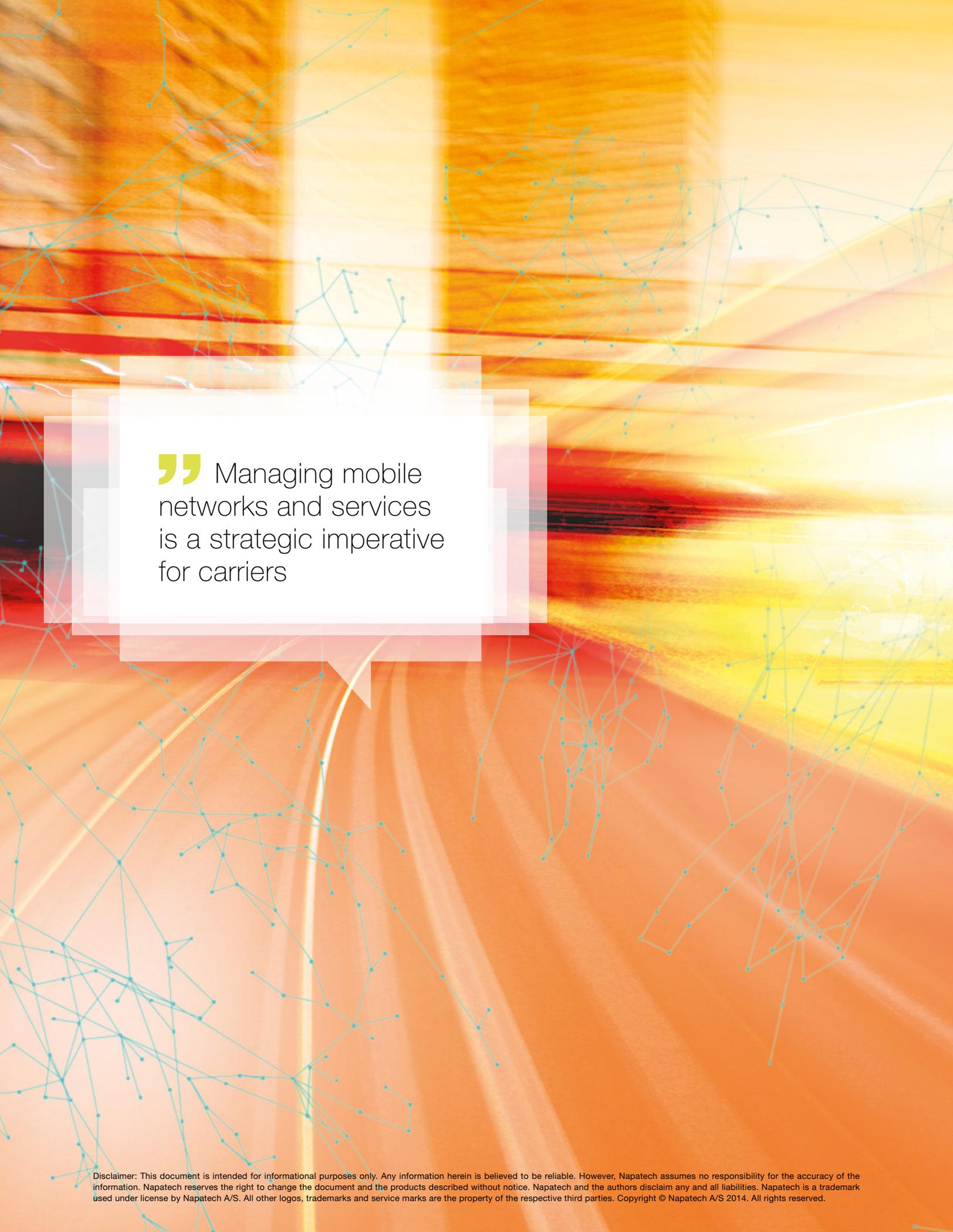


TIME TO RETHINK MOBILE NETWORK ANALYSIS

The explosive growth in mobile data challenges carriers to rethink their strategy. The technical focus on radio spectrum and transition to all-packet networks is now being replaced with a business focus on delivering compelling mobile services profitably. Managing mobile networks and services is now a necessity; however, managing them in real time will prove a strategic imperative. Napatech and its partners now provide the capabilities that will allow telecom equipment vendors to deliver the solutions that carriers need for success.



