may be deployed directly on cloud infrastructure to better assess cloud-native network function performance. This eliminates the need for carriers to perform expensive, non-repeatable, and time-consuming drive testing in the live network.

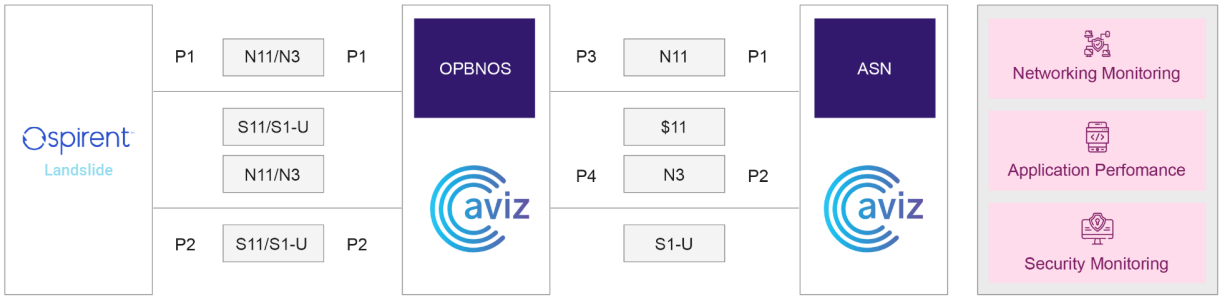
To ensure a successful adoption of 5G, there needs to be an evolution strategy from 4G extensions and 5G non-standalone to true-native 5G. Landslide emulates 5G devices & network

functions to validate new 5G core & mobile nodes, helping network service providers to develop KPIs, ensuring their readiness to deliver high-quality services for successful 5G rollouts. Landslide delivers superior 5G core testing capabilities with market-leading support for new 3GPP releases and unparalleled historical coverage extending back to Release 13.

Landslide helped customers to decrease time to revenue for new products & services by 60%, reduce testing costs with pre-built test libraries and automation by 80%, and avoid costs by finding issues in the lab versus the live network by 95%. High value of the product has made it the most popular mobile network testing platform in the world.

We are glad to see Aviz Networks has used Landslide to emulate 5G core network with 100s Gbps of traffic loading generated to excise its ASN product, collect KPIs to validate accuracy and performance of the service models.

Topology



Feature Set of ASN

Function	Feature Description
Management:	SYSLOG, SNMP, NTP, REST API GUI
Correlation	SYSLOG, SNMP, NTP, REST API GUI S11 and S1-u Correlation for 5G-NSA S11 and S1-u Correlation for 4G-LTE
Application Identification	500+ Apps (Youtube, WhatsApp etc)
Header Stripping	UDP-GRE, VXLAN
Subscriber Aware Metadata	Metadata Extraction of S1-u, S11, N3, N4, N11 Metadata Extraction of Payload (HTTP, DNS etc) Smart Kafka Export
Redundancy	Active/Backup with Clustering
Performance	Up to 150 Gbps per Node
KPI	Throughput/Bandwidth Latency for C-Plane and U-Plane Number of packets

Features Validated

Metadata Extraction and Correlation

ASN works on different 5G-SA, 5G-NSA and 4G-LTE interfaces for metadata extraction and achieves the correlation between User and Control Plane.

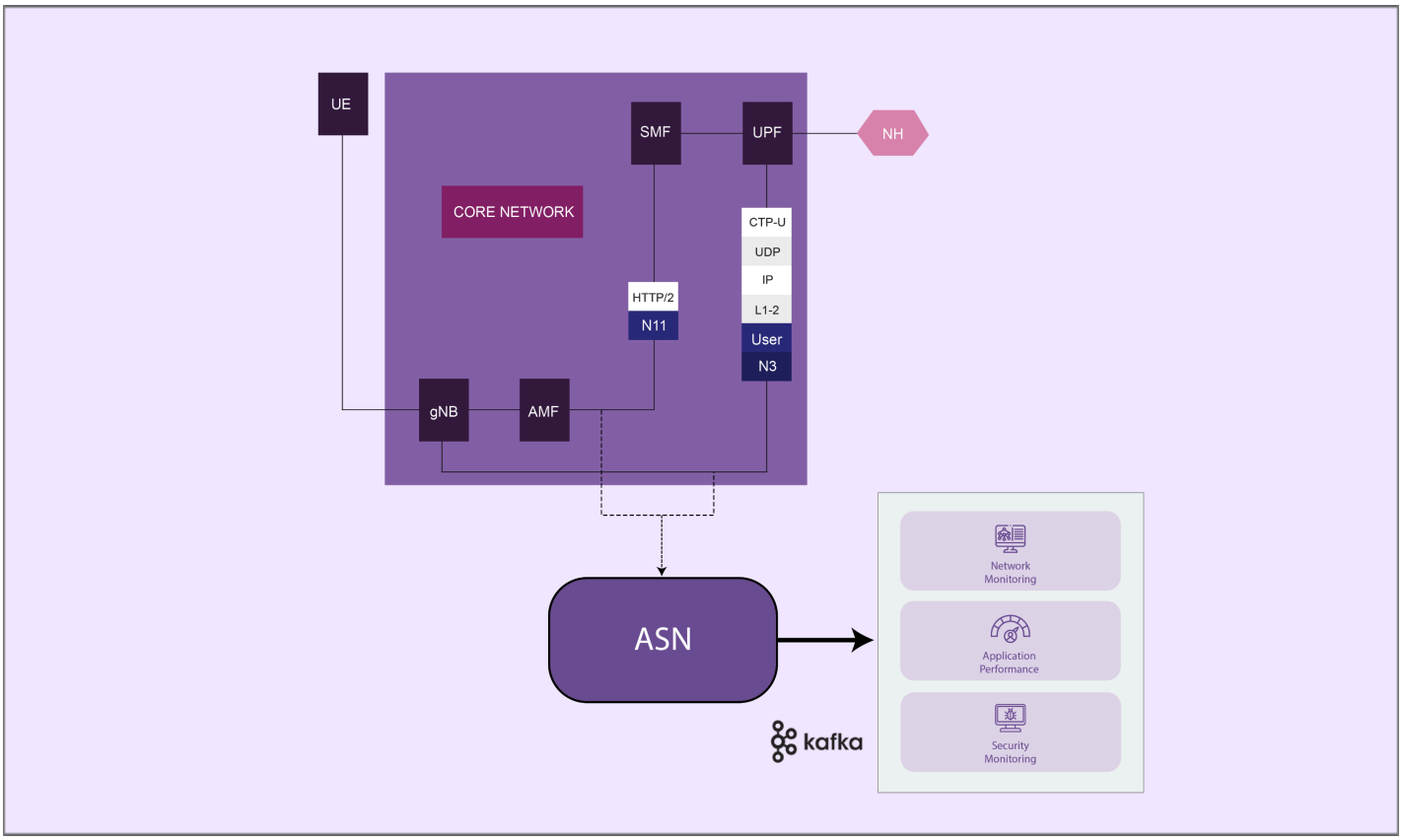
Test-Cases and Topology Details

5G-SA Test Scenarios

Metadata extraction and correlations are validated based on below 5G-SA scenario

01	Metadata extractions for the N11 and N3 traffic from Spirent
02	Correlation of N3 data with the extracted N11 packet and exported to kafka
03	ASN should relate uplink and downlink traffic of the particular subscriber and correlate it as a single session
04	ASN will send the priority update to kafka as a event based even before the next interval time
05	Correlation validation when the single subscriber has multi-PDU sessions and different traffic is running on it over 5G network
06	Metadata extraction during the PDU session disconnect and revert for a particular subscriber in 5G
07	ASN should identify the location of a particular subscriber through extracted control packet in 5G
08	Control and Data packet extraction of specific subscriber running on IPV6 in the 5G network
09	Kafka export of correlated data between N11 and N3 of the IPV6 subscriber

