# MAXIMIZE GATEWAY EFFICIENCY WITH GTP DIRECTOR

## A10 NETWORKS' GTP DIRECTOR BALANCES GTP TRAFFIC TO MAINTAIN CORE EFFICIENCY AND SUPPORT ADVANCED SERVICES

5G transforms mobile network requirements with more dynamic and much higher traffic volume, more ecosystem and roaming partners and deeper requirements for the treatment of network slices. The common core of 5G Non-Standalone (NSA) networks supporting 4G and 5G radio access, the co-existence of other network generations and multiple radio access networks (RANs) for narrow-band-IoT or shared infrastructure partners all add to the complexity of intra-network routing.

The effective balancing of GTP traffic is essential in sustaining 5G speed and low latency, and in maximizing the capacity utilization of gateways. The A10 Networks GTP Director allows mobile networks to dynamically respond to shifting traffic patterns and provides intelligent load balancing to maximize network efficiency.

## THE CHALLENGE

### INEFFICIENT SCALING OF PACKET GATEWAYS

In 5G NSA networks, traffic is highly dynamic and must be processed by serving gateways in the common core then forwarded to packet gateways. Static routing tables can't keep up with the dynamic nature of 5G traffic. This results in inefficient distribution of traffic between serving gateways (SGW) and packet gateways (PGW), and in either underutilization or overutilization of network capacity. Efficient load balancing of traffic with protocol

## CHALLENGE

Traffic distribution in 5G mobile networks is complex. 5G traffic is more dynamic and variable. Architectures are more distributed with multiple sources and destinations. To ensure effective use of network resources, operators need an intelligent and efficient traffic distribution mechanism.

## SOLUTION

GTP Director is inserted inline in multiple mobile interfaces to provide efficient traffic distribution to mobile gateways for the following use cases:

- Packet gateway (PGW) scaling*
- Packet gateway traffic slicing per mobile virtual network operators (MVNOs)
- Roaming traffic routing*
- Network slicing*

## BENEFITS

With GTP Director, mobile operators can make effective decisions dynamically based on a number of parameters to ensure efficient traffic distribution to packet gateways, high network resource utilization, and meet latency and throughput requirements for network slices.

and network element awareness is essential for supporting 5G performance, network slices and other general use cases at the roaming interface, from 4G and 5G RAN, and where traffic is destined for multiple MVNOs.

## THE A10 NETWORKS GTP DIRECTOR SOLUTION

### BALANCE TRAFFIC LOAD FOR MAXIMUM EFFICIENCY AND PERFORMANCE

The A10 Networks GTP Director provides intelligent steering of the GTP traffic using extracted information such as traffic characteristics and static and dynamic configuration details. The GTP Director allows mobile operators to maximize the efficiency of the traffic load on packet gateways in 5G NSA and distributed environments and for network slicing scenarios.

GTP Director is included in the A10 Thunder® CFW product and GTP firewall functions, part of the 5G security suite. The solution can be deployed as software-only appliances, including bare metal, virtual or container and on physical appliances (PNF). Combined with the GTP firewall, it provides security and traffic steering for network slicing scenarios.

### USE CASES

GTP Director can be inserted inline in several points in the network, based on allowed visibility. It operates over traffic with multiple protocols. Primary use cases include the following:

- **Packet Gateway (PGW) Load Balancing\***: In 4G and 5G NSA mobile networks, serving gateways (SGW) and packet gateways (PGW) perform different functions and therefore have different capacity requirements. For maximum network efficiency, these elements should be scaled separately, and traffic distributed efficiently. The A10 Networks GTP Director considers business logic, traffic volume, GTP-specific parameters, and other factors, from traffic coming from multiple local or visiting SGWs. It will then distribute the load efficiently to multiple instances of the packet gateway to ensure efficient load balancing.

- **PGW Traffic Slicing per MVNO**: Mobile networks often include multiple packet gateways, each assigned to different MVNOs. Traffic through the serving gateways destined for a specific MVNO can be differentiated based on a specific IMSI range or on another GTP parameter. Thus, a simple distribution between packet gateway instances based on traffic load alone is insufficient. The GTP Director can intercept all traffic coming from serving gateways (SGW), evaluate that traffic based on a specified condition and deliver it to the right packet gateway assigned to the specific MVNO.

- **Roaming Traffic Routing\***: When the GTP Director is inserted into the roaming (S8/Gp) interface, it can distribute traffic coming from visiting networks and deliver it to the proper packet gateway. The GTP Director analyses the content of the GTP traffic, identifies subscriber identity and, based on configured forwarding rules, delivers traffic to the right packet gateway.

- **Network Slicing – Classification and Distribution\***: In 5G use cases with stringent latency and throughput requirements, early traffic classification will allow for the ability to choose the best network service path to meet those requirements. The GTP Director will analyze the traffic source, identify the device type using content parameters (i.e., DNS and MME request parameters) and choose the most appropriate SGW for that service path.

### SOLUTION COMPONENTS

The solution includes multiple components that provide:

- Visibility and analytics via traffic monitoring by the GTP Director; metrics and logging information are then provided to the A10 Harmony® Controller GTP Director application or any other third-party system deployed by the customer.

