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Feature Articles

- Case Study: Reducing Cost of GSM Backhaul over Satellite Links
- Ringback Tones — Ready to Take on the World
- Your Network Is Going Broadband, But What About Your Echo Cancellers?

Articles and Publications

- NMS mentioned in *Business Week Online* article on ringback tones
- NMS Wireless Backhaul Optimizer Integrated into Ericsson Expander Offering
- Cox Communications Introduces MessageManager
- DTAC Launches First Mobile Karaoke Service for Wireless Subscribers
- BridgeComm Delivers NMS Studio Sound to Mobile Service Providers in South Korea

Spotlight Event

- NMS will be a sponsor and exhibitor at Mobile Content World

Feedback

Please send your thoughts and suggestions to Joanne Babbitt, Editor, NMS Communications, 100 Crossing Boulevard, Framingham, MA 01702 or email joanne_babbitt@nmss.com.

Case Study: Reducing Cost of GSM Backhaul over Satellite Links

By Dan Daly, Vice President, Network Infrastructure

While all wireless operators are looking for ways to decrease operating expenses, this task is especially challenging for GSM operators serving developing and/or geographically dispersed areas. In these financially strapped markets, the main deployment drivers are lower equipment and operating costs. Due to

geographical and social conditions, however, expensive satellite-based transmission must frequently be used to support the backhaul traffic between the base station (BTS) and the base station controller (BSC). This backhaul cost represents a significant percentage of total network operating expenses (OpEx). For example, the annual cost of a 36 MHz satellite transponder (which can carry 10 E1s) can cost in the range of $1.5M to over $2M. The monthly cost for a full E1 can reach $18k and more. These factors make it nearly impossible for operators to deploy infrastructure in rural areas while reducing both capital expenses (CapEx) and OpEx.

Another challenge for mobile operators in rural or developing areas is that they face rapid increases in the number of subscribers and minutes of use (MOU), which require additional backhaul bandwidth. Due to the finite capacity of satellite transponders, this demand for resources cannot always be provided, limiting growth and leading to unhappy operators and subscribers.

AccessGate — A Backhaul Cost Reduction Solution

NMS is able to provide operators that service remote areas with a solution for greatly lowering their operating expenses. AccessGate is designed to optimize and aggregate traffic in the radio access network (RAN) across any type of backhaul medium — leased line, satellite, or microwave. It uses statistical multiplexing bandwidth reduction techniques to enable GSM operators to maximize network utilization, while preserving call quality.

AccessGate optimizes GSM Abis networks by reducing loaded bandwidth needs by up to 50%. The bandwidth is saved by elimination of redundant silence and idle frames. AccessGate's demonstrated interoperability with devices from major network equipment providers (see related newsletter item on Ericsson) and its proven track record make it an ideal solution for lowering backhaul costs. Its small footprint at the BTS site (1U), allows AccessGate to be installed in existing cabinets at remote locations.

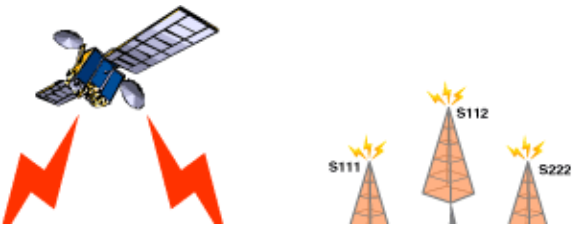
As a result of new development and testing in the satellite field, AccessGate has become an essential component for any GSM network utilizing satellite transmission to backhaul RAN traffic.

Case Study — An African Operator

Satellite communication in Africa is a common practice. In many countries, more than 95% of international traffic is carried by satellite. Interestingly, mobile operators are carrying more voice traffic than their wireline counterparts. By December 2001, Africa had an estimated 30M mobile subscribers and 20M wireline subscribers. Since then, the mobile community has grown and the gap has increased.

After learning about NMS' various deployments of AccessGate and its proven ability to optimize backhaul bandwidth, a well-established operator in Africa approached NMS with the task of providing its solution in a rapidly growing region. The continent-wide operator's motivation was to validate AccessGate's performance and cost-saving abilities, as well as NMS' responsiveness, before deploying in other fast growing areas.

The network configuration before the AccessGate installation included four remote base stations and a centralized base station controller located in a major city. A hub BTS was used to aggregate traffic from the three nearby BTSs using microwave links. At the centralized location (central office in the regional center), the BSC was connected to the satellite by two E1/T1s. The measured peak traffic was 1.5 E1, carried over two E1s in the backhaul. This network configuration is shown in Figure 1.