5G-SA Topology

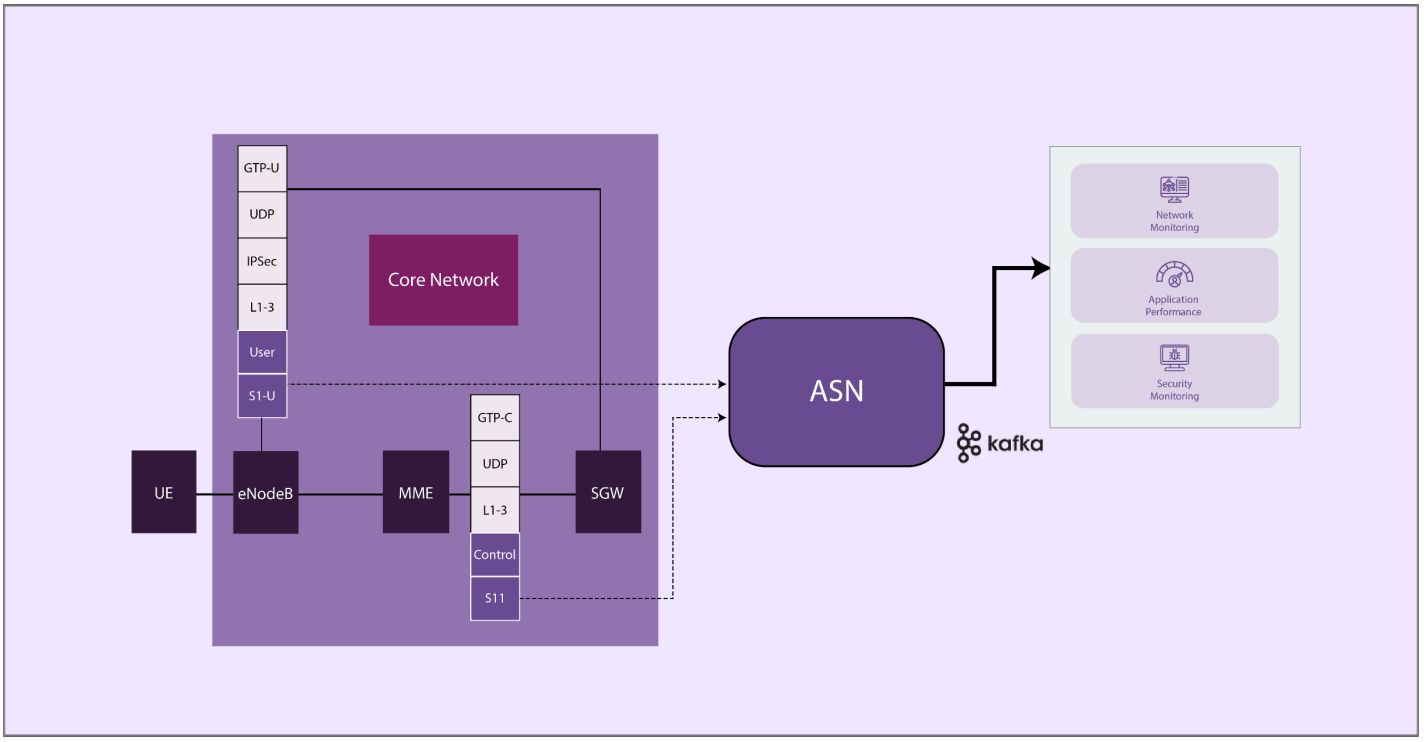


5G-NSA Test Scenarios

Metadata extraction and correlations are validated based on below 5G-NSA scenarios

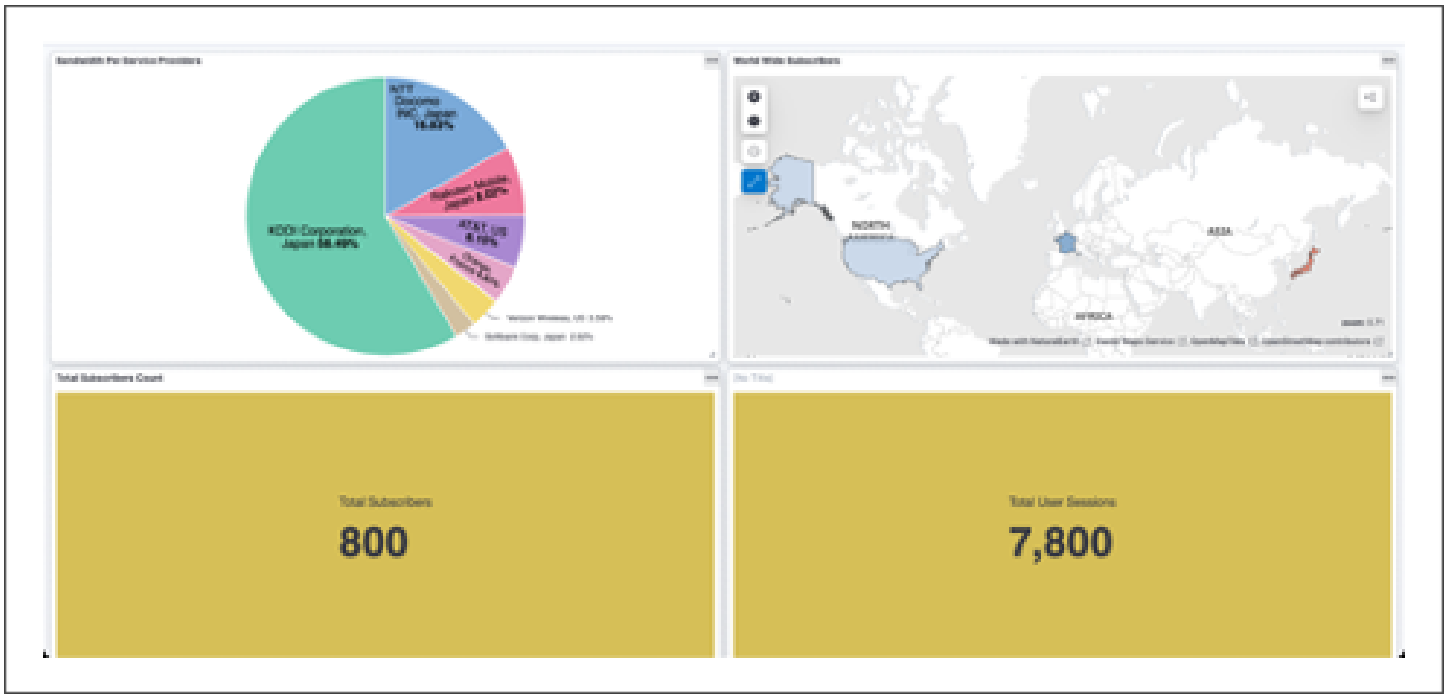
01	ASN should extract the metadata of S11 and related S1-U traffic from 5G-NSA network
02	5G-NSA correlated data of both control and user traffic with kafka update on configured interval.
03	ASN should relate uplink and downlink traffic of the particular subscriber and correlate it as a single session
04	ASN will send the priority update to kafka as a event based even before the next interval time
05	Correlation validation with the scenario where one subscriber with multi bearer session handling different traffic in 5G-NSA
06	ASN should identify the location of a particular subscriber through extracted control packet in 5G-NSA
07	Control and Data packet extraction of specific subscriber running on IPV6 in the 5G-NSA network
08	Kafka export of correlated data between S11 and S1-U of the IPV6 subscriber

