

**Make more profits now with  
the Nokia end-to-end EDGE solution  
Your 3G opportunity in GSM bands**



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CONNECTING PEOPLE

# EDGE is vital to the long term prosperity of GSM/GPRS

**GSM, as an open standard, is by far the world's most successful mobile technology having today over 1 Billion subscribers. It continues to increase its global market share, with the recent adoption of GSM in the Americas. Furthermore, the expanding range of new data services will further increase its market share. It is clear that GSM/GPRS/EDGE networks will be around for decades to come.**

Mobile data services are attracting more subscribers and many GSM/GPRS operators face the need to add capacity and boost their networks' data speeds. GPRS based services, such as WAP, MMS, content download and others, are already causing network congestion and this may create churn. Higher data rates and greater network capability is needed, to meet the needs of users exploring the opportunities of the latest high-tech phones equipped with larger color displays, cameras, video support and Java™ and Symbian applications.

Since the first days of these services, operators have seen many excellent results – T-mobile reported early success with 390,000 Java games downloads every month, while J-Phone quickly saw video mail users bring in 91% more ARPU than non-video mail users.

First experiences with commercial EDGE networks have proven that EDGE can increase the use of mobile multimedia as well as operator ARPU. According to CSL Hong Kong, after the first two months of commercial EDGE use, MMS traffic increased five fold and ARPU doubled.

## **Fact – three times better performance**

EDGE, an enhancement to GPRS networks, is increasingly being seen as the best way to achieve faster data rates and cheaper data capacity. By May 2003, the first EDGE terminals had already appeared in the shops. The first commercial EDGE networks were launched in July 2003 by Cingular (USA), in August 2003 by CSL (Hong Kong) and in October 2003 by Telefonica Movil (Chile). Dozens of operators have conducted exhaustive tests and confirmed an average three fold higher performance with EDGE.

Bringing EDGE into your network allows you to give users the speed they need to make the most of the advanced services they want to use. Typically, adding EDGE brings three times the performance of GPRS, achieving an average data rate of 80 to 160 kbps per user with 2–4 timeslot mobiles.

Consider this example: order one video clip over MMS via GPRS and EDGE radio networks. With EDGE, the dial up time is shorter, WAP browsing for the video clip is faster and the actual MMS video clip is delivered more quickly. Overall, this leaves the user with the impression that, with EDGE, all applications are easier to use, fun and more addictive. What's more, operators could even offer the video clip at half the price and still maintain their existing profit level.

Even better, no major infrastructural changes are needed to achieve all this – EDGE is a true 3G technology (according to 3GPP & ITU) at GSM frequencies.





## Modernize your GSM/GPRS network

EDGE can be deployed in an existing GPRS network at very little cost, with a typical modern Base Station (BTS) site needing just a software upgrade. Sometimes co-siting the new BTS with old BTS is a viable and low cost solution for enhanced voice and data business that also protects existing investments well. Furthermore, there is no need for additional antenna sites when deploying EDGE, which further protects existing site investments.

Typically, an operator with an existing Nokia GPRS and Circuit Core, will already have EDGE capability, because the simple software upgrade will have already been implemented.

Applications will need no additional investment to become EDGE compatible and users do not need to learn anything new. EDGE is seamless for the user and terminals are used in exactly the same way as with GPRS.

Upgrading to EDGE creates more capacity with fewer transceiver units in the Base Station Subsystem (BSS), allowing operators to grow with fewer BTS sites. EDGE improves cost effectiveness and enables delivery of new 3G services over GSM bands.

EDGE also provides a high quality user experience for more advanced bandwidth-hungry services, which will help prepare subscribers for the even more capable services that WCDMA will provide. EDGE is the low cost add on that will allow operators to introduce advanced services quickly.

### Enhanced user experience

EDGE makes browsing a practical way to find new content, encouraging mobile users to spend more time downloading games, video clips and other multimedia content. Sending and receiving MMS messages is faster, making the service more user-friendly and encouraging greater usage.

Enabling video is another major benefit of EDGE, as its high bit rate makes good quality video streaming viable. As services and networks develop further, the ability to see and hear friends and colleagues is expected to be popular with users and will be a big selling point for operators offering EDGE.

EDGE also brings much higher quality to new services such as Push to talk over Cellular, or PoC. This simple to use GPRS service allows people to talk to individuals or groups by simply pressing one button.