” Managing mobile networks and services is a strategic imperative for carriers

TIME TO RETHINK MOBILE NETWORK ANALYSIS

Managing mobile networks and services is a strategic imperative for carriers. But, as the majority of data in mobile networks will be real-time in nature, the ability to monitor and analyze this data will prove crucial. Only with a real-time overview of network and service usage will carriers have the information required to react quickly to customer demands for more flexible services and superior Quality of Experience (QoE). These factors will form the cornerstone of many mobile carrier strategies going forward.

This provides a unique opportunity for Telecom Equipment Manufacturers (TEMs) to provide strategic solutions to their key carrier customers. Napatech and its partners now provide the capabilities that will allow TEMs to quickly develop high-performance management and analysis solutions that can directly support carrier strategies. Real-time analysis at maximum speed based on Commercial Off-The-Shelf (COTS) hardware provides TEMs with a reliable platform for development of a variety of mobile analysis, test, security and optimization solutions.

SMARTPHONE VIDEO DATA DRIVING MOBILE TRAFFIC GROWTH

The adoption of smartphones is driving explosive growth in mobile data traffic. This will continue with smartphones expected to account for 48.3% of all traffic in 2016 (see Figure 1).

As can be seen, a further 24.2% of traffic is expected to be related to laptops and netbooks, while tablets account for a further 10%. This means that 82.5% of all traffic will be related in some form to smart mobile devices supporting a variety of services. This will include real-time services, such as voice and video.

In the same report from Cisco, it is expected that 70.5% of traffic in 2016 will be related to mobile video. This will come in many forms from a variety of providers, but almost exclusively be delivered over the Internet as an “Over-The-Top” (OTT) service.

If one also considers that a further 20% of traffic will be related to mobile web data, then a clear picture presents itself. Up to 90% of traffic on mobile networks in the future will be delivered OTT. What does this mean for carriers? Can they continue with an “all-you-can-eat,” fixed rate model in the face of explosive data growth?

THE MOBILE “DEATH SPIRAL”

Carriers have been aware for some time of the “scissor effect” of rising costs due to growing data traffic and flat revenues due to all-you-can-eat service offerings. For mobile carriers, the introduction of smart devices and mobile data access has aggravated the scissor effect and led many carriers to investigate new ways of increasing revenue and/or controlling bandwidth-related costs. However, the first attempts at solving this dilemma have introduced a death spiral effect, where customers became alienated and actively sought alternative solutions.

To understand this effect, consider that the increase in smartphones and tablets drives not only more data traffic, but also fuels explosive growth in mobile applications, otherwise known as apps. These are accessed over wireless Internet connections or OTT leading to an increase in mobile data traffic, but with no extra revenue for the carrier unless limitations are implemented. To make matters worse, some apps actually substitute voice and SMS usage leading to lower carrier revenues.

Early efforts to address this issue consisted of traffic shaping and throttling of “undesirable” app usage. But, this negative approach only results in dissatisfied users who feel like they are being penalized. This leads to lower loyalty and an even greater desire to use the very apps that carriers do not want these customers to use. Thus, a death spiral effect ensues that not only fails to address the scissor effect, but actually exacerbates it.

BREAKING THE DEATH SPIRAL

An alternative focuses on a more customer-centric approach where the carrier tries to understand what the customer wants and how they are achieving it. They then provide high-quality services that better match this need. This involves understanding customer behavior, as well as when and how they are using various services. Then, these services can be optimized to better suit this behavior. This can potentially include tailoring services to suit individual customer needs. This would lead to more loyalty and theoretically more revenue, but with more efficient use of network resources.

The key to driving more revenue is the ability to offer a superior product that is compelling for customers. This in turn requires that you deliver on this promise, so assuring QoE proves critical.

By focusing on understanding customer needs, meeting those needs in an innovative way and assuring that users get value for their money, there is the potential to break the mobile death spiral.