5G-NSA Topology

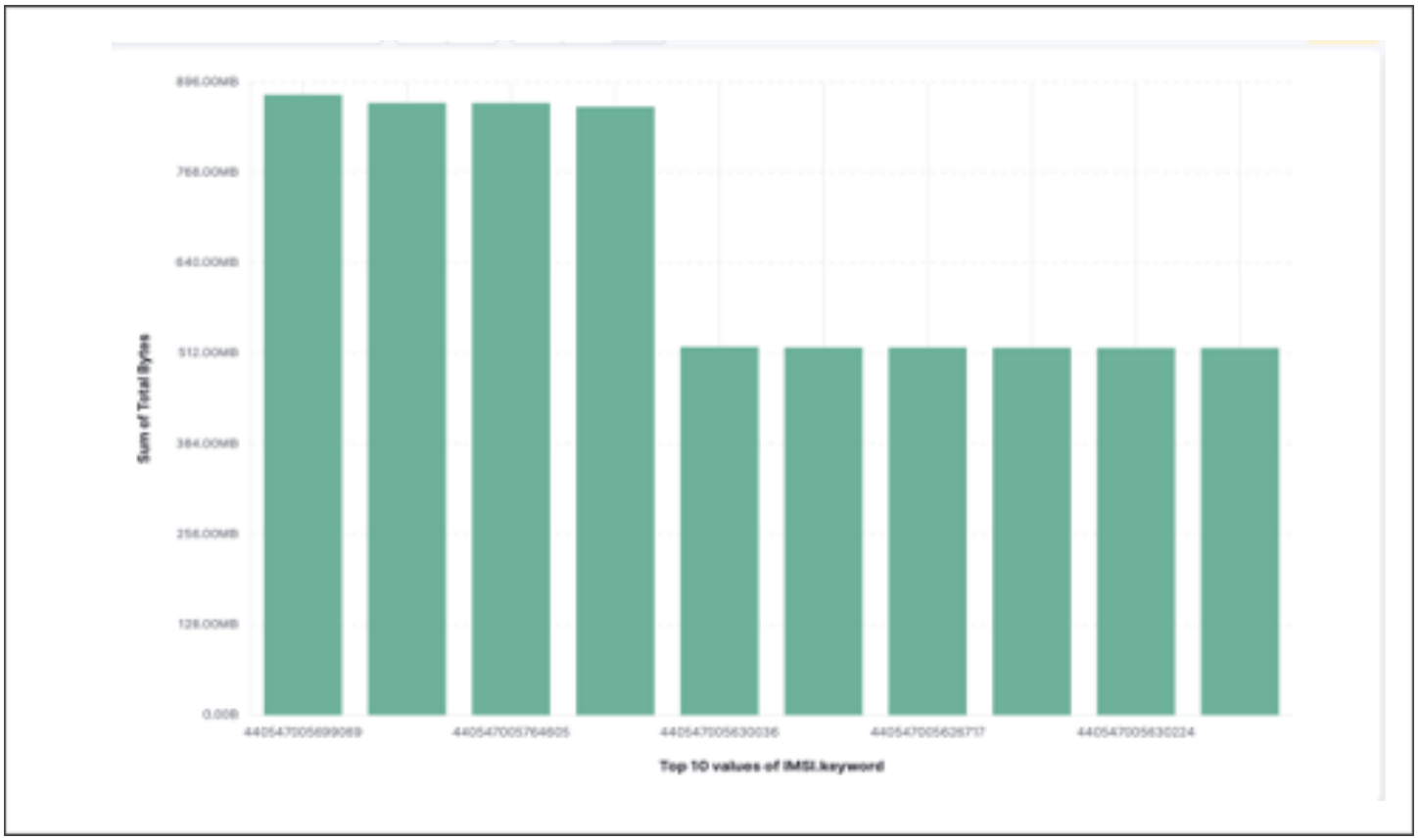


DashBoard Snapshots

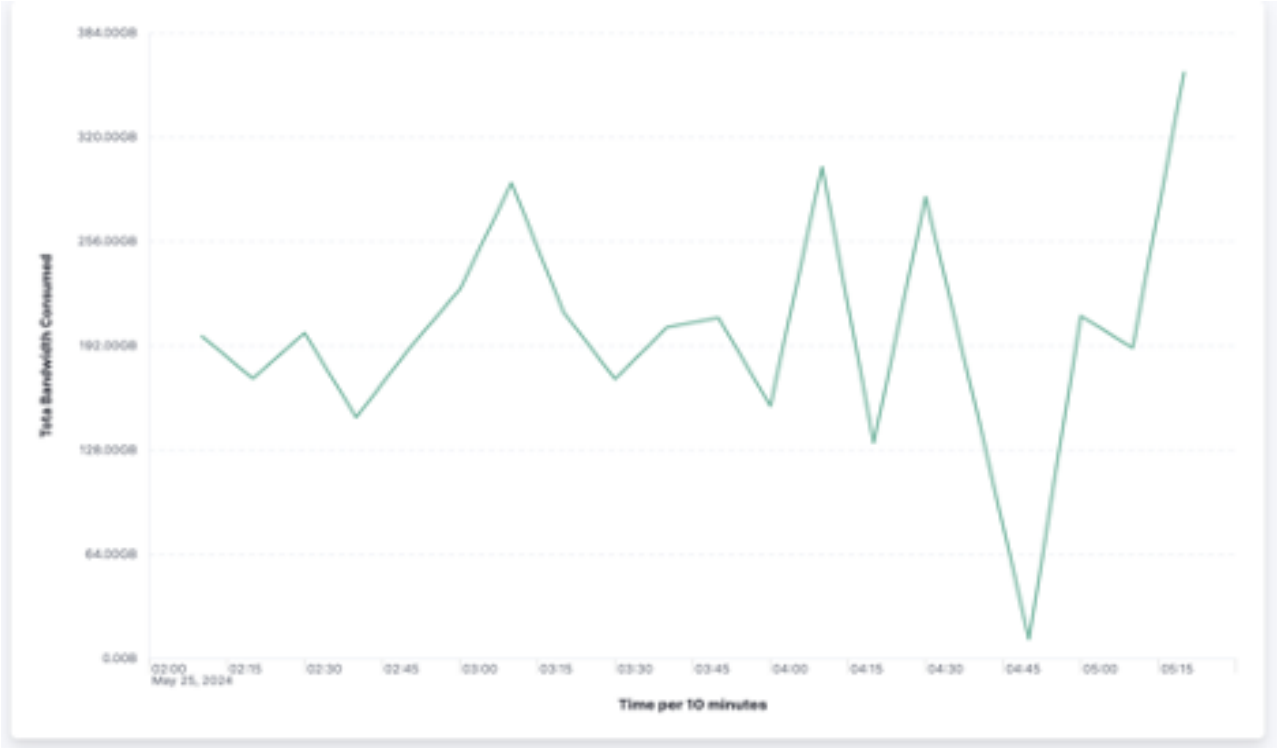
Overall Snapshot



Bandwidth Utilization Per Subscribers

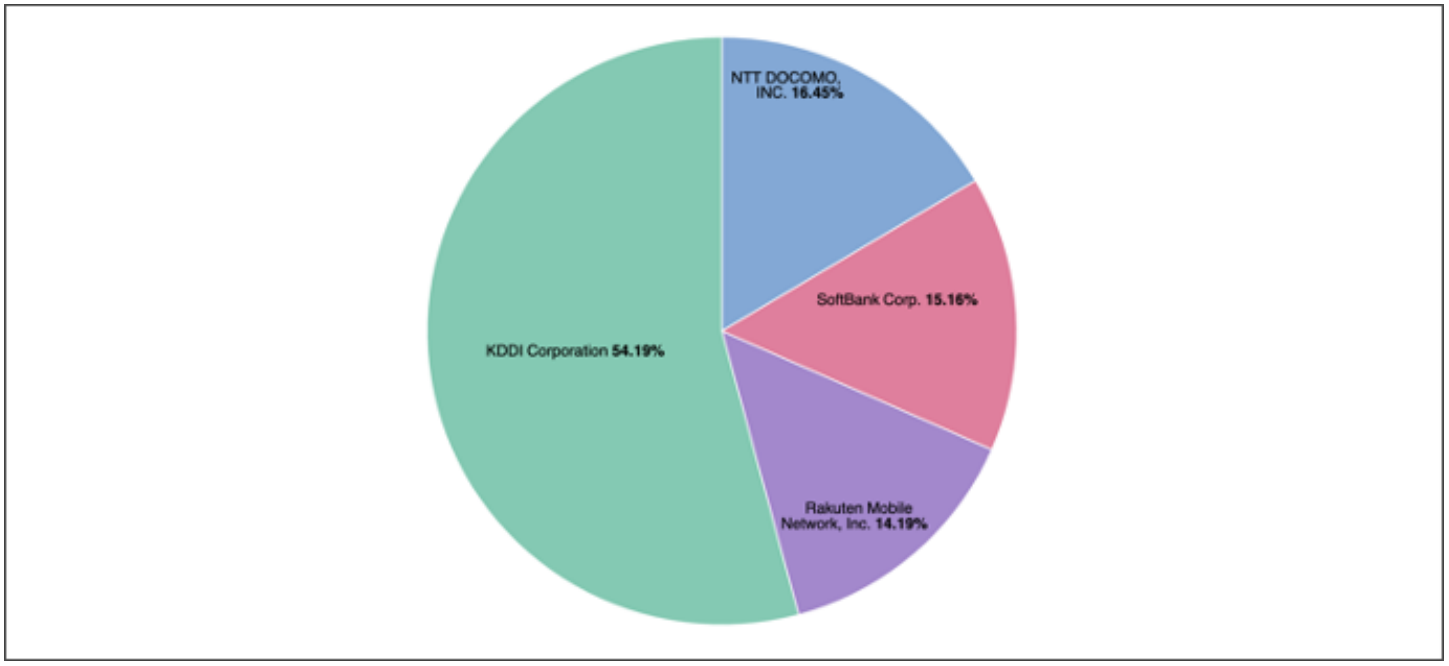


Last 10 minutes Traffic Visualisation

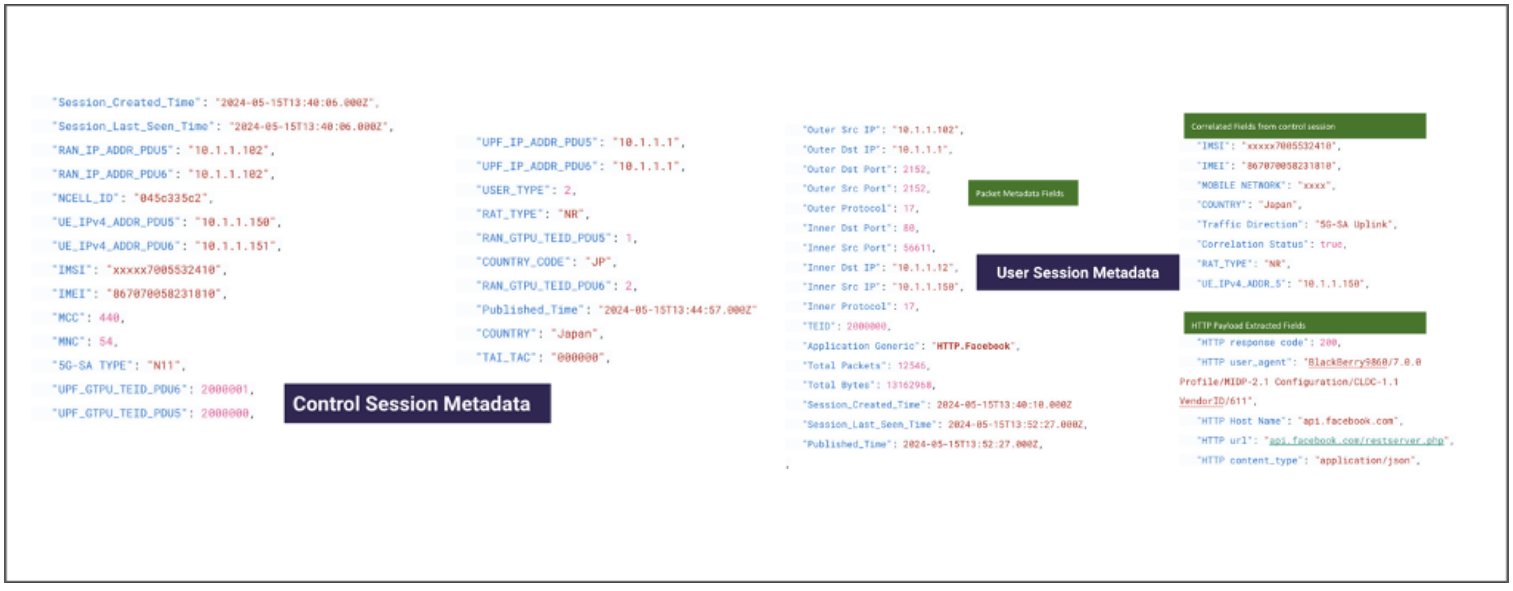


Top Users World Map

Service Providers Information



Metadata Extraction Snapshots



Handover Handling

ASN manages and captures various handover types, such as gNodeB handover, inter-mobility, and