

North American Mobile Operator Enables Proactive Service Delivery Management for 4G/LTE Network Services

Overview

Region

North America

Business Challenge

- Visibility into the performance of the charging and accounting transactions in the LTE and IMS core networks
- Early warning on problems with service-enabling applications that can affect user experience
- Ability to visualize services properly to help pinpoint the location and cause of problems quickly

Business Value

- Service visibility: dashboards provide service performance visibility
- Proactive service delivery management
- Faster problem resolution down to root cause
- Seamless coverage across 3G and LTE networks



Customer Profile

The customer is a leading provider of wireless voice and data services with over 90 million mobile subscribers. They deliver a wide array of services over their 3G and LTE networks to customers in North America.

Business Challenge

A large wireless operator known for its commitment to quality and performance has been evolving its current 3G network with the deployment of a Long Term Evolution (LTE) architecture for delivering high-speed mobile data services to its customers. In parallel, it has been deploying IP Multimedia Subsystem (IMS) components to support the delivery of innovative services for its LTE customers. Due to the requirement for high availability and the high performance demands of the IMS core network, it was important for this service provider to have an intelligent, early warning system that would alert on any performance degradation that could affect user experience. In addition, this system needed to provide rapid assessment of the location, severity and impact of any problems with service delivery as well as provide a clear path to determining root cause.

In LTE networks, understanding user experience meant visibility into the core service enabling processes that allowed subscribers to attach, authenticate and register. In addition, it was important for the service provider to ensure that the charging and accounting transactions performed properly. The nGenius® solution was used to provide visibility into the performance of these core transactions.

NetScout Solution

The customer leveraged their existing nGenius solution and extended it to provide visibility into their next-generation LTE/Evolved Packet Core (EPC) network and the core service enabling functions critical to delivering services across their 3G and LTE environments. Additional InfiniStream® appliances were deployed in each of the regions where IMS was being deployed.

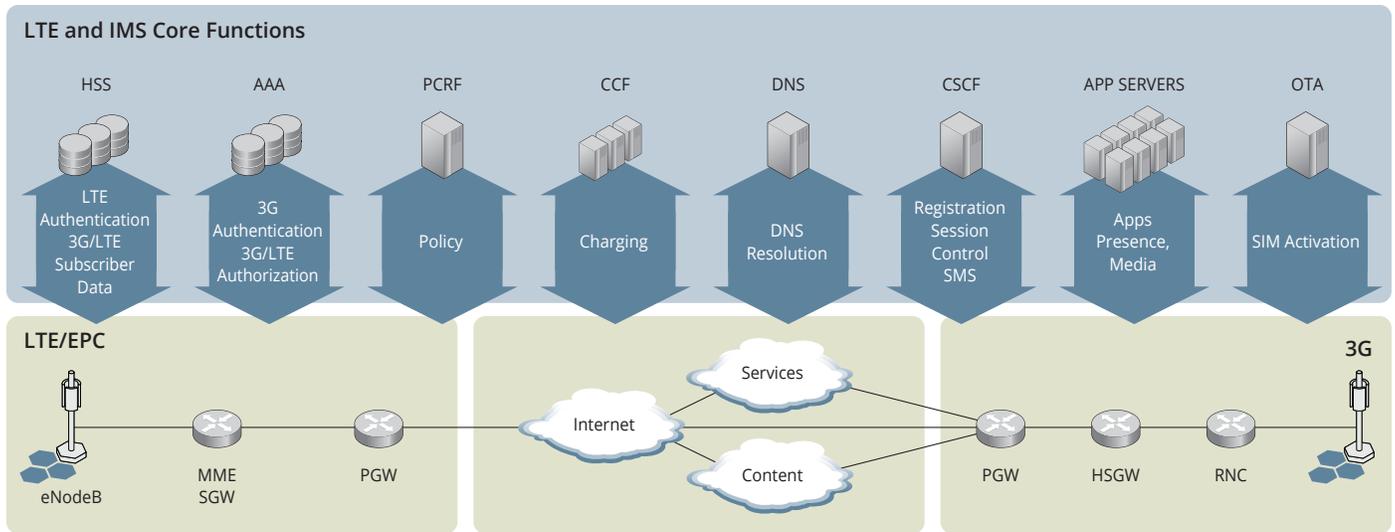


Figure 1: Core service-enabling functions spanning the 3G and LTE service delivery domains.