UNDERSTANDING CUSTOMER NEEDS AND BEHAVIOR

Mobile networks are now migrating to an all-IP infrastructure. To understand customer behavior and needs, service usage needs to be monitored. But, since IP networks are bursty and dynamic by nature, it is not enough to poll the network occasionally to find out what is happening. You need to monitor it in real time, analyze each and every IP packet and build a picture of what is taking place. This requires dedicated monitoring probes (otherwise known as appliances) that have the capability to capture and analyze all packets traversing the network connection in question.

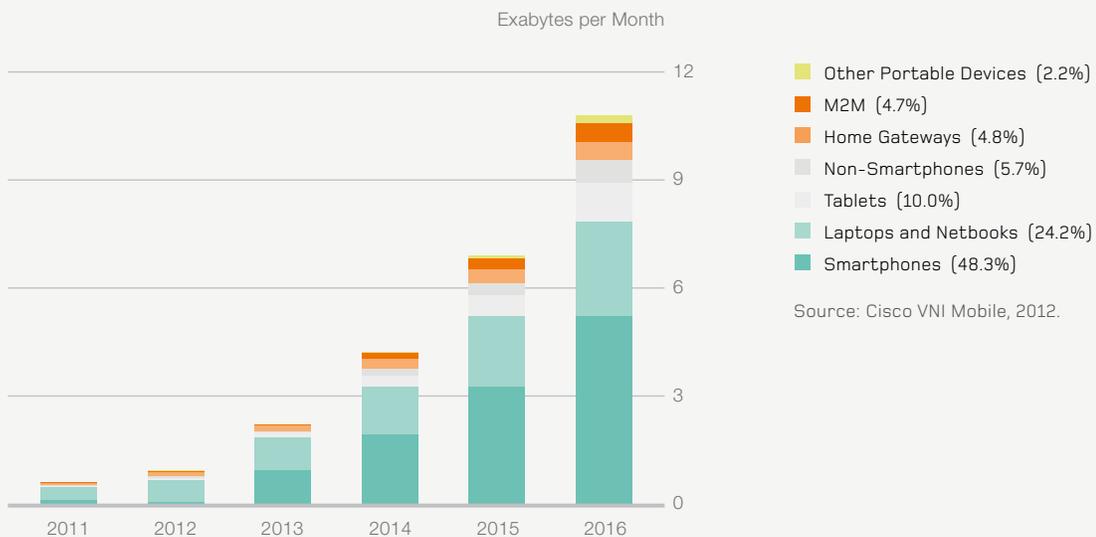
This is often referred to as Deep Packet Inspection (DPI) as the payload of each IP packet needs to be examined in order to determine what kind of service or app is being used.

With real-time monitoring and DPI capability, it is possible to analyze subscriber behavior over time and build a profile of service usage by customers. This can provide the key to understanding what kind of service offerings could bring value to different sets of customers.

MEETING CUSTOMER NEEDS

With big data analysis of real-time information provided by DPI, the knowledge is now available to design compelling services that better suit customer needs. These can be upgrade services that can be offered when customers reach limits under their current plan or can be tailored services based on time-of-day, device, location or app usage.