AMF handover in 5G, as well as eNodeB handover, intra-mobility, and S-GW handover in 4G-LTE/5G-NSA. It delivers prioritized updates for Handover scenarios for precise network visibility, ensuring customers have accurate and real-time insights.

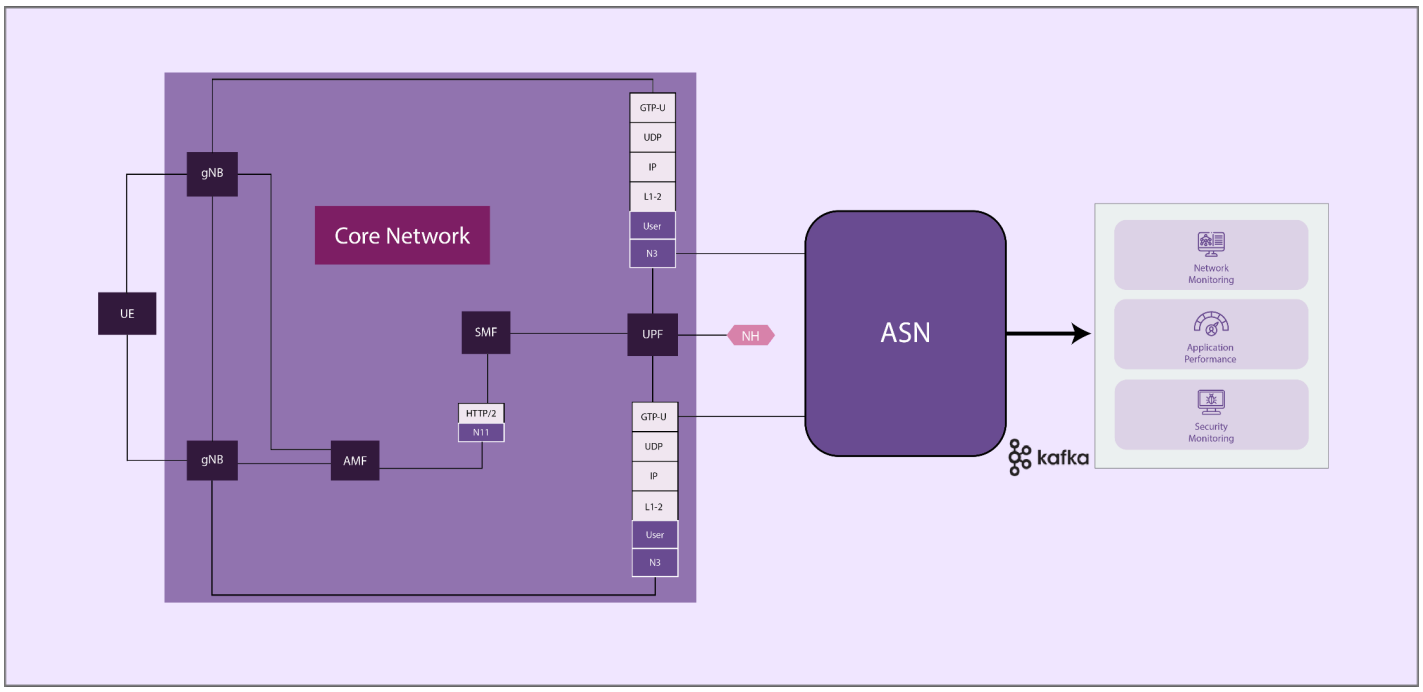
Test-Cases and Topology Details

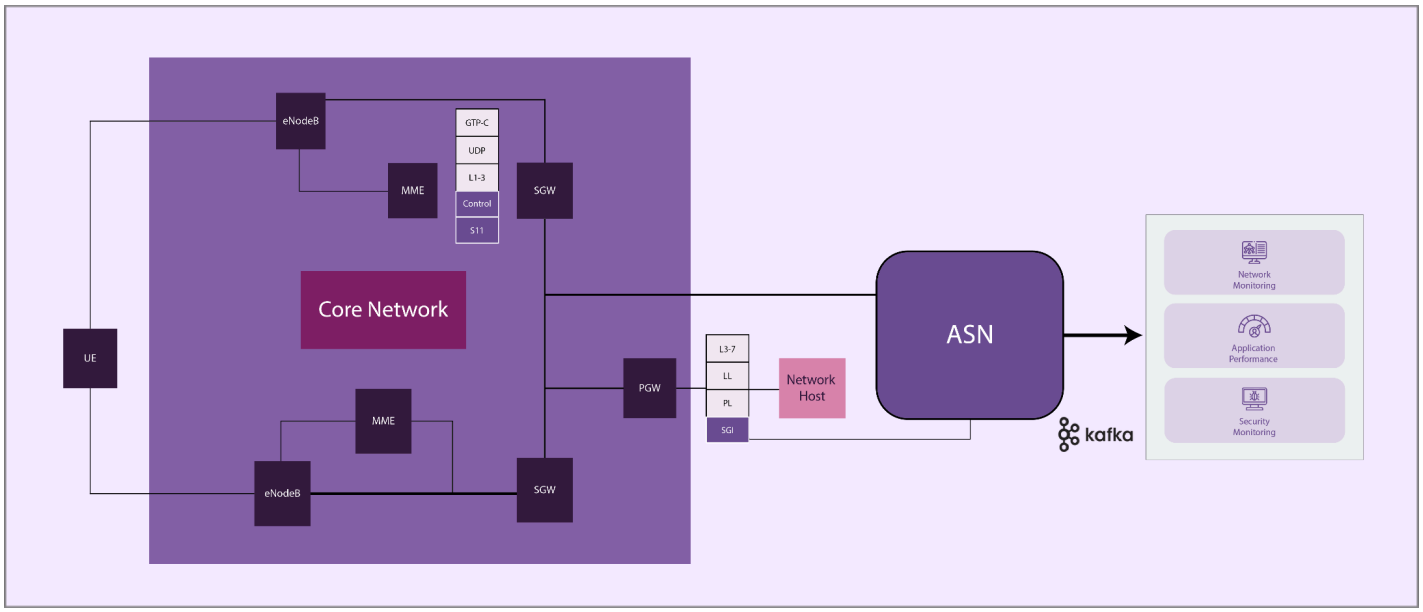
Handover Test Scenarios

Below are the test cases validated as part of handover scenario

01	5G Control and User plane handling on ASN when UE attached gNodeB is handed off to another
02	ASN capability of correlating the N11 and N3 traffic with the inter AMF mobility
03	ASN should handle the S11 and S1-U data changes when the UE attached eNodeB is handed off
04	Metadata extraction and correlation during the existing MME is handed off to another
05	ASN behavior on metadata extraction and correlation on eNodeB handover along with SGW relocation
06	ASN behavior on metadata extraction and correlation on MME handover along with SGW relocation

