Challenges in Today's 3G & 4G/LTE Traffic Visibility

As data traffic from mobile devices and applications continues to grow exponentially, mobile carriers have searched for a way to efficiently and effectively monitor performance and quality of experience (QoE) for their subscribers, as well as identify and monetize new offerings.

However, in order to ensure accurate, cost-effective analytics from their tools infrastructure, service providers are dependent on two critical components:

- Ability to correlate traffic flows to the subscriber(s)
- Visibility across all segments of their mobile networks

GTP Correlation

GPRS Tunneling Protocol (GTP) is commonly used to carry mobile data across the networks and includes the control plane (GTP-c) and a user-data plane (GTP-u) traffic. Therefore, visibility into a subscriber's activity requires the ability to understand the stateful nature of GTP (v1 and/or v2) and to correlate subscriber-specific sessions to gain an accurate view of the subscriber's activities.

Gigamon's GTP correlation application helps carriers gain access to the subscriber's data in these GTP tunnels by reliably correlating and passing all of the identified subscriber's control and data sessions to the analytics/monitoring probes and billing subsystems to ensure an accurate view of the session.

Further, given the rate of increase in the volume of information traversing through the mobile service provider networks, the tools infrastructure has been unable to scale accordingly, and proliferating tools across the network to monitor millions of subscribers can be very expensive and cost prohibitive.

With Gigamon's GTP correlation application, carriers can intelligently filter, replicate, and forward specific subscriber sessions to the specific tools by correlating the subscriber ID, also known as the international mobile subscriber identity (IMSI), that are exchanged as part of the control sessions to the corresponding tunnel ID or tunnel endpoint ID (TEID) that are part of the user-data plane traffic. This can optimize current tool infrastructure investments by providing only relevant data to the tool while increasing visibility into subscriber traffic that can help improve QoE and performance.

When combined with GigaSMART® packet modification operations like slicing, monitoring tools can perform more efficiently by eliminating unwanted packet content. Gigamon's GTP correlation application also has the ability to ensure that all IP fragments within the subscriber session are sent to the same tool.

By gaining a complete activity view of high-value subscribers, carriers can look to optimize ARPU by improving operational efficiency, ensure business continuity and QoE, and identify and monetize new offerings. When used with FlowVUE™, Gigamon's intelligent sampling of active subscribers, carriers can have a representative view of a subscriber's usage patterns. Armed with these subscriber level insights, Gigamon® can help operators to identify roaming subscribers across peered networks through IMSI filtering.