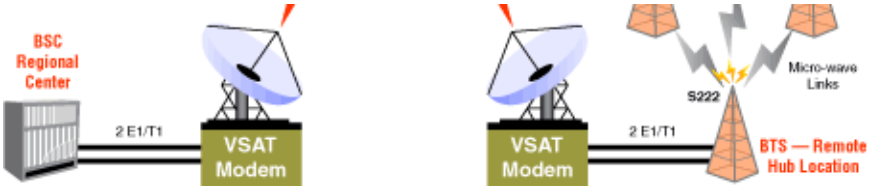


Figure 1: Case study network before AccessGate

The deployment of AccessGate into this operator's network was fast and on time. The operator was also impressed by NMS' responsiveness and professionalism. After the installation of AccessGate, the peak traffic dropped to .75 of an E1, saving the mobile operator a full E1 in the backhaul. The configuration after the AccessGate installation is shown in Figure 2.

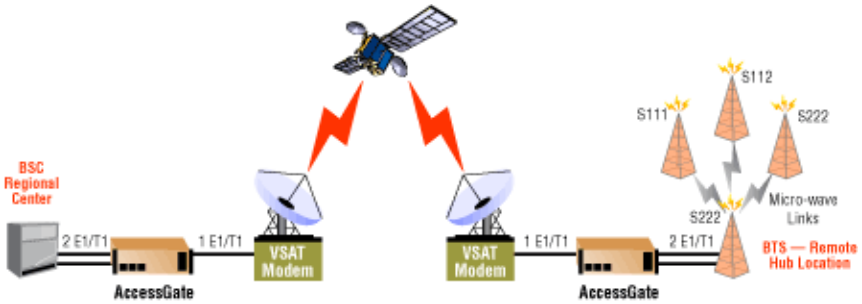


Figure 2: Case study network after AccessGate

Payback Period of Three Months

When the African regional operator analyzed the results, a decision was made to retain the second E1 and use the bandwidth savings for future growth in this fast-growing rural area. Without AccessGate, this growth would not have been possible because additional satellite capacity was not available due to a lack of satellite transponders.

This AccessGate deployment enabled the operator to grow with no increase in OpEx. This improved customer satisfaction and gave the operator a competitive edge. The return on investment period for this African operator is about 3 months (based on their forecast growth).

To learn more about AccessGate, call +1 508 271 1321 and ask to speak to one of our AccessGate experts, or send an email to AccessGate@nmss.com.

Back to Top

Ringback Tones — Ready to Take on the World

By John Orlando, Vice President of Marketing

Ringback tones are the latest killer app to buzz the telecom world. As described in the Winter 2004 issue of *At Your Service*, ringback tones enable callers to hear music or other sounds while waiting for the phone to be answered. It's a simple concept and an innovative new form of peer-to-peer communication, which lets callers express their individuality through their phones.

Asian Roots

Already a resounding success in Asia, where currently more than 30 million

subscribers use ringback tones powered by NMS, experts predict the fledgling service to be huge across Europe, where music-related applications have been a major force behind the growth of mobile services. European industry pundit Informa Media predicts the ringback tone market will generate more than $4.7 billion worldwide by 2008 and UK-based ARC Group expects 700 million global subscribers to mobile music by 2006. Even more impressive, Datamonitor estimates that the innovation will generate $4 billion in revenue by 2008. And the wireless entertainment market as a whole is expected to reach $11 billion by 2005!

Those are pretty staggering figures.

Poised for Worldwide Growth

Ringback tone services help operators reduce churn by not only attracting but also retaining subscribers. More importantly, they help operators generate significant additional revenue through premium fees. Inventive ringback tone services, like NMS' industry-leading MyCaller, offer wireless and wireline operators market-proven capabilities, quick and flexible deployment times, and a fast return on investment. Ringback setup costs are inexpensive and with so many new subscribers signing up daily, the enabling technology pays for itself within months.

With marketing efforts targeting the vast international teen demographic, ringback tones also offer a great business opportunity to the music industry, which has been plagued the past few years with decreases in revenue greatly due to widespread peer-to-peer file sharing. Because the technology behind ringback tones resides on the operator's network and the songs aren't downloaded onto the phone, there is minimal risk of song piracy.