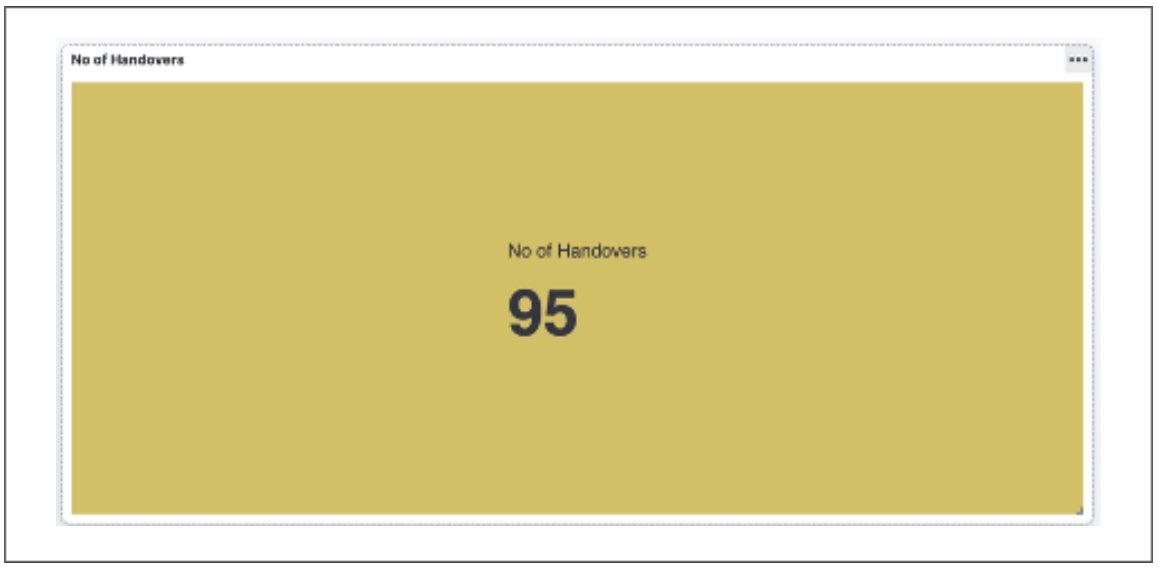
Handover Test Topology (5G-SA & 5G-NSA)



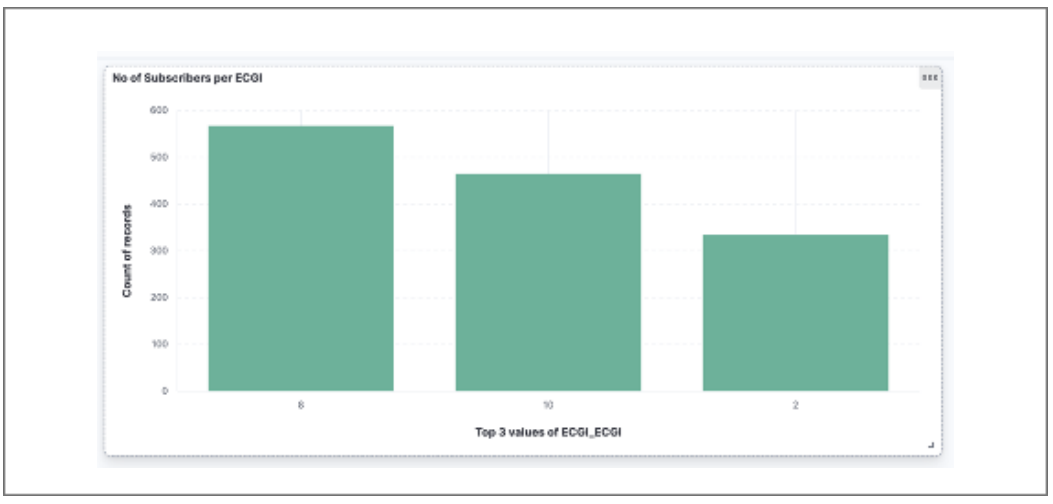


Dashboard Snapshots

No of Handovers reported



Visualisation Based on Cell Information



Application Identification

ASN features an advanced DPI engine that identifies applications used by subscribers and extracts content payloads such as HTTP and DNS. Additionally, ASN can detect the device type and operating system based on the payload, providing comprehensive insights into subscriber activity.