InfiniStream appliances provided continuous deep-packet capture and analysis of the service enabling traffic traversing the links into the LTE/EPC.

The customer configured the services dashboard in the nGenius solution module to provide an early warning system for detection of abnormal behavior in service and network performance. The goal was to provide a dashboard that would give users, at a glance, the exact services and interfaces that were experiencing performance problems and capability to quickly drill down to the region and application where the problem was occurring. This would lead to faster problem analysis and quicker mean time to repair.

In order to meet these goals, the nGenius service dashboard was configured to use high-level domains for the LTE and evolved High Rate Packet Data (eHRPD) attach functions. The nGenius solution gave users the ability to create monitored sites, allowing them to distinguish the proper interface based on the communication path. For example, a policy download over the Gx interface uses Diameter credit control request/answer commands with a communication path between the Packet Data Network Gateway (PGW) and the Policy and Charging Rules Function (PCRF) platform. The policy download function over the Gxa interface uses the same Diameter commands; however, the communication is always between the HRPD Serving Gateway (HSGW) and the PCRF. The nGenius solution is able to distinguish the traffic and associated performance between these two different links.

Business Value

By leveraging the early warning alerting and service visualization capabilities, technicians were able to quickly identify the presence of a problem with the subscriber registration process. They were also able to determine where that problem was occurring and which services were being affected. The nGenius service dashboard displayed an alert in the registration process with the Home Subscriber Server (HSS) in the IMS and LTE core. The technician was able to quickly drill down to see the alert by region and then by service and protocol. In this particular case, the nGenius service dashboard automatically detected a performance issue with Diameter-based multimedia authorization requests.

The alert details provided the context and evidence needed to understand what was occurring when the alert was triggered. This included Key Performance Indicators (KPIs) over time (slow responses, request/response timeouts, user events, server events and packet loss), response time distributions, application usage over time, and the number of responses over time. With this information, the technician could see both the percentage increase in KPI values that had occurred as well as the number of failed responses and consequently was able to quickly identify the problem was with the HSS server.

The net effect this problem was having on user experience was that subscribers were not able to access multimedia services that should have been available to them. The evidence provided by the integrated workflows in the nGenius solution made it

possible for the technician to determine the reason the HSS was returning this code was that the LTE profiles were not being correctly updated with the correct International Mobile Subscriber Identity (IMSI) information.

After taking corrective action, the technician was able to validate that the problem was resolved through graphical evidence. Historical performance views showed that the access errors were eliminated after corrective actions were taken to fix the problem with the updates to the subscriber profiles.

Conclusion

The nGenius solution has enabled this service provider to implement an extensible service delivery solution across its 3G and LTE networks and in its IMS core. The flexible service representations within nGenius solution allowed them to quickly identify and resolve issues with the enabling applications that support their customers' ability to access critical services over the LTE and IMS network domains. The comprehensive workflows in the nGenius solution take operation teams from an indication of abnormal behavior to graphical views of KPIs with the capability to launch into protocol-level decode views of the corresponding packets. This quickly provides the performance intelligence service providers need to understand the impact on user experience, the services affected, the problem location and the root cause.

Solution Highlights	
NetScout Equipment Deployed	nGenius solution for analytics with more than 300 InfiniStream appliances.
Users	Over one hundred users in multiple departments.
Breadth of Coverage	The nGenius solution is used to monitor, troubleshoot and report on applications and service enablers in the CDMA2000 network. It was expanded to monitor key interfaces and applications in the LTE and IMS core.
Services Covered	The nGenius solution provides visibility into 3G service enabling applications such as authentication, profile download, policy download, authorization, and charging related Diameter- based services.
Networks Covered	LTE Evolved Packet Core, IMS core, eHRPD/CDMA2000 network.



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