FIGURE 1
Smartphones driving explosive growth in mobile data traffic



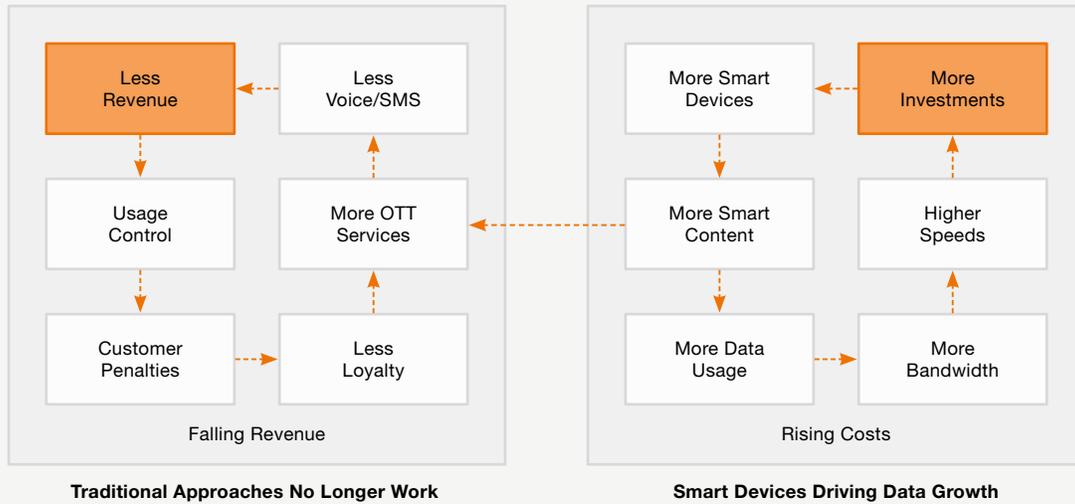


FIGURE 2
Telecom “Death Spiral”

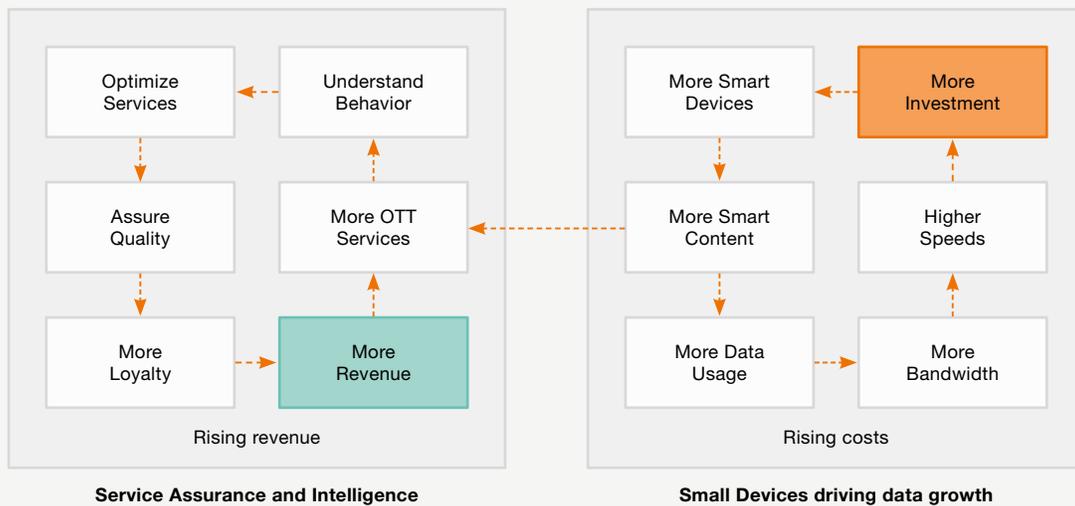


FIGURE 3
Break the “Death Spiral”

A customer does not need to be a subscriber. It could also be a cloud service provider that needs to ensure that its service has excellent connectivity for customers and that its Service Level Agreements (SLAs) can be honored.

DELIVERING THE KEY CAPABILITIES

One of the strengths of mobile carriers is their ability to assure quality through their processes, back-end systems and mindset. What is missing is end-to-end visibility into real-time service quality. Real-time monitoring and DPI provide the visibility, while intelligent packet capture technology delivers the real-time capabilities to measure jitter, delay and other critical service parameters.

Napatech and its partners have now assembled the key capabilities that TEMs can exploit to offer the various mobile analysis, test, security and optimization solutions that carriers will need to succeed in the future.

The three key components are:

- A hardware platform that can scale to 100 Gbps throughput and beyond
- Intelligence to efficiently monitor and analyze telecom/mobile protocols
- Application awareness for efficient management of services

Napatech has recently announced initiatives in all of these areas. 100 Gbps system throughput has been achieved on a mainstream Dell R720 standard server using five Napatech NT20E2 accelerators for network management and security applications. The throughput test was performed as a worst case scenario using only 64 byte Ethernet frames. This milestone achievement underlines the fact that standard servers have the capability to support demanding workloads.

