Silicom Denmark A/S
FPGA SOLUTIONS

5G/4G/3G

For independent UPF/PGW monitoring
with 5G and 4G CUPS support

5G/4G/3G SUBSCRIBER SESSION COHERENT DATA SOURCING

2022

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5G/4G/3G SUBSCRIBER SESSION COHERENT DATA SOURCING

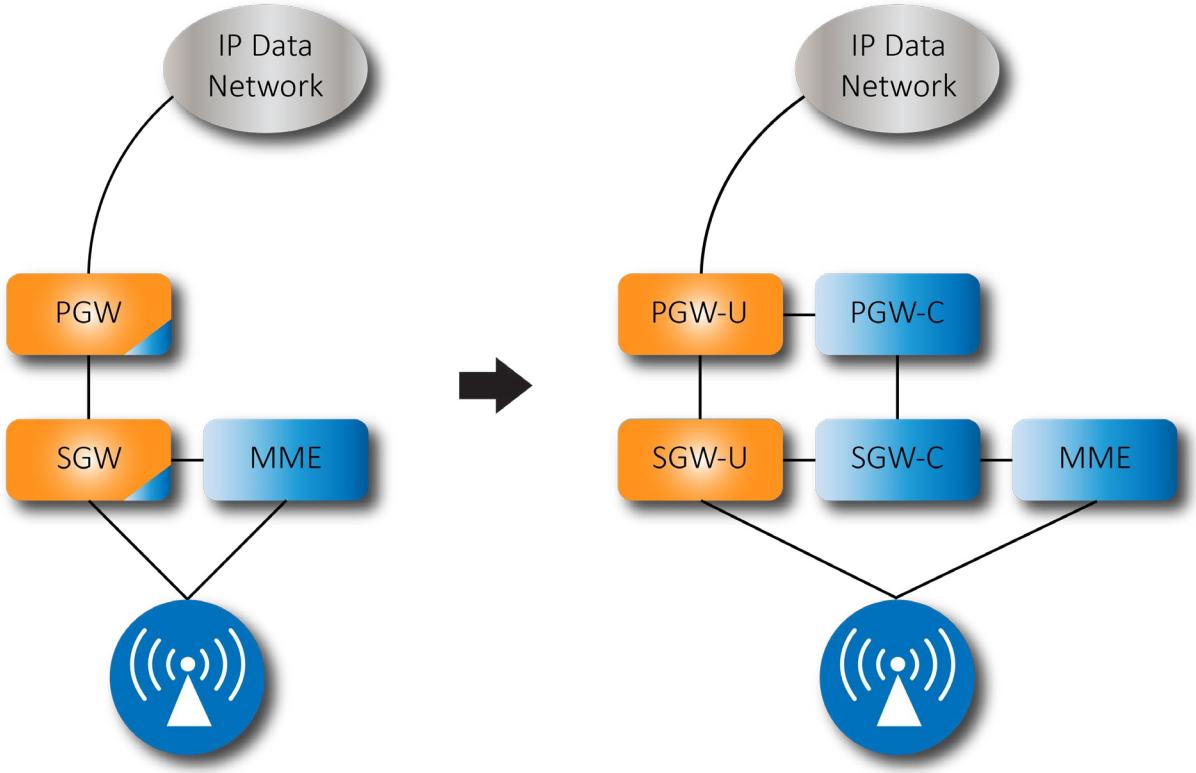
Today's mobile networks are challenged by the increasing amount of subscriber data traffic. All parts of the network are under pressure. The mobile core network is revolutionizing the connectedness of its subscribers and is also taking on fixed line and Wi-Fi connectivity. This is partly driven by the explosive growth of bandwidth needed for video and media, but also IoT and autonomous cars are growing factors.

For QoS and monitoring solutions relying on analysis of the mobile network traffic, including control or user plane analysis, this growth is equally an ever-increasing challenge. Being able to analyze the data while preserving subscriber association and segmentation on the fly, is a daunting task to solve in a CPU based solution.

