Technology Article

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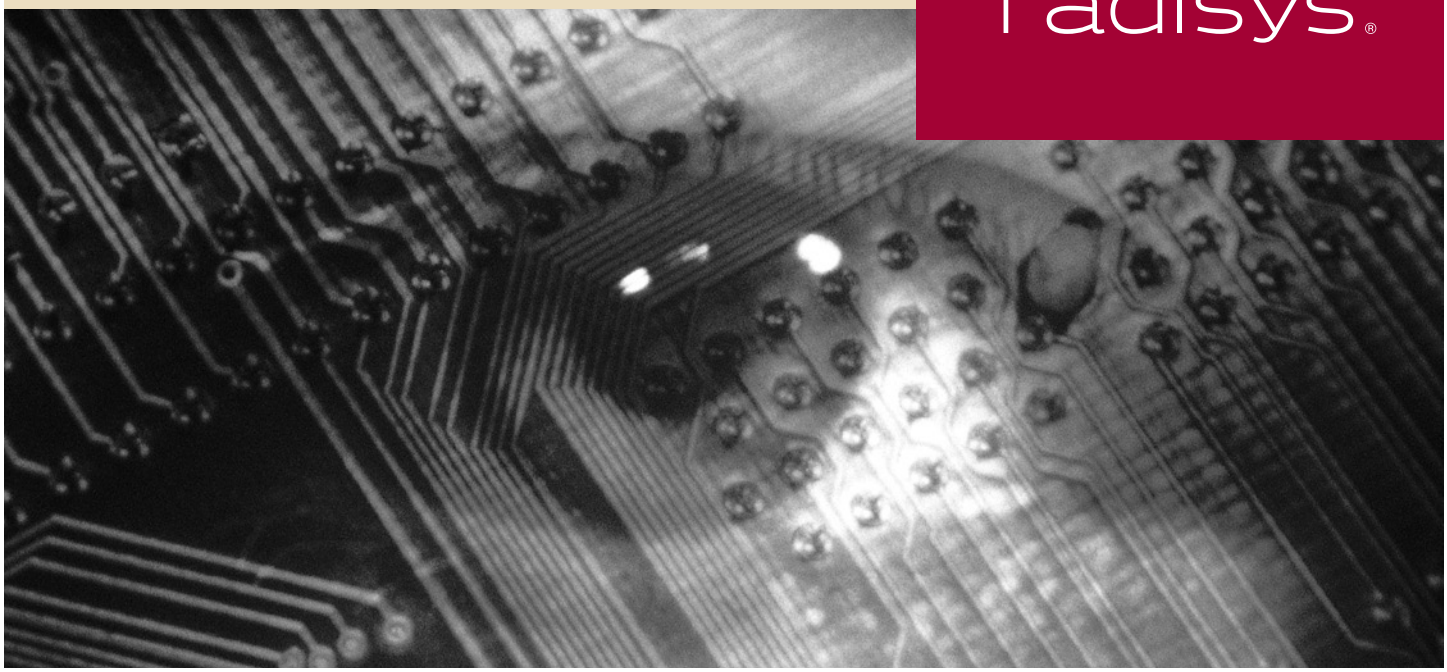


DPI: Managing Data Traffic in LTE Networks

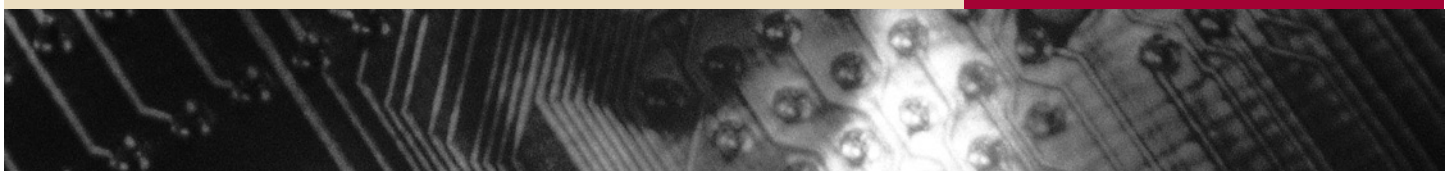
By Mike Coward, VP of Strategy & Innovation

Long Term Evolution (LTE) is the true heir to the 4G moniker and a pure evolution of today's 3G wireless networks. Plans for offering LTE's 100 Mbps+ data rates already have been announced by the majority of wireless operators, and the race to be first has begun.

LTE offers the promise of a pure, all-IP converged core network instead of the separate circuit- and packet-switched networks used in current cellular systems. At the same time, with "all-IP" networks, wireless carriers have to prepare for all of the challenges that today's Internet service providers (ISPs) face:

- Will peer-to-peer (P2P) traffic clog the networks?
- How to guard against distributed denial-of-service (DDoS) attacks?
- How to prepare for dealing with ever-emerging new threats?

For these and many other questions, deep packet inspection (DPI) will play a key role in allowing carriers to ensure that the LTE network delivers on its true promise of high-speed data rates.