Over the last year, Napatech has made several announcements with its DPI software partners Qosmos and Vineyard Networks (now Procera) demonstrating that high-speed application recognition can be provided using standard Intel CPU chipsets. Common wisdom says that only proprietary hardware designs based on complex programmable chips can provide the performance required for DPI analysis. These latest achievements demonstrate that this is no longer the case.

REAL-TIME VISIBILITY IN MOBILE NETWORKS

The latest Napatech achievement promises to make optimal use of standard server capabilities while accelerating DPI analysis of mobile data. In the latest announced release of Napatech products, support will be provided for extraction of information from GPRS Tunneling Protocol (GTP) and IP-in-IP tunnels. This is extremely important for monitoring and analysis in mobile and telecom networks.

GTP is the tunneling protocol used for aggregating and transporting data traffic in the core of the mobile network. This is the ideal location for monitoring of multiple subscribers at one time. In 3G networks, this corresponds to the Gn

interface between the SGSN and GGSN. In 4G networks, the equivalent interface is the S5 interface between the S-GW and P-GW.

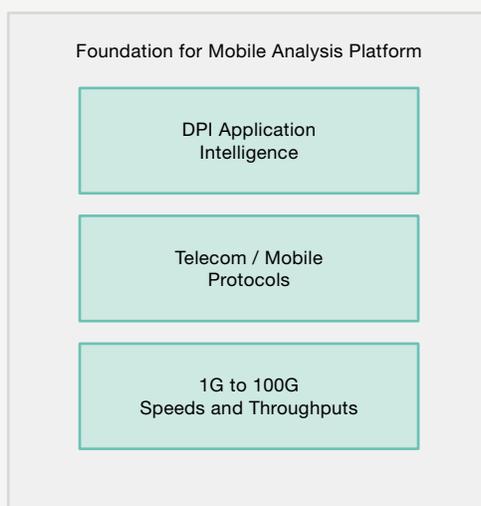
GTP is an encapsulation protocol that runs over UDP and can transport IP packets. Each tunnel has a unique tunnel identification called the Tunnel Endpoint Identification (TEID) that is available in the GTP header.

To effectively analyze the multiple services associated with each subscriber, it is important to separate and analyze them individually. In some solutions, the GTP TEID is used together with IP and Ethernet header information to uniquely identify these services, but this is not sufficient. To effectively separate and analyze each service used by a subscriber, it is necessary to extract information from the encapsulated IP header.

This capability is now available in Napatech products. Napatech accelerators have the capability to identify layer 4 flows and distribute them to the various server CPU cores in mobile analysis applications running on standard servers. The contents of GTP tunnels can now be distributed in the same way, allowing analysis of each service used by a subscriber. This provides invaluable information quickly and efficiently to the application, effectively accelerating analysis performance.

Napatech products also have the intelligence to identify fragmented frames and ensure that all associated frames are directed to the same analysis process for reassembly.

FIGURE 4
The key components for mobile analysis solutions



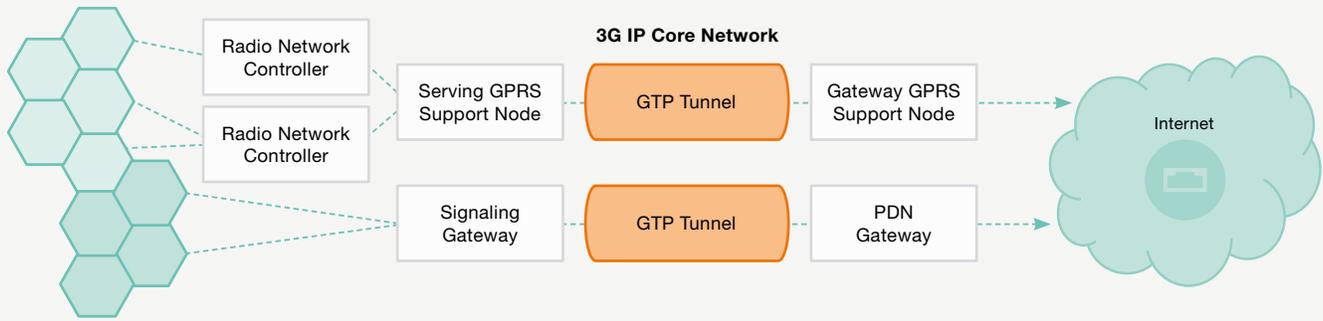


FIGURE 5
GTP in 3G and 4G networks



FIGURE 6
GTP tunnel frame format

This can be a process intensive task and thus Napatech accelerators offload a costly process from analysis applications.