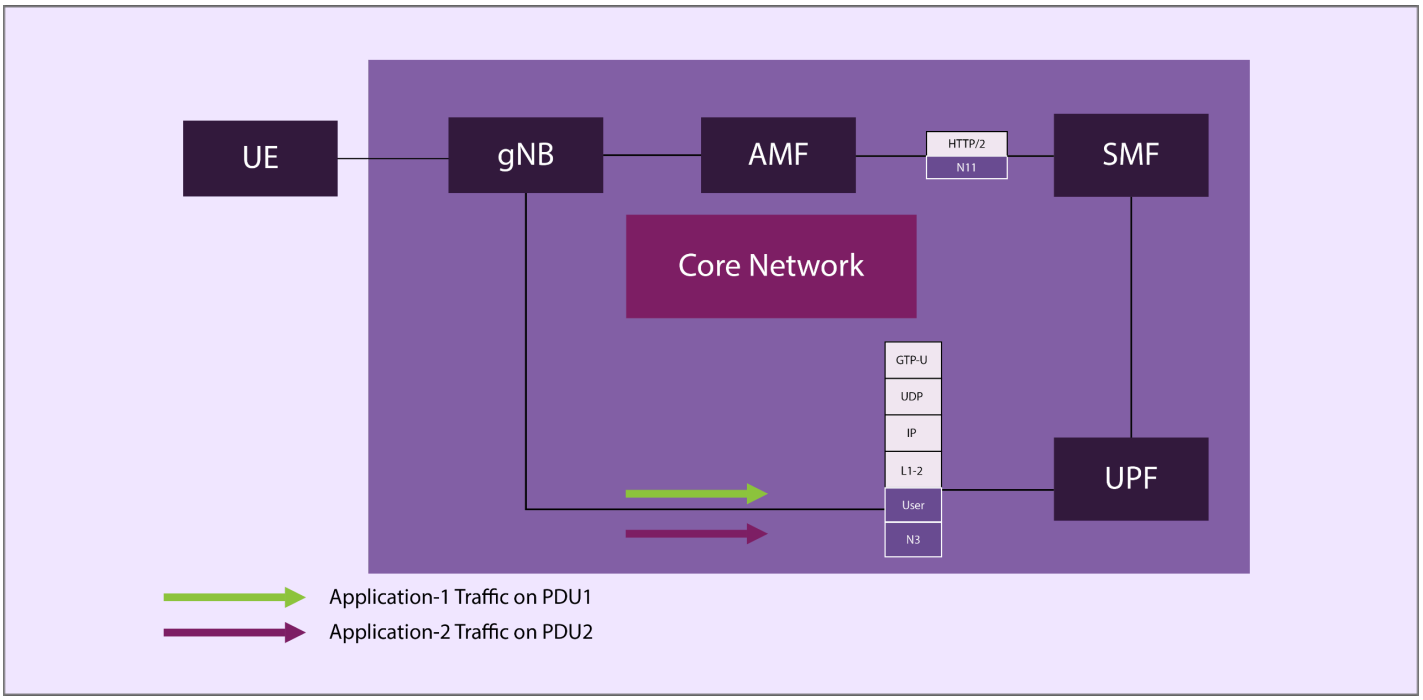
Test-Cases and Topology Details

Application Identification Test Scenarios

Test scenarios tested and functionality confirmed on below scenarios

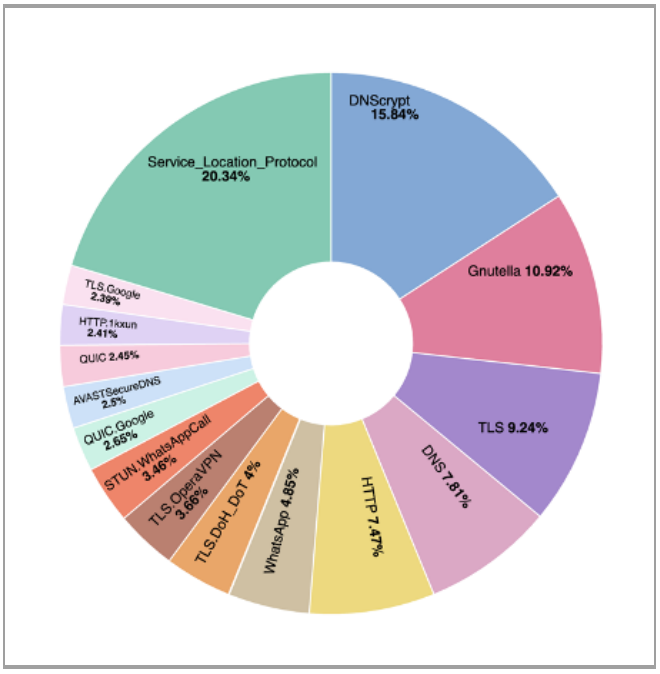
01	ASN deep packet inspection for identifying application traffic based on Destination Port
02	Application identification by ASN through the destination IP address
03	Identifying application which is encrypted inside the HTTPS [SNI based identification]
04	Multiple application traffic mapped to the multiple PDU on 5G network traffic
05	Multiple application traffic mapped to the multiple Bearers on 5G-NSA network traffic
06	ASN capability on extracting the HTTP details as metadata from a user data packet
07	ASN capability on extracting the DNS details as metadata from a user data packet

