

WHEN MORE CAPACITY IS NEEDED TO ACHIEVE SUBSCRIBER GROWTH OR SERVICE EXPANSION, BRUTE-FORCE PROVISIONING OF COSTLY DEDICATED NEW LINKS IS NOT ALWAYS THE ANSWER.

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# Network Bandwidth...you have more than you might think

Every operator knows the importance and value of capacity planning for efficient use of network resources; controlling expensive assets such as T1/E1, leased lines, Radio Access Network (RAN) infrastructure, satellite or fiber links is crucial to ensuring a strong business model for service quality that prevents customer churn.

The best kept secret lies in taking capacity planning one step further to include bandwidth optimisation planning that takes into account not only the types of services running on the network, but also how the bandwidth of every asset is managed to support immediate, short, medium and even long term requirements for each service. This will ensure capital expenditure is controlled and network investments are protected.

Today's advanced bandwidth optimisation begins with an optimisation, compression and aggregation (OCA) solution that allows extracting more bandwidth from the existing infrastructure. It reduces the amount of bandwidth needed to support mobile 2G and 3G voice and data services while lowering OPEX and maintaining CAPEX under control. As a result, more 2G services (voice, EDGE) can be deployed or new premium 3G/HSPA high-speed services can be introduced using the same equipment set. OCA is based on three main techniques: Converting all traffic to a common packet layer (GSM 2G, 2.5G, 3G, and CDMA), statistical multiplexing and bandwidth payload reduction.

Considering the limited availability and high-cost of additional capacity, and the regulatory constraints on microwave spectrum allocations, bandwidth OCA solutions offer a simple, effective, and low-cost approach to accommodating at least two or three times more traffic without procuring more capacity. Operators can achieve immediate savings and revenue growth by doubling and tripling network capacity, but a comprehensive analysis must be performed to define a realistic roadmap that achieves performance objectives within budget guidelines.

Blindly integrating any OCA solution through-out the network isn't going to solve bandwidth problems; it may temporarily alleviate bandwidth bottlenecks, but only a critical and realistic network analysis will ensure a sound OCA investment that manages bandwidth requirements long term, an exercise that examines and identifies current bandwidth issues and incorporates requirements for future service expansion. The devil, as they say, is in the details.

The process begins by critically evaluating the bandwidth issues currently occurring in the network to determine which applications (whether they be 2G, 3G, voice, WiMAX, HSPA, DCME, or a combination of some, or all) may be experiencing acute quality of service (QoS) issues such as bottlenecks, voice quality drops, cut-off voice conversations, delays, etc. This exercise, however, is only the prologue, establishing a launching point for further examination into the behavior of the network to figure out where and when an OCA solution provides the most bang

for the buck.

In order to define exact OCA requirements, set realistic priorities/objectives and establish budget

conditions, the exercise must continue to detail short and long term growth expectations for each application. Attention must be given to identifying 2G, 3G, and WiMAX strategies whether they are immediate or future considerations to assess traffic growth and evaluate bandwidth sharing requirements between the services. Only through a sound understanding of expected growth across all applications can priorities be set to respect budget limitations and best serve overall business objectives. Failing to qualify this information will jeopardise traffic management abilities, the effectiveness of the OCA solution and the return on investment (ROI).

Only once these business operations are defined is it appropriate to examine the actual link capacity again, per application. To properly assess the capabilities of current assets and define what (if any) additional assets are needed to support traffic growth, applications must be examined during peak periods which are typically the most at risk, to measure quality of service issues. These results will dictate where an OCA solution will be the most effective. For example, E1/T1 voice service links currently operating at 100% capacity during peak hours would greatly benefit from an OCA solution that would optimise bandwidth up to 40%, extending investment without compromising on expansion or quality.

An operator with international voice and data lines faced a congestion situation, causing serious quality of service issues. The voice was clipping, and at peak hours, calls were simply dropped, flooding customer service with complaints and increasing subscriber churn.

