



Offload to Avoid Overload – and Retain Revenues

Kimmo Klemola, Technical manager at Clavister looks at how operators can resolve network congestion issues and maintain their billings by offloading mobile data to Wi-Fi, while retaining control of subscribers' data usage.

Mobile operators are facing a data crunch. Sales of bandwidth-hungry mobile broadband devices continue to rise but consumer led, all-you-can-eat tariffs mean that revenues aren't keeping pace with data volumes. Instead, there's increasing congestion on networks. What's more, a recent report from Juniper Research forecast that almost 50% of data traffic generated by 3G/4G-connected devices will be offloaded to Wi-Fi and Small Cell networks this year. This equates to 10 billion movie downloads, or 9,000 petabytes being offloaded from mobile networks.

So MNOs are being hit with a double whammy of shrinking data billings, and diminishing network capacity which is in turn demanding investment in infrastructure. As subscribers have become used to flat-rate data plans, they are likely to resist attempts to reintroduce usage-based costs – but could be tempted to move to rival networks if their mobile data experience with their current operator is compromised. To resolve this data squeeze, MNOs have three basic options: purchase more licensed 3G or LTE spectrum; improve the efficiency of their radio networks; or boost technology in base stations to deliver the bandwidth needed.

As buying more spectrum is prohibitively expensive, and LTE's efficiency is already approaching its upper limits, boosting base-station technology to support Wi-Fi offloading is the solution that is being increasingly adopted by operators. Some are starting to introduce 802.1x EAP-SIM Wi-Fi data offloading services, to move traffic from 3G/LTE networks to access media that is cheaper to deploy and use, while offering comparable performance.

Standing in the way of control

However, the challenge for MNOs with Wi-Fi data offloading is being able to control and manage subscribers and their data traffic, in the same way that operators can currently do over their cellular networks. Wi-Fi data offloading solutions from access point vendors often lack multifunctional networking features; for example, without an application control feature, an operator is unable to control the traffic's content, or know which subscribers are accessing content. Some MNOs are addressing this issue with two different approaches.

The first is to complement the Wi-Fi solution with aggregating traffic to a central operator-controlled point with multifunctional networking features. However, this approach is not future proof. An 802.11ac access point can generate 800 Mbps traffic, and 1,000 access points can require a maximum capacity of 800 Gbps. It also requires site-unique management and can be too complex and costly to add capacity at the central point.

Secondly, operators can complement mobile data offloading with appliance solutions for each site that offer multifunctional capabilities. But this approach increases CAPEX and OPEX costs, and, when bandwidth limits are reached, will require a product swap.

Authentication matters

An alternative approach is to deploy a solution that works with any networking system and allows operators to seamlessly authenticate mobile subscribers without needing any user interaction – making the handover between networks transparent to the user. MNOs can also deploy web portal-based authentication to increase the subscriber base.

The basis for the solution is authentication proxying, which enables inspection of the communication between access points and the MNO subscriber database when users authenticate. This in turn gives the MNO insight into every user's identity and subscription profile, and the basis for effective network management. The subscriber information collected includes:

- Application usage in the Wi-Fi network
- Data transferred in the Wi-Fi network
- Session duration in the Wi-Fi network
- IP – MAC-address – IMSI mappings
- Visited URLs
- Visited URL categories

The information collected, and the corresponding traffic decrease in the core mobile network, also enables operators to improve the user experience. MNOs can provide subscribers with a range of advanced service options that go beyond simple connectivity, such as management and control capabilities, web category blocking and anti-malware services, and bandwidth management.

Security considerations

A major consideration for operators offloading data to a Wi-Fi network is to give customers peace of mind that their data is protected to the same level as it is on 3G and LTE networks. SIM authentication does this by verifying users through their devices' existing SIM cards as they move to Wi-Fi, using the same approach as authorizing devices onto the cellular network. This needs no input from the user, and enables operators to manage users' data traffic.

A further benefit of using SIM authentication is that it addresses the urgency to encrypt confidential information – an important consideration following the revelations about the NSA and GCHQ intercepting communications. With SIM authentication, operators can use the encryption methods in the 802.1x standard to protect customer data in any Wi-Fi session run by mobile operators or their partner ISPs.

Reaping the rewards

Transparent mobile data offloading over Wi-Fi delivers real benefits to MNOs: it helps to better manage data traffic on the core mobile network; it reduces costs of upgrades and build-outs; and enables operators to offer a range of new, incremental services to subscribers. The challenge of retaining control of their subscribers is nothing new for operators: what's important is the ability to either keep the data traffic on their own Wi-Fi networks or, if they partner with a vendor to offload data, to be able to track and manage subscribers' traffic.

From the subscriber's viewpoint, they enjoy a better data service with high-speed connectivity available anywhere, without the need to manage logons to multiple networks; all they have to do is switch on their device and enjoy the bandwidth. As such, services become stickier for users, reducing churn and helping MNOs retain subscriber revenues. This makes offloading to Wi-Fi a true win-win proposition, with the potential to take a load of worry off operators' minds.

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