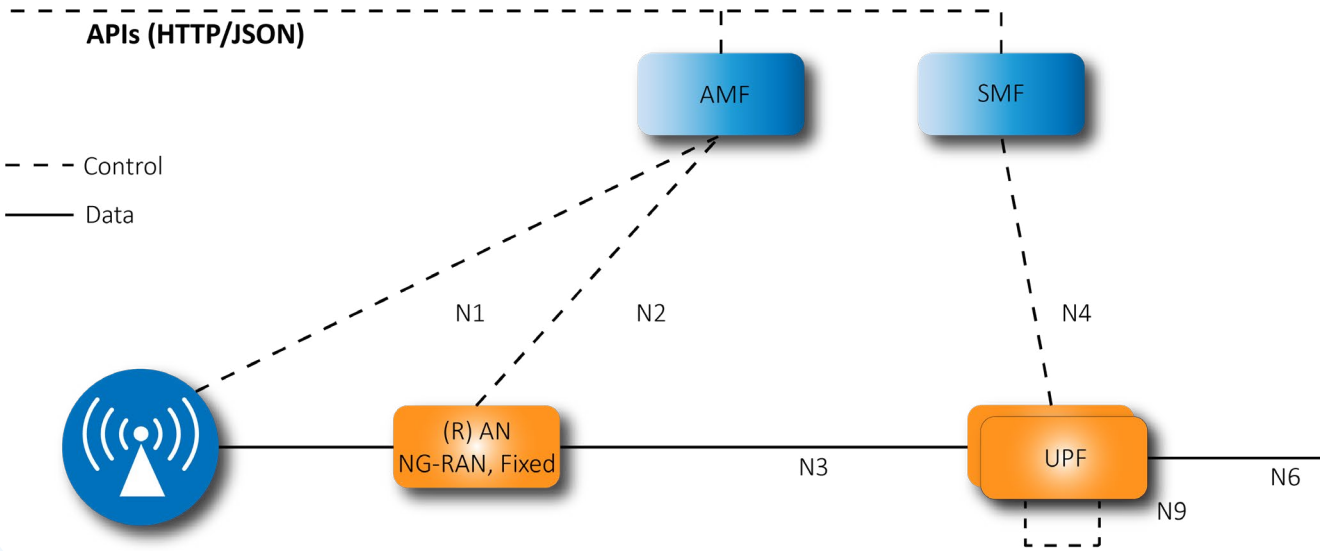
Correlating all the different traffic tunnels per subscriber on-the-fly is quite simply not economically feasible on Server / CPU systems due to the enormous traffic load.

For the network themselves, the load pressure is alleviated by changes to the network architecture of 4G and 5G, core and access networks. Traditionally user plane traffic was tunneled through the network using the GTP protocol, with its own user and control plane protocol, routed alongside each other terminating in the same nodes. This has been changing for some time.

Control and User Plane Separation (CUPS) yields higher scalability. In cloud-based nodes, these changes pose an ever-increasing challenge for retaining the ability to inspect the actual traffic of the network, especially if such analysis is required independently of the network equipment vendor. Typically, a requirement for B/OSS systems within service assurance, monitoring, analysis, interception, planning, and traffic management.



With the introduction of Control and User Plane Separation (CUPS) in 4G, and CUPS being an inherent feature of 5G, the correlation of the tunneled data has been further complicated by the full decoupling of the nodes servicing respectively Control and User plane. Ultimately complicating the task of independent monitoring of subscriber sessions in coherent fashion, while also ensuring a reasonable resource utilization.



B/OSS with focus on individual subscriber sessions has become a costly discipline due to the constantly increasing traffic loads. A typical solution has been to deploy a wide mesh of packet broker devices backhauling data to analyzing nodes.

This is both cumbersome and expensive, as well as a decoupling of the traffic acquisition for monitoring and the analyzing nodes. Also, this does not automatically provide any kind of subscriber session filtering or isolation and is a solution that may be hard pressed to reliably correlate the traffic of subscribers as encountered on the various interfaces of the network. This complicates the already considerable task of managing a mobile service network and the task of coordination with 3rd party vendors and service assurance solutions.