The latest release also supports IP-in-IP tunneling, which will be invaluable in supporting the transition from IPv4 to IPv6, when the two protocols operate simultaneously. During this period, there will be a need to transport traffic from islands of IPv6 over IPv4 networks and vice versa.

OPPORTUNITY FOR TELECOM EQUIPMENT MANUFACTURERS

Until recently, TEMs had only one option for providing the kind of mobile analysis solutions that carriers now require. That was proprietary hardware development based on complex programmable chip technology. Standard hardware such as Advanced Telecommunications Computing Architecture (ATCA) has been used, but has proven to be a costly solution. The end result has been complex development projects that require expert resources leading to costly analysis solutions.

The alternative provided by Napatech and its partners promises to provide the same level of performance, but with mainstream hardware and software. COTS servers have

now reached a performance level that can support the most demanding analysis applications, while still enjoying the economies of scale of a general purpose computing platform.

In addition, standard servers support standard operating systems, such as Linux, FreeBSD and Windows, while Napatech accelerators provide drivers and other software that do not require special skills to integrate. Even complex DPI software integrated with Napatech accelerators does not demand special programming skills.

This provides TEMs with a powerful, standard hardware and software platform that should reduce complexity, time-to-market and cost.

TIME TO RETHINK MOBILE NETWORK ANALYSIS

The capabilities that Napatech and its partners provide are ideal for development of the mobile analysis, test, security and optimization solutions that carriers will require to succeed in the future. This provides a golden opportunity for TEMS to quickly address a burning need of their carrier customers in a timely fashion.

DISCOVER THE POWER OF NAPATECH

Napatech accelerators are designed to handle the maximum theoretical throughput of data for a given port speed.

Napatech offers a range of accelerators supporting speeds from 10 Mbps to 100 Gbps. A single, common Application Programming Interface (API) allows application software to be developed once and used with a broad range of Napatech accelerators. This allows combinations of different accelerators with different port speeds to be installed in the same server. Additional features include:

- Napatech accelerators can identify, filter and distribute flows to up to 32 CPU cores
- Data merging functionality allows flows from different ports on different accelerators to be merged for analysis
- Data sharing functionality allows multiple applications to access the same data at the same time
- All of this can be performed with very low server CPU load

CHOOSE THE MARKET LEADER

Napatech is the market leading provider of accelerators for network management and security applications. Napatech provides global sales and support from local offices in all major continents, which is included in the price of the accelerator. This means that our highly experienced support resources are available for design and integration support, as well as field support without extra charge.

Napatech accelerators are manufactured to the highest standards by outsourced manufacturers in Switzerland and the USA supporting all major certifications including NEBS for telecom applications.

COMPANY PROFILE

Napatech is the world leader in accelerating network management and security applications. As data volume and complexity grow, the performance of these applications needs to stay ahead of the speed of networks in order to do their jobs. We make this possible, for even the most demanding financial, telecom, corporate and government networks.

Now and in the future, we enable our customers' applications to run faster than the networks they need to manage and protect.

Napatech. FASTER THAN THE FUTURE



EUROPE, MIDDLE EAST AND AFRICA

Napatech A/S
Copenhagen, Denmark

Tel. +45 4596 1500
ntemeasales@napatech.com
www.napatech.com

NORTH AMERICA

Napatech Inc.
Boston, Massachusetts
Mountain View, California
Washington D.C.

Tel. +1 888 318 8288
ntamericassales@napatech.com
www.napatech.com

SOUTH AMERICA

Napatech
São Paulo, Brazil

Tel. +55 11 2127 0782
ntsouthamericassales@napatech.com
www.napatech.com

APAC

Napatech Japan K.K.
Tokyo, Japan
Tel. +81 3 5326 3374

Napatech Korea
Seoul, South Korea
Tel. +82 2 6001 3545

ntapacsales@napatech.com
www.napatech.com