

QUANTEA QP: DEEP PACKET INSPECTION FOR LTE NETWORKS

Overview

The imminent growth of mobile LTE networks worldwide, is shown in the number of users and devices being added to LTE networks every year. It is also shown in the types of services being added to the networks, along with the quickly evolving LTE standards such as 4G and soon-to-be 5G. 5G will be in major deployments by 2020, worldwide.

LTE networks are becoming more and more complicated as new services, and the number of connected users and devices, continue to grow. Because of this growth, the need to monitor and analyze the network at any given time is more important than ever. This need will continue to grow as the mobile networks become more complicated with new types of services and more populated with users and devices through services like IoT.

The continuous growth of LTE network users and services, worldwide, creates more pressure for the service providers to deliver a better class of service with improved security and QoS. To handle this growth and enable a better network overall, the service providers need to have the tools to ensure a secure connection, while delivering a high level QoS.

Quantea's Deep Packet Inspection solution helps service providers to deliver a better user experience while improving security by supplying the right tool to monitor, analyze, and help to design and grow the LTE network and services.

What Can the Quantea QP Do for LTE Operators?

The QP captures data from the network and the end user (UE) when it is placed between the SGW and PGW. All of the GTP traffic can be captured and analyzed with the built-in detailed search engine and any packet analysis tool. The QP helps to ensure QoS, network security and management.

Some of the information that can be captured via GTP tunnels

- Source/Destination Ip addresses
- Protocol
- MAC address
- MSISDN Info
- Port number
- AAA info
- TEIDs
- Time/Date
- QoS policy

Quantea QP captures the information based on the 3GPP GTP standards. If using a non-standard, customized solution, the supplier's system usually translates into the 3GPP standard that the QP can then capture.

The Quantea QP captures traffic at 50Gb/s, stores it as PCAP files, and provides replay capability, traffic generation, fine-tuned search engine to search captured data and the PCAP files can be processed with any packet analysis tool like Wireshark® and Splunk.

After capturing the data, any customized search can be done on the PCAP file based on any search criteria related to the specified captured information generated by the capture filter details. The system allows for storage compression of up to 36x with its unique compression engine.

The search engine can process 1M packets in 30 seconds. The search parameters can be set to find any information stored in the PCAP file from 1 parameter to any parameter.

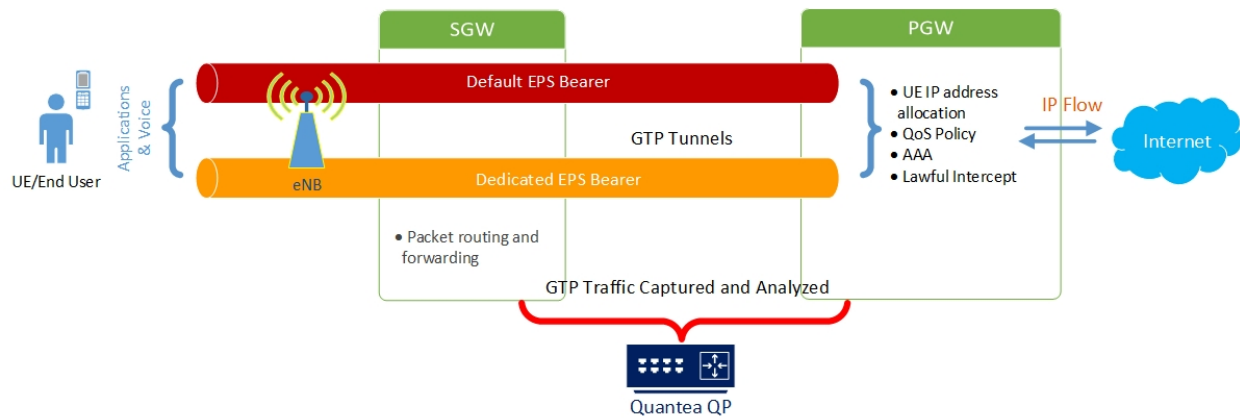
The Quantea QP can capture data information based on any criteria that is available in the GTP packets. For example: If the service provider wants to capture only the TEID (Tunnel Endpoint ID) and IP address of all users, then that parameter is set in the QP and it only captures that information.

Also, all of the GTP information can be captured and then searched to find any captured information such as TEIDs and IP addresses along with MSISDN information in a granular fashion including time intervals from 1 second to weeks, along with being able to search the data based on separate control plane or user plane information, or any other searchable parameters.