Introduction

DPI has emerged as a key technology in managing the growth of data traffic in fixed broadband (wireline) networks. Broadly speaking, DPI refers to services based on inspecting the contents of packets. Usually this inspection is done for the purpose of understanding which application is creating the traffic – whether it is a VoIP packet, a P2P application, e-mail or a Web page download. Based on this identification, different actions can be taken: traffic shaping, traffic management, lawful intercept, caching and blocking.

Some of the highest profile DPI deployments in the wireline market have revolved around P2P blocking and traffic shaping, with Comcast's blocking policy receiving the most attention and criticism. At the same time, it is becoming accepted that some shaping of subscriber traffic is required, and the notion of premium services and service level agreements (SLAs) are well-established. All of these can be implemented with DPI.

While initial DPI deployments were mainly in the fixed broadband arena, mobile DPI deployments are increasing because wireless data traffic is growing rapidly. In fact, mobile DPI revenues are expected to exceed fixed DPI revenues by 2011.

Looming Challenges for LTE

LTE faces two main challenges as it reaches broader market rollout – one technical and one business-related.

On the technical side, two trends give pause. The first is the proliferation of increasingly intelligent handsets based on Windows Mobile, Google's Android, and the Apple iPhone; these smart devices signal a wave of third-party applications coming to wireless networks. The second trend is high wireless bandwidth, which means these intelligent handsets will have network connections equal or superior to typical PCs on broadband connections. Both trends suggest that the LTE network will follow the same path as wireline networks and will thus become quickly dominated by P2P traffic and susceptible to aggressive network security attacks.

On the business model side, customers have long been accustomed to a flat fee for their home broadband connection. DSL and cable modem services have long been flat-rate, with some tiered pricing based on download speed but typically no per-byte charges. Wireless carriers had hoped that they could take the per-minute pricing model of mobile calling and also apply it to the new mobile data services, but the initial trend in the industry has been in the opposite direction. For example, all of the major U.S. carriers have moved to a monthly flat rate for calling, SMS and wireless data. As a result, carriers are left to look for advanced services for which they can charge subscribers a premium in order to recoup their investment in LTE technology. Enter DPI.

DPI provides a solution to both of these challenges. On the technical front, DPI is the best way to regain control of the network. DPI solutions can be used to implement network-based security and prevent attacks from even reaching the handsets – and it's much easier to block an attack in the network with a single appliance that can protect thousands or millions of subscribers than it is to try and get each handset to run anti-virus software. This same DPI solution can be used to control P2P traffic by throttling it down to protect more valuable Web, e-mail or mobile video traffic while not blocking it entirely.

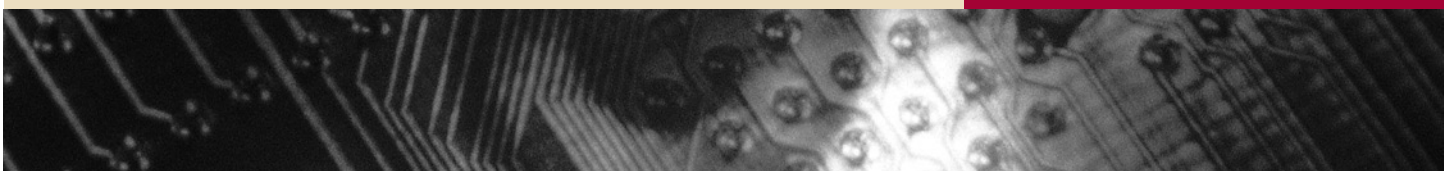
DPI systems also can form the basis for innovative new services that allow carriers to differentiate their offerings or garner additional revenue. These include ideas such as offering different bandwidth levels, offering speed boosts when connecting to affiliated network sites, or delivering a service that prioritizes gaming, VoIP and video conferencing traffic, for example. Similarly, DPI platforms can be used for market intelligence gathering where the data is used to plan new service packages or create targeted mobile advertising.

DPI Integration

One of the interesting aspects of DPI for wireless systems is deciding where the functionality should reside. On the fixed broadband side, DPI has been implemented with standalone appliances that reside between the access equipment (like CMTS or DSLAM) and the core network – but this has led to a proliferation of boxes, each requiring administration, power and rack space. Such an approach made sense in the wireline market because the access equipment was already installed, but the wireless network offers new opportunities for DPI consolidation because LTE equipment is still being designed.

The ideal solution is to include DPI functionality in the LTE network nodes themselves, particularly if those nodes are based on open, bladed architectures like ATCA. Why? Combining the functionality reduces the number of separate boxes in the network, which is especially valuable because wireless networks are already considerably more complex than their wired equivalents.

It also eases the administration challenge by reducing the number of elements to manage and can improve packet latency through the system by reducing the number of hops – critical in maintaining good voice call performance in a pure-IP network and for new online mobile gaming applications. Using an open, bladed environment where DPI and other functions can be mixed and matched enables reduced rack footprint and lower system administration costs and latency, while maintaining the ability to gracefully upgrade DPI functionality as new threats and defenses emerge.



Conclusion

DPI is quickly being recognized as a necessary element for the successful deployment of LTE. DPI provides solutions to the technical and security challenges posed by high-bandwidth connections to increasingly open, intelligent, and sometimes vulnerable handsets – and it also provides carriers with a new set of business tools to increase average revenue per user (ARPU).

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