- Centralized management with A10 Harmony Controller – configuration and management of multiple instances of GTP Director at multiple locations, including those geographically distributed.

- Information communication between GTP Director and external systems are supported with interface and/or protocols to facilitate forwarding decisions for the intercepted traffic.
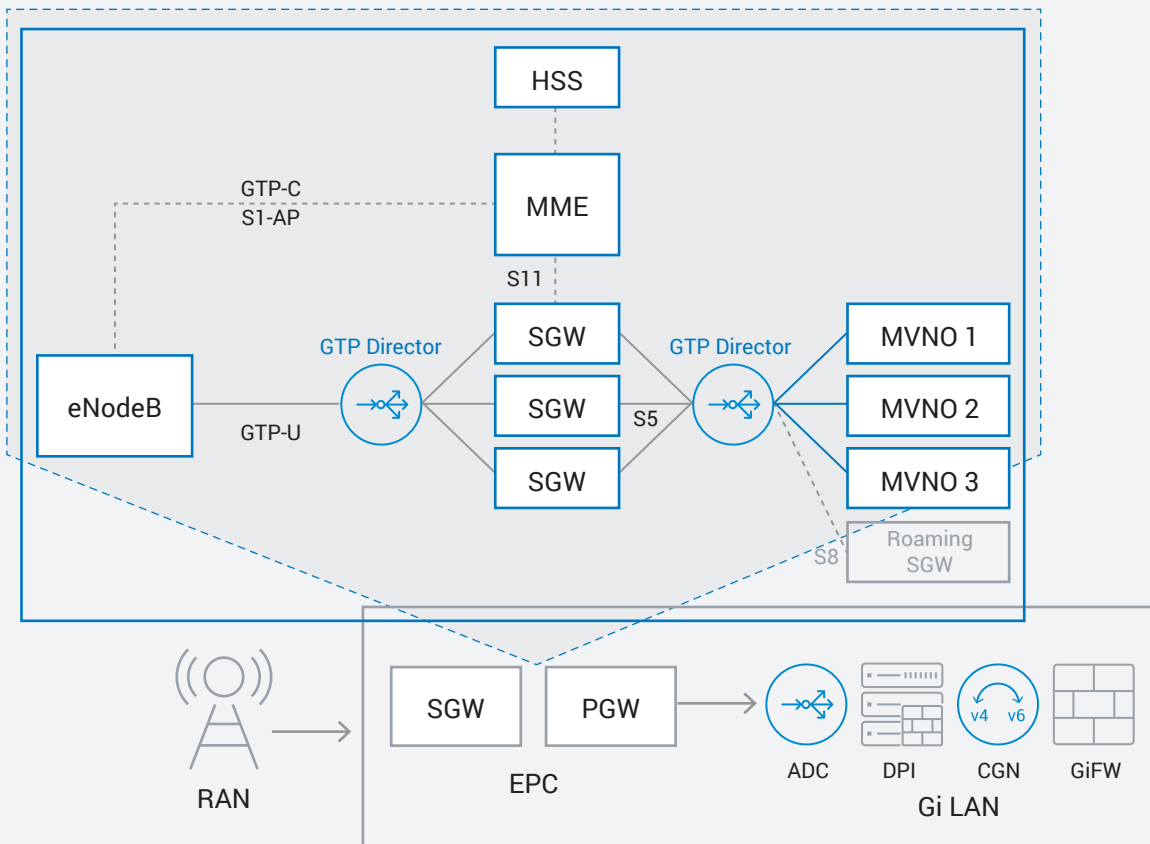
Figure 1. GTP Director use case – traffic slicing per MVNO

Functional capabilities of GTP Director include:

- Evaluation of incoming GTP messages, DNS and MME requests
- Flexible customization using aFleX®  snippets
- Application of forwarding actions for GTP tunnels and/or UE sessions (with potentially modified content)
- Modification of traffic based on configured rules
- Highly granular logging and statistics to A10 Harmony Controller or other external system
- Centralized management and analytics with Harmony Controller or an external system
- Integration with external systems to provide additional subscriber identity, traffic forwarding rules, orchestrating etc.

## *DYNAMICALLY BALANCE 5G TRAFFIC AND MAXIMIZE NETWORK EFFICIENCY*

Mobile network operators can maintain core network efficiency while responding to dynamic changes in network traffic volume, stronger performance and scalability requirements and a growing ecosystem of infrastructure partners. The A10 Networks GTP Director solution analyzes traffic from multiple sources to choose the optimal path and achieve desired efficiencies.

## NEXT STEPS

For more information, please visit https://www.a10networks.com/solutions/service-provider/.

## ABOUT A10 NETWORKS

A10 Networks (NYSE: ATEN) provides Reliable Security Always™, with a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure. Founded in 2004, A10 Networks is based in San Jose, Calif., and serves customers globally with offices in more than 80 countries worldwide. For more information, visit: www.a10networks.com and @A10Networks.

*Some solution elements and use cases are roadmap items, planned for future releases.

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