After analysing all applications on the network, the operator determined that improving customer satisfaction on voice services was the top priority. After applying OCA, the operator experienced a 300% increase in customer satisfaction; the dropped calls rate was insignificant, and customer perception of voice quality was greatly improved. OCA also allowed the operator to allocate extra capacity to support HSPA services, subsequently removing stress on the mobile network for the medium term.

An operator was under intense competitive pressure to quickly launch 3G services to maintain its existing market share, and to attract new subscribers demanding new services such as internet browsing and mobile video. Soon after deploying the new services, the operator experienced bandwidth issues since 80% of the available capacity was reserved for 2G traffic. The radio access network (RAN) was statically configured with dedicated transmission resources per service, creating huge inefficiencies when considering real-time 3G traffic. Therefore, when a surge of 3G data traffic occurred, the RAN was not able to dynamically allocate any of the 2G bandwidth to support the 3G traffic.

This aspect became increasingly problematic as traffic for other services increased and potential bottlenecks were looming. Subscriber satisfaction was at risk, with potentially negative impacts on image, revenue, and growth plans. By implementing an OCA solution to enable multiservice capabilities on the mobile backhaul infrastructure, the operator was able to dynamically manage bandwidth



allocations and therefore introduce more 3G services on the existing RAN, increasing revenue and maintaining customer satisfaction. Furthermore, the OCA dynamic allocation functionality allowed the operator to better benchmark, analyse and manage traffic surges encountered during a regular day, such as voice conversation peaks in the morning, lunch time and evening, and data surges at night. The launch of 3G services was unanimously considered a success with a 20% increase in subscribers, increasing the operator's market share over the competition.

In the past, several types of equipment used to co-exist in a network, each with their own unique management systems (if any). However, as pointed out by Yves Hupé, President at MEMOTEC, in today's environment of economic constraints, the demand for cost and performance efficiencies is driving the convergence of networks and technologies, making it crucial to assess the impact of equipment introduction right across the network. OCA solutions can be complex, touching various services network-wide. It is therefore crucial to evaluate any solution with an eye towards their impact across the network, rather than only on a specific service and also to how it easily integrates with the existing Operation & Maintenance monitoring platforms to keep budget requirements and ease of use in check.

Equipment must be also carefully evaluated to ensure it supports the interfaces common throughout the environment (for example Packet over SONET/SDH or MLPPP/E1), but future interface requirements must also be considered (Ethernet, GE...).

Operators must analyse the following criteria when considering any OCA solution: Performance – in congestion situations and during peak traffic times; Flexibility – in terms of the number of applications supported on a single device (look for solutions that support Abis, Ater and DCME), and in terms of interface support (look for Ethernet, TDM, optical...); Scalability – a system should seamlessly scale from 1 x E1 to several STM-1 connections without requiring hardware forklift upgrades, keeping CAPEX under control; Multiservice capability – a system should support 2G, CDMA, 3G, WiMAX

and Telephony services with dynamic allocation capabilities.

It is only when all these criteria are met that an OCA solution will help an operator achieve the best results in a network, with a direct impact on the company's profitability.

**"IN TODAY'S ENVIRONMENT OF ECONOMIC CONSTRAINTS, THE DEMAND FOR COST AND PERFORMANCE EFFICIENCIES IS DRIVING THE CONVERGENCE OF NETWORKS AND TECHNOLOGIES"**

Yves Hupé, President - MEMOTEC

OCA solutions can easily double and in most cases even triple or quadruple the bandwidth capacity of existing networks. OCA solutions empower operators with the ability to control bandwidth bottlenecks while a network is being upgraded, support revenue growth initiatives, and control service quality all while reducing OPEX budgets. But the acquisition of such solutions must be done in an informed way in order to ensure long-term benefits that maximise investment. A step-by-step approach that analyses exact network needs can help define a realistic roadmap that achieves performance objectives in-line with budget guidelines. It ensures the OCA solution provides an operator with the strategic strength that comes from a network not hampered by bandwidth constraint issues while providing the nimbleness to address future service requirements without costly capacity procurements. ■

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