Smart networks for smart devices – interoperability matters

Nokia Siemens Networks

Today there are eight times as many smart devices as mobile broadband-enabled laptops active on the world's networks[1)], and this proportion will continue to increase.

By year 2015 over 85% of traffic in the mobile networks will be generated by mobile data, 49% of which will be via handheld devices.[2)]

Dongle-enabled laptops were the first big mobile broadband success, and for the last few years our industry has been focused on meeting the needs of laptop users – which has often become the pursuit for higher bandwidth. Bandwidth and latency continue to be important, but most recently in the device end the smart devices have become the "must-have" device of choice.

In the future the market will experience substantial growth of smart devices and applications. According to Informa's latest report on Future Mobile Handsets (11th edition, 2009), the sales of feature-rich phones, including smart devices, will grow from almost 323 million in 2009 to just over 873 million in 2014. This strong growth will be largely driven by sales of new smart devices, which will grow to account for almost 40% of the new handsets sold in 2014, says the report.

As a consequence, smart devices have joined laptop computers equipped with USB HSPA data cards as a major driver of mobile broadband traffic.

Use of smart devices generates two types of network traffic. One is the data traffic that carries information benefiting the user, an example would be an email message. The other one is the signaling traffic. This is the result of networks, applications and devices discussing with each other and without this discussion the network would not function. Often it is exactly this signaling traffic that today's networks are not built to handle.

Even today, when smart device traffic is only a small fraction of the total amount of data flowing in the networks, the effect is very visible across the world. On one hand there is the consumer excitement over new applications and the pace at which these applications are developed and implemented is breathtaking. Users enjoy data applications such as email, web browsing, video and music, and social networking. On the other hand the same consumers are unhappy with the battery-life of their phone: it doesn't last long enough and the network connection does not stay on. Also the way applications are used is irregular and a new application launch

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can sometimes crash the network overnight. Signaling overload impacts all the users who are accessing the system, not just those who are generating the increased signaling. Some network elements that have not been designed smartly will even experience a reduced throughput because of the increased signaling requirements. So called “hot spots” create a particular challenge. This is where the usage is concentrated on a smaller area for some occasion, such as a football match, Olympic Games etc.

How to find the balance between the battery lifetime and network load for enhanced end-user experience?

Smart devices need to be supported end-to-end by smart networks, service control and applications delivery. The target is to maximize the end-user mobile broadband experience and ensure efficient, congestion-free network performance. Web page optimization for faster downloads, device management for correct handset settings at all times and identity management for seamless log-in process are examples of win-win solutions that ease the network congestion and make a difference to the consumer experience.

How to find the balance between the battery lifetime and network load for enhanced end-user experience?

In order to deliver excellent consumer experience, networks can be continuously and proactively optimized to meet changing consumer and traffic load requirements. Traffic flow analysis and subscriber and Quality of Service differentiation help to prepare for service launches and busy hours.

The network Cell-PCH state that is defined in the 3GPP standard helps in decreasing the total amount of signaling data that goes into the networks and at the same time increases the stand-by battery lifetime for the consumer. In Cell-PCH state, the radio network controller (RNC) and packet core will keep the packet bearer active. Signaling in the network is cut down because the RNC tracks device mobility during the Cell-PCH state. The RNC is ready to send data to the device via the correct cell without any signaling between the RNC and packet core, and without wide area paging. Because of less signaling with Cell-PCH, response times are improved for the packet applications. Also, with Cell-PCH the device stand-by power consumption can be significantly reduced.

To ensure full use of existing RNC capacity, the usage should be fully optimized before adding new elements. Advanced pooling features at the RNC level, not only on the sub-RNC level, provide independent scalability of the RNC for signaling and payload to flexibly meet the needs of busy hours and hotspots. The varying traffic patterns are also demanding on the core and transmission parts of the networks, and it should be ensured that also here the latest technology is used to maximize the total efficiency gains, end-to-end.

All efforts should be made to improve the interoperability of applications, networks and devices. Applications can be designed and supported optimally to limit the amount of required network resources. Proactive device and application performance analysis as well as end-user service and network capacity optimisation assure excellent service experience. Also standardization work in 3GPP Releases 7 and 8 is promising to enhance the end-user experience of smart devices even further. Continuous packet connectivity (CPC) as an example will further increase the battery life when the consumer is making calls or actively using applications. The selective use of the new features, combined with the supporting devices just around the corner, will also offer a significant contribution to the relief of signaling load. In the future, network solutions need to work in multivendor network environments with a wide variety of smart devices and a wide variety of smart device applications.

1) Morgan Stanley 2009
2) Nokia Siemens Networks 2009

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