Sunbay Ltd.
Netsnapper™ System

Netsnapper, an Intelligent Approach For Mobile Operators To Manage Data Congestion While Increasing Revenue

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By J M Arimany & Ed Kress
Contents

Contents ....................................................................................... 2
1. Introduction ............................................................................. 3
2. Background .............................................................................. 3
3. Netsnapper .............................................................................. 4
   3.1 Network Advantages for the Operator ........................................ 4
   3.2 Subscriber Benefits .................................................................. 4
4. Netsnapper Financial Analysis ................................................. 4
   4.1 Cost Benefit ............................................................................. 5
   4.2 ROI ......................................................................................... 6
5. Conclusion ............................................................................... 6
1. Introduction

The current mobile infrastructure is undergoing a massive transformation due to the deployments of new wireless standards such as HSPA+, Long Term Evolution (LTE) and WiMax as well as the prevalence of public WiFi coverage.

At the same time, the increasing demand for data bandwidth is outstripping the ability for mobile networks to keep pace. Complicating the situation is that both data and voice revenues for mobile operators are declining – which makes large investments in more radio and backhaul infrastructure unattractive. The Netsnapper (NS) platform provides a variety of solutions to intelligently manage data traffic flows and enables Value-Added Services to improve the profitability of these networks.

2. Background

With the rapidly increasing uptake of data capable wireless devices, multiple wireless devices per user, data intensive mobile applications, the ubiquity of 3G (EVDO and HSPA) and the introduction of 4G (LTE and WiMAX), data traffic is projected to grow 300% year over year in the United States through 2013. At the same time, carrier revenues from data are expected to grow marginally and in some cases remain flat.

The increasing use of innovative media rich applications and the need to stay always connected are facilitated by the use of smart phones, wireless mobile cards on laptops and netbooks using wireless broadband services, significantly increasing data usage. At the same time, mobile operators are upgrading from 3G wireless networks to 4G wireless networks, which are expected to offer uplink and downlink data speeds of 75mbps and 150mbps, respectively.

A serious impediment to 3G networks and 4G deployments is insufficient bandwidth at cell sites. Simply deploying larger "pipes" to cell sites is an extremely expensive undertaking. Beyond the cost of "truck rolls", new equipment and construction, there are the dedicated month over month backhaul costs in operating expenditures (OPEX). For wireless service providers in the US Market, OPEX was $6.8 Billion in 2008 and is estimated to be $15 billion by 2011\(^1\).

Increasing bandwidth does not guarantee increased revenue for the operators. To the contrary, operators are more likely to see an increase in non-billable (web-based or HTTP) traffic if capacity is added. A considerable challenge for operators is that a growing percentage of data traffic is non-billable as users pay only for connectivity. The decoupling of data traffic and revenue is troubling for wireless operators as projected revenues do not justify the increase in OPEX.

Some carriers who have chosen to solve the problem with a "data bypass" solution, where data is sent via an alternative network. The problem with this approach is that the carrier loses "touch" with the subscriber while they are on the other network and cannot manage the quality of service, or be able to deliver other VAS during that period.

To address this, Mobile Operators need alternative ways to manage IP across all their networks (3G, 4G, Wi-Fi) networks. Additionally, they must also select solutions that allow them to maintain a continuous relationship with the subscribers both to reduce the likelihood of churn and to allow them to generate incremental income to offset declining voice and data ARPU.

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\(^1\) Exfo BU
3. Netsnapper

One such solution is Sunbay’s Netsnapper product. Netsnapper is the only solution in the market offering offload of traffic (which is still routed through the carrier’s network), seamless switching between interfaces, session persistence, Mobile VPN security, interface profiling and compression. These features are delivered without user intervention, authentication and regardless of the network bearers used.

3.1 Network Advantages for the Operator

Netsnapper seamlessly switches data traffic between device interfaces. Combined with session persistence, this allows substitution from expensive 3G/4G networks to cheaper transport layers such as Wi-Fi hotspots.

In addition, Netsnapper optimizes all IP-based data traffic, significantly unburdening the existing carrier 3G/4G networks and creating substantial, immediate savings on the cost side and in resource deployment.

With Netsnapper, all compressible incoming and outgoing IP-based traffic on mobile devices such as smartphones, netbooks, or laptops is compressed from the client to the core of the network.

The combination of compression and offload results in a reduction of data traffic on the network of up to 40%. With the load reduction, the existing network infrastructure is able to run at a significantly lower cost.