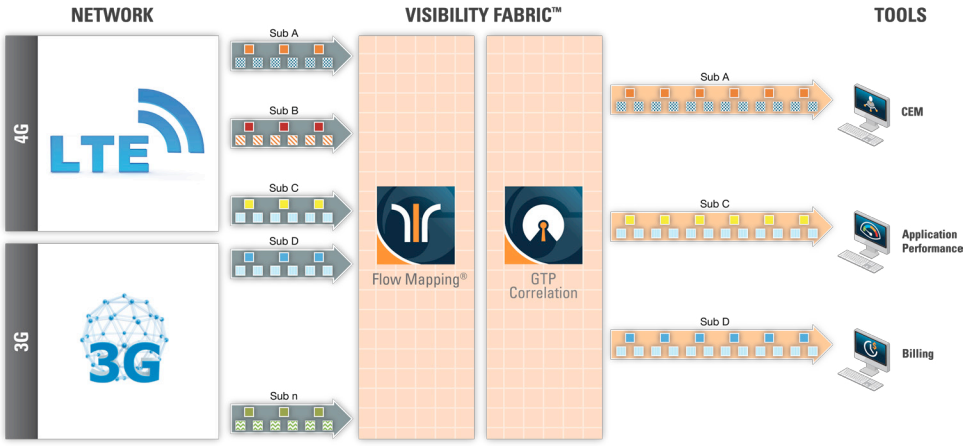

Figure 1: GTP correlation

GTP Correlation Features

- Stateful Filtering Based on Subscriber ID's (IMSI)
  - Stateful correlation of GTP-c with GTP-u messages
  - Correlate subscriber ID with corresponding tunnel ID
  - Forward subscriber-specific control and user plane sessions to a tool or a group of tools
- Traffic Filtering, Replication, and Distribution Based on:
  - GTP TEID and inner-packet parameters including: Src/Dst IPv4/v6 Addresses, Protocol, Src/Dst Port, IP Version, TOS, TTL, DSCP, Fragmentation Flags, TCP Flags
- Support LTE and 3G Networks Including GTPv1 and GTPv2

Key Benefits

- Optimize the Tools Infrastructure
  - Optimize tools processing by accurate filtering, replication, and forwarding of monitored subscriber sessions
  - Reliably correlate subscriber sessions (control and data) to increase analytics accuracy
- Pervasive Visibility into Subscriber Traffic
  - Extended visibility is critical for proactive identification of service-impacting issues and offending subscribers
  - Facilitate drilldowns into roaming users across peer networks
- Maximize Quality of Experience and Monetizing Services
  - Pervasive subscriber-level visibility to facilitate monitoring tools to gauge end-user QoE
  - Real-time stateful visibility enables reliable accounting, billing, and subscription management

Pervasive Visibility

In this era of Big Data, mobile carriers have searched for a way to efficiently and effectively monitor performance and QoE for their subscribers, as well as identify and monetize new offerings. Converging on a single platform that not only simplifies and automates network traffic visibility, but also provides built-in intelligence to address Big Data will shape how mobile carriers choose to monitor and manage their network to provide better, faster connections and new services.

Legacy approaches to monitoring have offered limited traffic visibility with limited filtering capabilities; are difficult and costly to scale and manage; and often require change orders or network downtime in order to adapt to the evolving network.

Gigamon provides the architecture and intelligence for mobile operators to create a monitoring infrastructure that is designed for the new era of Big Data providing pervasive visibility, awareness, and control from the converged edge to the cloud. Sitting between the IT infrastructure and the tools that need the access to data, the Visibility Fabric™ provides a holistic approach to traffic visibility that includes:

Architecture Advantages: The GigaVUE® family of fabric nodes offers the volume, port-density, and scale needed to connect the right analytical tools to the appropriate large or bonded pipes. Tool trials are streamlined, new tools can easily be added or removed, and uptime is protected while downtime is prevented with a solution that is outside the production network providing pervasive visibility.

Feature Advantages: Advanced filtering and packet manipulation reduce the amount of data arriving at each tool while ensuring that the data is formatted precisely for the tool's consumption. Each tool is optimized by not needing to parse the incoming stream or waste processor cycles on non-relevant data so it can focus on the more important task of data analysis.

GigaSMART Apps: Traffic intelligence and management provides effective monitoring of Big Data through the logical reduction of traffic so that it is more suitable to connect to an existing speed tool at 1Gb or 10Gb. Gigamon's GTP correlation enables visibility at the subscriber/session level in order to maximize QoE and monetize services. The FlowVUE application intelligently manages Big Data traffic through active subscriber-aware flow sampling while keeping data flows intact.

About Gigamon

Gigamon provides an intelligent Visibility Fabric™ architecture to enable the management of increasingly complex networks. Gigamon technology empowers infrastructure architects, managers and operators with pervasive visibility and control of traffic across both physical and virtual environments without affecting the performance or stability of the production network. Through patented technologies, centralized management and a portfolio of high availability and high density fabric nodes, network traffic is intelligently delivered to management, monitoring, and security systems. Gigamon solutions have been deployed globally across enterprise, data centers and service providers, including over half of the Fortune 100 and many government and federal agencies.

For more information about the Gigamon Visibility Fabric architecture visit: ***www.gigamon.com***