With these capabilities, the QP helps the LTE operator detect any anomalies in the network between the UE and the Internet, or voice quality. This helps ensure QoS and allows the operator to identify any issues. The QP can also help design the correct solution for an LTE network while also being able to see if there have been any attempted attacks on a particular user's connection.

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LTE GTP Architecture



GPRS Tunnel Protocol (GTP)

The tunnels created by GTP are the transport core of the LTE network between the user and the data services, or voice services. The tunnels provide the ability to manage each independent user and their QoS and security, even when there are thousands of users connected at the same time.

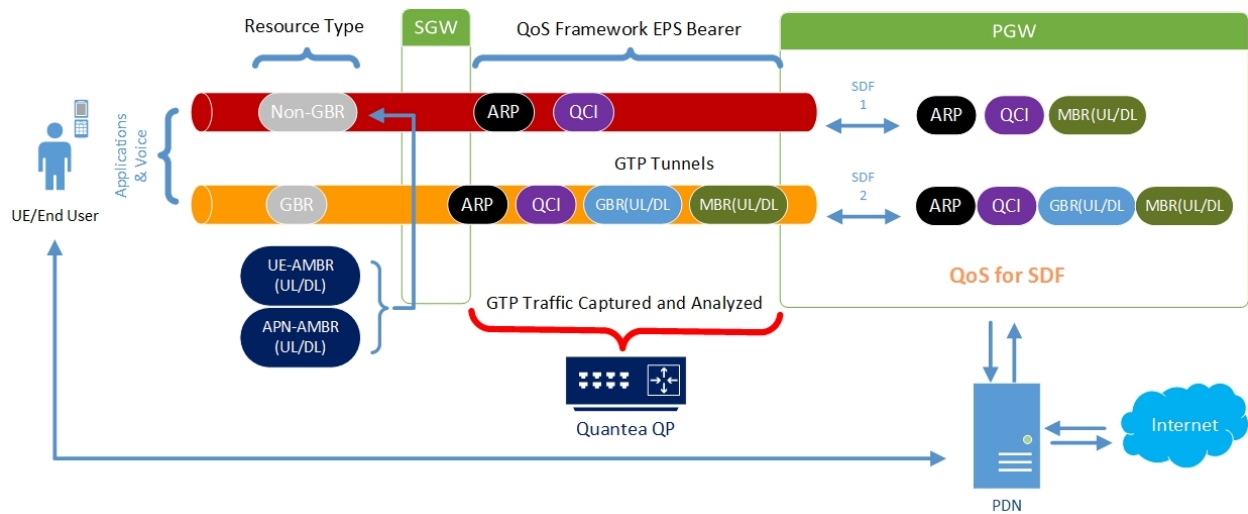
There are two types of tunnels: Dedicated and Default. The Dedicated tunnel usually carries the higher QoS traffic like voice calls (VoLTE) and applications like Skype. This tunnel has a GBR (Guaranteed Bit Rate). The Default tunnel is used for traffic that is based on a best-effort basis. This tends to be data traffic for the Internet and video services that do not require high QoS like YouTube and general Internet surfing. Both tunnels have a specified MBR (Maximum Bit Rate) in order to allow the carrier to allocate bandwidth across all users.

The information contained in the tunnels is provided in GTP-C and GTP-U packets which contain the IP control data and the user data. These two sets of data contain a lot of information including IP addresses, TEID (Tunnel Endpoint Identifier), authentication/authorization/accounting from MME, MSISDN

Because of TEIDs on an LTE network, the carrier has a choice to separate/identify users by TEIDs and IP addresses, not just IP addresses. The PGW checks both TEIDs and IP addresses.

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QoS: Quality of Service



The QoS framework in the EPS bearer is the determining factor for the level of quality the end user experiences. This has become a growing concern for service providers to supply a solid level of quality on their networks as customers are becoming more demanding than ever and have more than one carrier to choose from. This places pressure on the carrier to supply a service that will satisfy the customer and retain them as a customer.

In order to achieve this, the carrier must first have a solution that can supply the required services and have the tools to ensure that the QoS will be maintained. The Quantea QP allows for the ability to monitor and help maintain this type of network since it can look directly at the ARP(Allocation and Retention Priority) and QCI(QoS Class Identifier) packets and determine if there are any issues at any given time.

All EPS bearers must have ARP and QCI defined and maintained, especially the QCI, since it is a reference for the QoS level in each EPS bearer.

Key Points

- Interoperable on any LTE network
- Ease-of-use: No command line interface necessary with GUI
- DPI(Deep Packet Inspection) capability from L2 to L7 and any information contained in GTP packets with detailed search of captured packets
- Replay captured traffic for fine-tuned analysis without any loss of information in packets