3.2 Subscriber Benefits

Netsnapper provides end users with an improved quality of experience (QoE) through a series of features delivered by the NS client.

The Netsnapper connection manager seamlessly utilizes any available interface on a device and chooses the "best" connection based on preset criteria. This might include choosing a network based on lower cost such as using Wi-Fi over a roaming carrier network.

Session persistence ensures that authenticated sessions are maintained even when switching between network types.

Another feature where Netsnapper provides the end user with improved QoE is personal security. With the connection secured end-to-end through VPN and SSL, the users data is protected in transit. This results in safe transactions regardless of the network transport. The Mobile VPN capability can also be packaged as a VAS and sold through the operator’s B2B sales force to generate additional revenue.

The improved QoE through the Netsnapper client ultimately results in a reduction in churn, providing benefit to the carrier.

4. Netsnapper Financial Analysis*

Netsnapper provides operators the ability to intelligently manage backhaul bandwidth and with that an opportunity to dramatically reduce the cost of data packets traversing the backhaul.

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* This analysis strictly looks at the cost benefit of Netsnapper in a Tier 1 LTE network architecture though the model is extensible to enterprise, Tier 2 and 3 carriers, 3G and other 4G networks.
Studies on traffic profiles\(^2\) and user behavior\(^3\) indicate that the amount of data removed from the backhaul through Netsnapper compression and offload will result in a savings up to 40%.

### 4.1 Cost Benefit

For the analysis, we make the following assumptions:

1. 300% increase in network utilization over three years
2. 20% of the LTE cell sites in "NFL Cities" will primarily benefit from Netsnapper. This is approximately 10,000 sites.
3. This model is based on 30% total savings through offload and compression.
4. Average beginning utilization of individual Ethernet links at each site is 50%. Based on industry standards capacity is added at 75% utilization
5. January 2011 all LTE sites brought online
6. Monthly recurring costs for 50MB Ethernet = $1500/month/site
7. Carrier upgrades are in 50MB intervals
8. Application utilization applied evenly to all sites

Figure 1 represents traffic growth based on an average trended increase in utilization per link per month at each of the 10K sites in an LTE network (see assumptions above.) "A" from Figure 1 is the deferred cost of link upgrades between the network with Netsnapper and the network without Netsnapper. The savings begins in July of 2011 and ends in March of 2012. "B" from Figure 1 is the deferred cost of the second round of link upgrades between Netsnapper nodes and non-Netsnapper nodes. The savings start to be realized in January of 2013 and end beyond the time frame here (March of 2014). Without taking cost estimates into consideration and adding "A" + "B", Netsnapper will result in a benefit of $300 Million in 3 years though the end of 2013.

![Bandwidth Growth](image)

Figure 1. Data traffic growth.

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\(^2\) I. Trestian, A. Kuzmanovic, S. Ranjan and A. Nucci, Measuring Serendipity: Connecting People, Locations and Interests in a mobile 3G Network, IMC’09

\(^3\) M. Gonzales et. al. Understanding Individual Human Mobility Patterns. In Nature, 45(7196), June 2008
4.2 ROI

Due in great part to the increase in data traffic, carriers are facing significant price pressures on their primary offering, bit transport. The fundamental market shifts mean that shorter-term planning will have to encompass a different model of monetizing network investment. By deploying Netsnapper, carriers will have a way to quickly reduce the cost per bit.

ROI varies based on an individual carrier’s situation due to factors such as size of network, latent demand for bandwidth and data plan models/costs among others.

The total cost of deployment of Netsnapper is a fraction of the amount saved. Regardless of the size of deployment, the payback for investing in a Netsnapper backhaul architecture will take place in the "A" period, roughly 9 months after installation.

5. Conclusion

Wireless operators are looking to reduce costs or monetize the bits to increase ARPU. Simply adding transit bandwidth will only lead to more consumption. Without traffic management, buying additional bandwidth will have little long term effect other than increasing bandwidth costs for operators.

As demonstrated in the example above, Netsnapper will generate savings by delaying the operators need to upgrade LTE backhaul links as data throughput rapidly increases. This model applies to all 3G and 4G networks. In addition, operators will benefit by using Netsnapper to reduce non-billable Best-Effort traffic loads and free bandwidth on the backhaul for Quality of Service billable traffic, subsequently generating more revenue.

Netsnapper in 3G and 4G networks will close the gap between revenue and increased traffic and help operators manage traffic loads, improving their bottom line.

Document authors:

J M Arimany, jma@sunbay.com

Ed Kress, epk@sunbay.com

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