Application Identification Test Topology

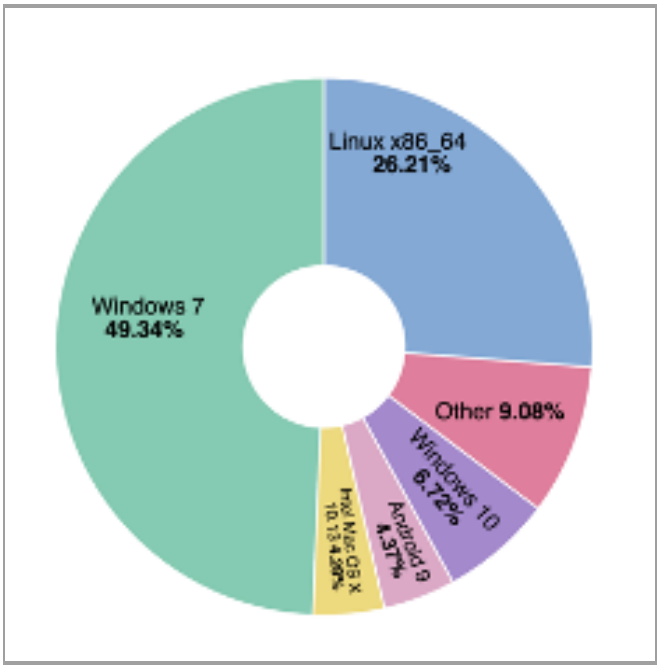


Dashboard Snapshots

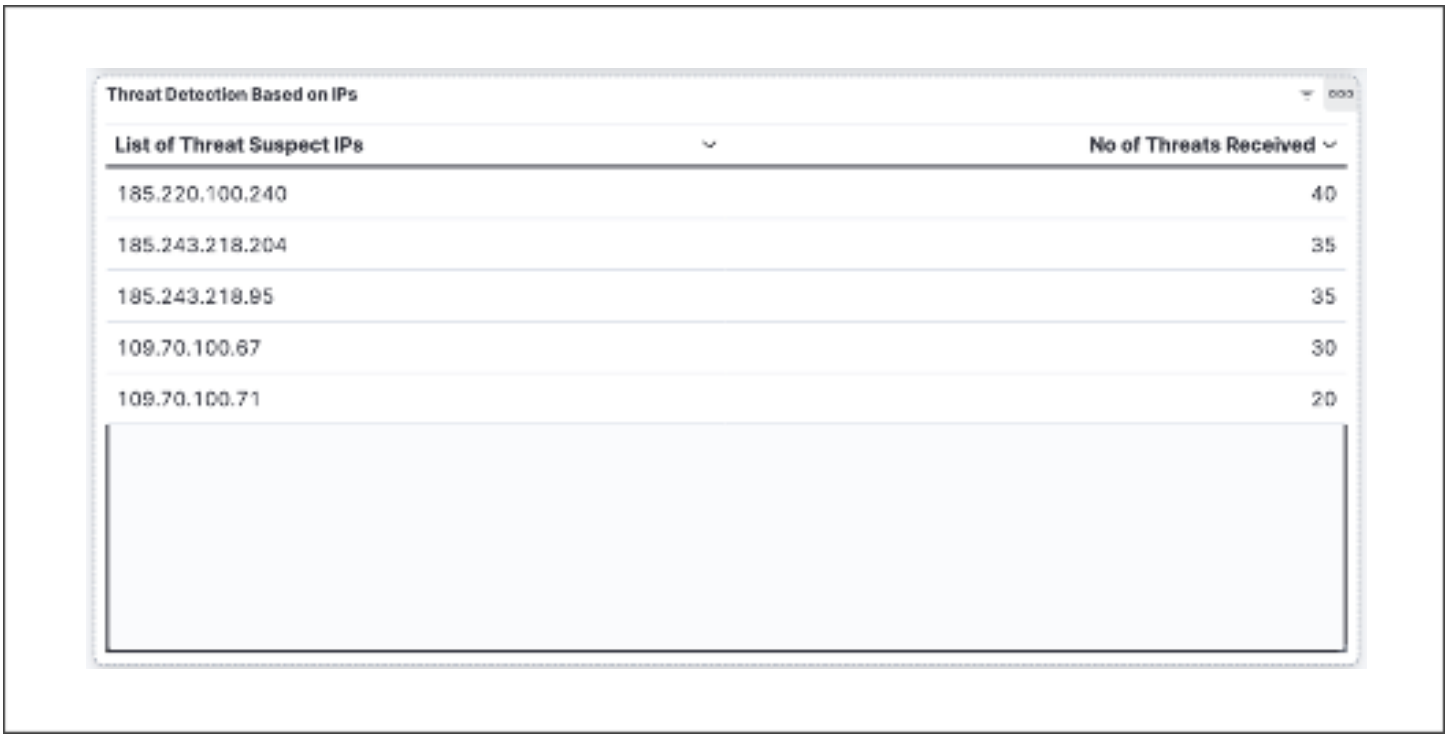
Top Application Identified by ASN



Top Devices by OS



Thread Detection



Threat Detection Based on IPs

List of Threat Suspect IPs	No of Threats Received
185.220.100.240	40
185.243.218.204	35
185.243.218.95	35
109.70.100.67	30
109.70.100.71	20

Test-Cases and Topology Details

Performance Test Scenario

01	ASN should handle the 1 million subscriber, verify the data extraction and correlation is proper and kafka upload from a 5G Network
02	ASN capacity on correlating the user packet 100Gbps with control sessions. Total bytes/total packet processed per core without drop
03	Maximum number of application traffics possible per subscriber with maximum payload on each
04	ASN behavior while the user core is hitting iMIX traffic from the core network. Ensure memory and CPU is stable across
05	Observe the ASN reaction on pumping multiple streams of traffic with different packet size on each stream
06	ASN should handle the 1 million subscriber, verify the data extraction and correlation is proper and kafka upload from a 5G-NSA Network

Note : Topology is same as the master

Per-Core Benchmarking against different Packet Sizes

- ASN Per core can handle around 6 Gbps with imix traffic(mix of 64 bytes to 1500 bytes)
- Note : This is purely based on the no of ASN use-cases enabled per core.

Per-100G System Benchmarking Table against different Packet Sizes

Test Setup Details:

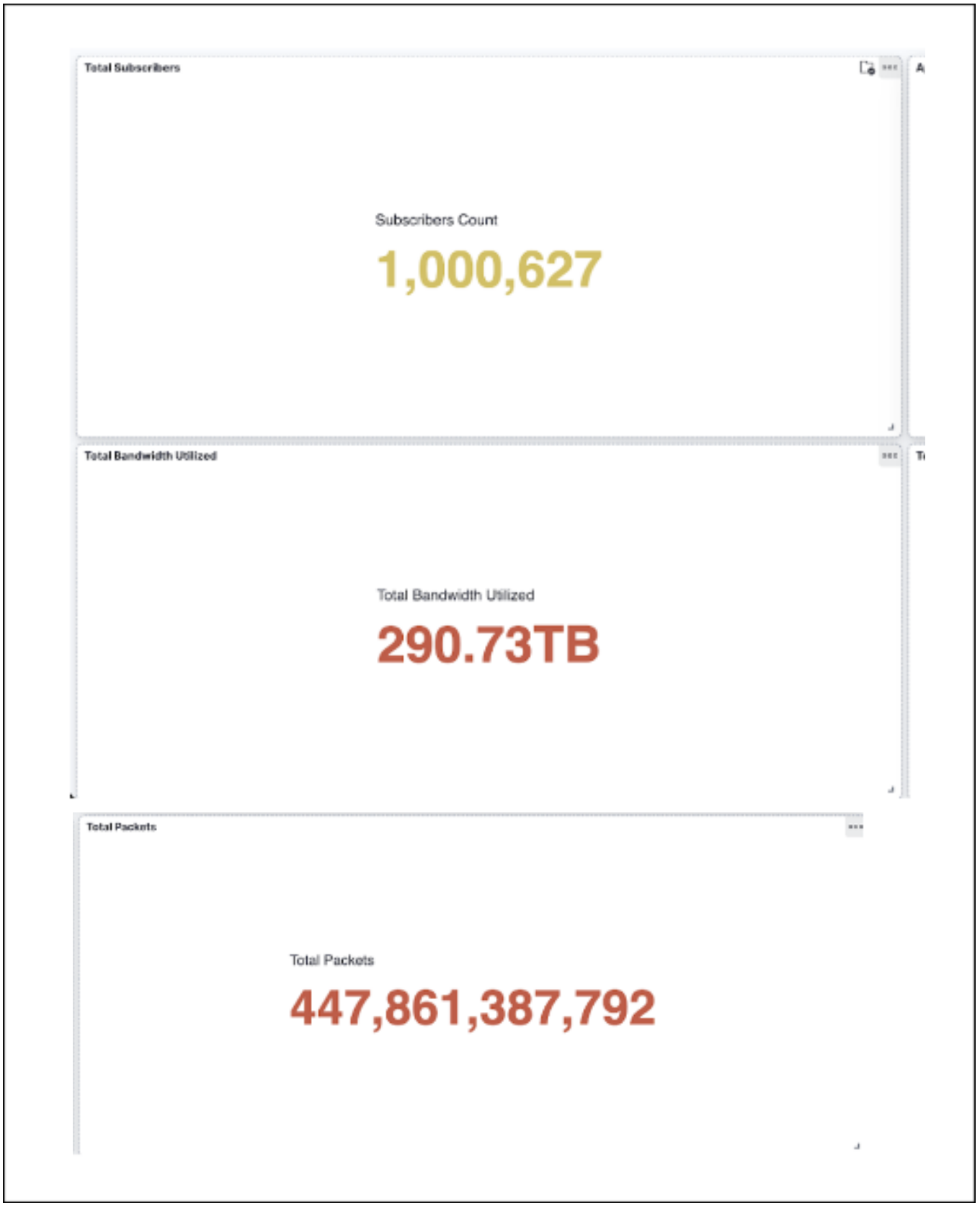
- 1M Subscribers, 100Gbps, Over 1 day

Packet Size	Drop %
> 128	2
256	0
512	0
1024	0
1512	0
IMIX Landslide (Size range from 64 to 1512)	0

Note : This is purely based on the no of ASN use-cases enabled per core.

DashBoard Snapshots

1 Million Subscribers with 100 Gbps Bandwidth



ASN Latency Measurement for control and User plane packets

Bandwidth Usage and Consumption Details in Performance Setup