Ringback tones are compelling to subscribers for a number of reasons — they're unique, they're fun, and they're easy to select and use. They can be heard on any kind of phone — wireless or wireline. And as new features are added, such as sound effects (celebrity voices), video, advertisements (company jingles), and bundled services (which could include a song, a singer's tour schedule, and ticket information) the market will expand beyond the currently targeted 15 to 24 year-olds into the business realm, and we'll eventually see the beginning of the end of the traditional ringback tone.

Next Stop, Europe

There are three primary operators (Vodafone Germany, T-Mobile Germany, and T-Mobile UK) currently offering this service in Europe, with many more expected to follow in the next 12 months. But despite predictions for huge market growth, ringback tone promotion in the UK and Europe has been relatively low-key to date. In the UK, for example, there has been little activity around broad advertising blitzes; rather, marketing activity has been in the form of targeted promotion, i.e., mailings to existing customers.

The reason for lack of promotional activity is most likely due to the fact that as additional operators enter the market, penetration will automatically increase due to the service's viral marketing effect. That said, in order to really ramp up the ringback tone market, European operators need a better pricing model. The current one is problematic. Operators are insistent on charging users a monthly fee, and the majority of youth-oriented users are prepaid and far more attracted to the concept of pay-per-use rather than pay-per-month. On a pay-per-use basis; subscribers can expect to pay somewhere between $2 to $5 for each individual song. Over time, the pricing model will most likely work itself out in response to market demand.

Still to Come — The US

Ringback tones are expected to be widely introduced to the not-quite-yet-nascent US market some time in late 2004/early 2005. And early indicators are that its success in Asia will be matched in the US. One reason for this prediction is that a large operator presently provides 5 million pieces of content (mostly ringtones, games, and wallpaper) per month to its subscriber base. And most of this content

must be downloaded. With ringback tones, there's no download paradigm; there's no handset dependency; there's no burden. That's why services like MyCaller are so appealing to both operators and subscribers.

When subscribers fully realize the technology's ease of use and discover the wide assortment of music titles and future add-ons, their friends — by design — will embrace ringback tones. It's quintessential viral marketing, and it's drawing in new users around the world by the thousands every day.

For additional information on ringback entertainment or the MyCaller service, visit Mobile Services or contact John Orlando directly. John may be reached at +1 508 271 1029 or john_orlando@nmss.com.

Back to Top

Your Network Is Going Broadband, But What About Your Echo Cancellers?

By Mary Jane Viscomi, Technical Marketing Manager

The tremendous adoption rate and still mounting use of mobile phones, combined with a growing demand for enhanced services, continue to spur the expansion of telecommunications around the globe. The resulting increase in network traffic is encouraging widespread deployment of ever-higher capacity telecommunications facility interconnections, such as SONET[1] and SDH[2]. The advantages of telecommunications equipment that supports these high-capacity facility interfaces are manifold and include:

- Lower cost
- Reduced power
- Smaller physical footprint
- Fewer cable interconnections
- Faster installation/deployment
- Higher reliability
- Easier manageability and maintenance

These technical advantages translate into a number of distinct economic advantages for wireless and wireline telecom operators upgrading to broadband. However, in order to reap the full benefit of this transition, affordable upgrades are also recommended for the network's echo cancellers and voice quality systems that enhance and improve voice transmissions, and without which customer satisfaction would certainly decrease.

The Echo Cancellation Crossroads

For both long distance and wireless networks, echo cancellation and voice quality systems are used to remove unwanted echo, as well as provide other enhancements that improve the perceived quality of voice services. These workhorses must break down transmission trunks into individual voice circuits and conduct intensive processing on each channel. After SONET/SDH is introduced into a network, the benefits of broadband listed above are lost if the new trunks must be broken down to connect to an embedded base of narrowband echo cancellers, creating extra steps in the voice transmission process.

In response to this inefficiency, NMS developed its Mercury product line of broadband voice quality systems. NMS is actively engaged in initial SDH/STM-1 deployments of voice quality systems across Asia, Europe, and Africa. In one case, a major Asian customer that had purchased and installed more than 2000 E1s of NMS' narrowband voice quality systems recently purchased Mercury

STM-1 systems, which will be deployed within its quickly expanding network. In addition, a key European customer will deploy Mercury in conjunction with a newly available STM-1 termination on the widely used 5ESS Digital Switch offered by Lucent Technologies.

Broadband vs. Narrowband Configurations — Some Details

Figure 3 illustrates the improvements in density and power consumption when migrating from a narrowband platform, such as NMS' E1 Sonata, to an STM-1 platform, such as Mercury.