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Session Based GTP Data Sourcing Solution

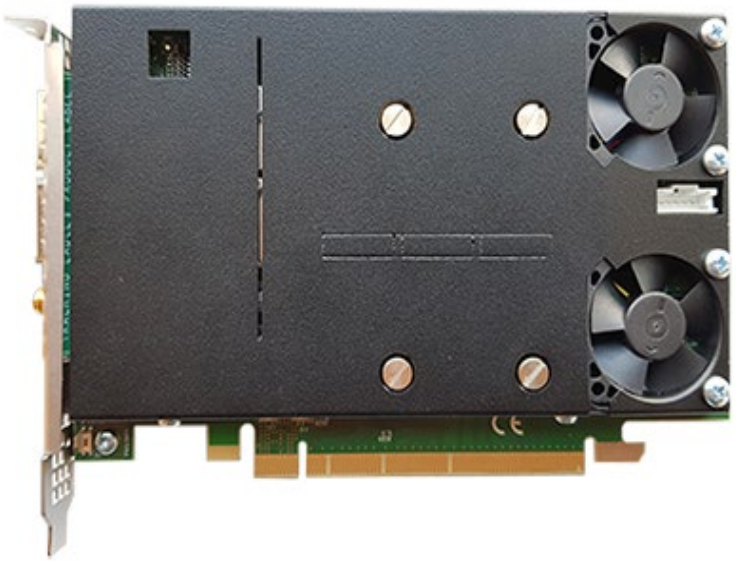
Silicom Denmark's Session Based GTP Data Sourcing Solution offers a solution to these challenges. A solution that has evolved along with the network technologies and provided high performance correlation and distribution since 2010.

The solution is based on cutting edge FPGA technology, deployed on PCIe line cards with port speeds from 1 to 100G and port counts from 2 to 16. By utilizing the strengths of both CPU and FPGA, a combined solution is constructed which is equally flexible in allowing correlation, and through the FPGA ensuring high performance traffic handling.

Enabling the solution to correlate and load balance up to 400 Gbps into channels of coherent User and Control plane traffic, this is distributed into 256 session coherent channels either to Host system RAM or via optical fibers to a chain or cluster of monitoring devices, where each can benefit from the distribution internally as well.

KEY FEATURES

- Suitable for stand-alone deployment or system integrated acceleration and offload
- Support and correlation of GTP-U with GTP-C and/or PFCP
- Fully offload session correlation tasks and eliminate typical performance bottlenecks
- Enables processing of large number of sessions
- Frees CPU cycles for analysis tasks
- Subscriber targeted monitoring
- More than 500M tunnel endpoints supported
- Easy integration into host system
- Scale performance of existing solution's SW/probe architecture
- Zero packet loss
- Coherent user sessions



Silicom provides a solution consisting of one or more PCIe FPGA cards for various link speeds, programmed with Silicom's FPGA IP. For the host side the software tools and drivers are provided, allowing the solution to be either a standalone deployment for session distribution via Tx network ports or as a fully integrated extension of the monitoring solutions, for distribution to local hosts RAM and/or via the FPGA cards Tx network ports either direct or in daisy chain. This allows any solution to scale to a capacity of 400 Gbps using existing SW architecture with minimal adaptation.

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FPGA SOLUTIONS

Silicom Denmark | FPGA Solutions (formerly Fiberblaze) is a premier developer and supplier of FPGA-based interface cards for cyber-security, telecommunications, financial trading and other sectors.

Silicom Denmark's products range from 1/10/25/40 and 100 Gb adapters for un-configured hardware platforms to specialized embedded solutions for Network Virtualization (SDN/NFV), Cyber Security, Lawful Interception and Encryption Acceleration solutions. In addition, the company provides advanced FPGA-based custom solutions.

Silicom Denmark's customers also benefit from Silicom's proven high-quality volume hardware production capabilities.

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