Product	Interface	Number of E1s per shelf	Number of voice channels per bay (assuming 30 channels per E1)	Power per channel	Number of circuit packs required per STM-1 (including ancillary packs & protection)
Sonata III	E1	48	5,760	120 mW	22
Sonata 100	E1	100	15,000	140 mW	17
Mercury	STM-1	126	18,900	140 mW	12
Mercury 14K	STM-1	441	66,150	60 mW	3

Figure 3: Broadband Platform Improvements in Density and Power Consumption

Of particular note is the broadband platform's significant increase in density, a feature that presents an entire host of additional cost savings to the telecom operator, primarily because less equipment takes up less valuable real estate in the central office. Less equipment also means reduced initial capital expense, as well as a lower failure rate and decreased maintenance costs. It also means that fewer spares need to be purchased and stocked. Another cost advantage is the lower power consumption of the most advanced product, the Mercury 14K, which translates into significantly reduced energy costs for the operator.

In addition to these improvements, there are considerable cabling advantages to replacing narrowband echo cancellers when migrating to a broadband network. Replacing the narrowband systems eliminates the need to add the demultiplexers and multiplexers required to connect the STM-1 facilities to the E1 interfaces on the echo cancellers, greatly reducing cabling requirements (by a factor of two or more) while decreasing equipment costs and maintenance time.

The reduction in capital expense gained by providing direct broadband connections to next-generation switches can more than pay for the replacement of existing narrowband voice quality systems. When space, power, and other ongoing operational expenses are also included, retrofitting with broadband systems is almost always a hands-down economic winner.

A Good Investment

As operators inevitably upgrade to broadband technology, they can rest assured they will reap both technical and business advantages as the STM-1 broadband world continues to expand. On the technical front, broadband voice quality systems can deliver decreased operating costs, lower power requirements, a smaller footprint, and increased reliability over their narrowband counterparts. On the business side, broadband voice quality systems allow an office engineer to fully leverage the economic impact of broadband interfaces for *all* the elements in the network. In addition, a state-of-the-art voice quality system provides operators with the network improvements they need to ensure crystal clear voice services for their customers.

An investment in broadband echo cancellation and voice quality systems is well worth the undertaking, as it saves capital, complexity, energy, and valuable space.

[1]The SONET (Synchronous Optical NETwork) hierarchy defines rates and formats for optical facility interfaces as classified by the American National Standards Institute (ANSI), and includes STS-1 and OC-3 facilities. It is most prevalent in the United States and Canada.

[2]The SDH (Synchronous Digital Hierarchy) defines rates and formats for optical facility interfaces as classified by the International Telecommunications Union (ITU), and includes STM-1 facilities. It is prevalent in locations throughout the world other than the United States and Canada.

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Back to Top

Articles and Publications

Business Week Online

NMS is mentioned on the second page of the article "America, Get Ready for Ringbacks" in the June 28 issue of *Business Week Online*.

MORE

NMS Wireless Backhaul Optimizer Integrated into Ericsson Expander Offering

NMS recently announced an agreement with Ericsson, the leader in telecommunications, involving the integration of AccessGate, NMS' new wireless backhaul optimizer, into the Ericsson Expander solution.

MORE

Cox Communications Introduces MessageManager

Cox Communications Inc. and uReach Technologies, Inc. recently announced the Omaha market trial of MessageManager, a unique service that provides participating Cox High Speed Internet and Cox Digital Telephone customers with the added convenience of checking their voice mail on their computer and their email over the phone.

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DTAC Launches First Mobile Karaoke Service for Wireless Subscribers

NMS recently announced that the mobile karaoke service from DTAC, the second-largest GSM mobile operator in Thailand, has been deployed by Sun Systems. DTAC's service will support 7 million mobile subscribers and is the first mobile karaoke service on the market with full "recording studio" features.

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BridgeComm Delivers NMS Studio Sound to Mobile Service Providers in South Korea

BridgeComm Corp., a South Korean provider of solutions for next-generation networks, will add voice quality and echo cancellation systems from NMS to its portfolio of product offerings.

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Spotlight Event

Mobile Content World

NMS will be a sponsor and exhibitor at Mobile Content World, which will run concurrently with Wireless Enterprise World from September 21–22 in London. Mobile Content World focuses on content business models, content delivery, DRM, billing, handsets and the various types of content that are driving usage.

NMS will be demonstrating MyCaller, the personalized caller entertainment service that turns personalized ringback sounds into chart-topping revenues. Be sure to come hear it for yourself in Stand E24.

Click here for more information or to register for the event.

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Back to Top