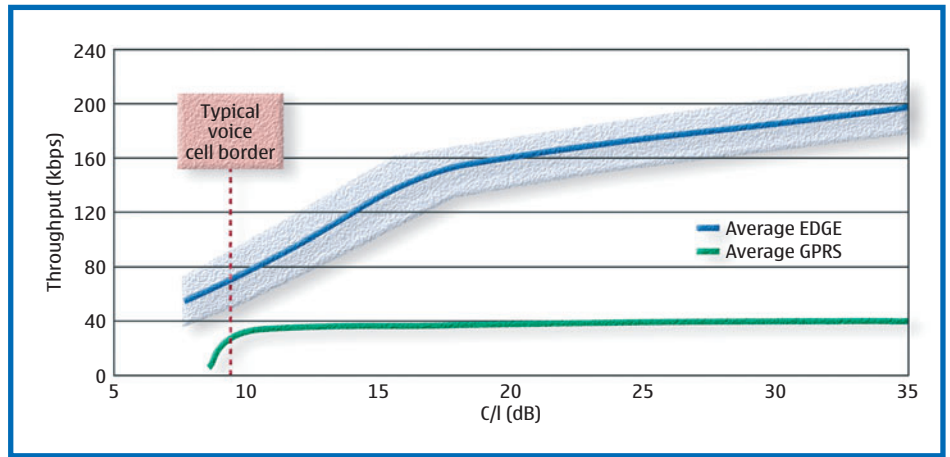


Figure 1. EDGE performance with FTP, 4 TSL mobile. Source: Nokia 2004

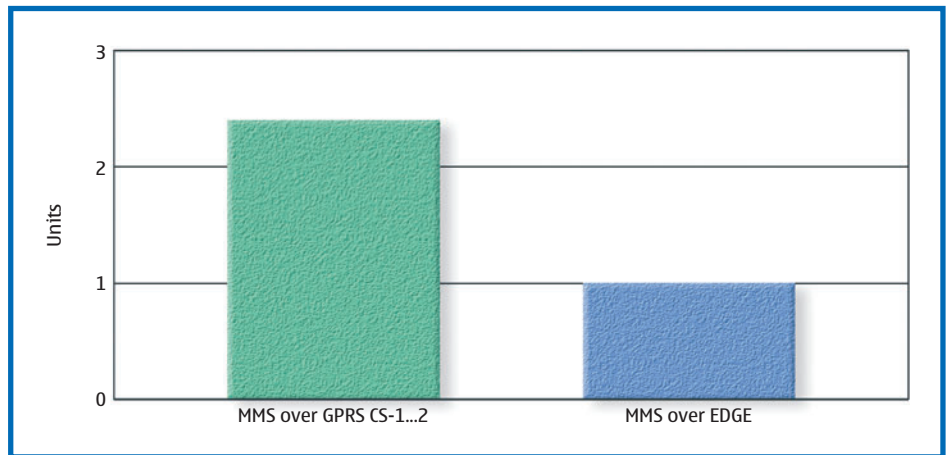


Figure 2. Cost of delivering a video clip over MMS. Source: Nokia 2004

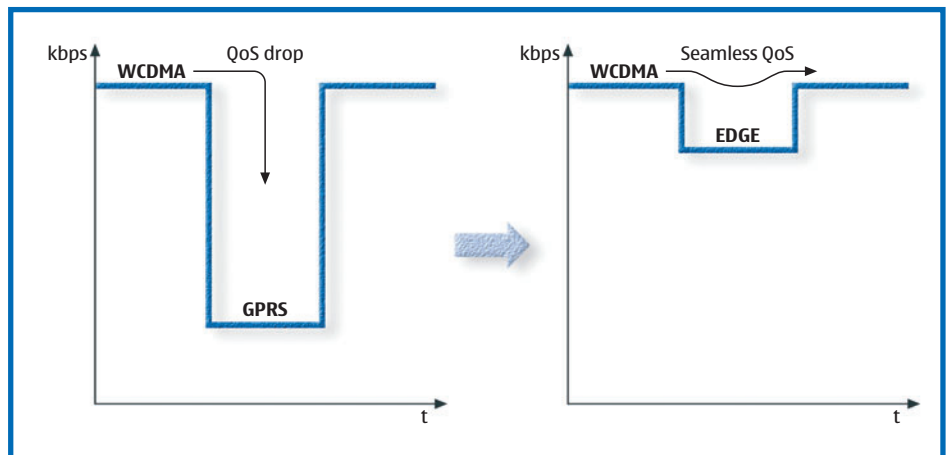


Figure 3. EDGE and WCDMA complement each other to give users a seamless experience. Moving from WCDMA to EDGE coverage will cause a marginal drop in QoS which will hardly be noticed by many users, compared to a drop from WCDMA to GPRS which is a significant step.

### Enhanced mobile business connectivity

Higher bandwidth will also encourage business users to make more use of mobile communications. With an EDGE terminal, the mobile business person becomes more effective and more productive when away

from the office. Faster access to data, including rapid synchronization of e-mail and other personal information, will be possible. Corporate data will no longer be excessively time consuming to access when out and about and even large files can be downloaded between meetings.

# EDGE for all users

## Virtually all new Nokia GPRS and WCDMA terminals will be EDGE capable

As a provider of complete EDGE solutions including both terminals and services, Nokia helps you offer services to your subscribers from the moment your EDGE network is launched.

Nokia has already released a variety of EDGE capable phones, with further models to follow, underlining our full commitment to EDGE. In total, Nokia alone will ship close to approximately 100 million EDGE capable phones by the end of 2005.

Nokia launched the world's first EDGE phone in early 2003. The Nokia 6200 tri-band phone offers GSM, GPRS and EDGE at 800, 1800 and 1900 MHz in one device. Making full use of EDGE capabilities, the Nokia 6200 incorporates a large, high resolution color display, onboard XHTML browser and support for MMS.

The Nokia 6220 also offers a 900, 1800 and 1900 MHz tri-band capability. It supports video over MMS, allowing users to download personalized content and applications, as well as creating videos and sending them over EDGE to their friends, family and colleagues.

The latest Nokia EDGE terminals are the classic messenger phones Nokia 6820 and Nokia 6810, the Nokia 7200 fashion phone, the classic Nokia 6230, the Nokia 7700 media device and the new communicator, the Nokia 9500.

Nokia EDGE terminals typically have AMR and tri-band with either 900/1800/1900 MHz or 800/1800/1900 MHz capability, which makes our EDGE phones truly global. Today's typical new EDGE mobile phone meets class 10 (4+2) requirements and higher capabilities will be added as the market dictates.

### All applications benefit from EDGE

Users will also want exciting, easy to use services with faster access and retrieval times to enhance their lives. Operators have already launched many exciting services and with EDGE these perform better and are potentially much cheaper to use.



### Nokia has launched a wide variety of EDGE capable phones





To help operators find the EDGE compatible services they need, Nokia has set up Nokia Tradepoint, a system that makes it easy to trade mobile content and applications.

Nokia Tradepoint is a business-to-business e-marketplace that makes it easy for service providers to search for mobile applications to suit their market needs, browse application demonstrations and comprehensive product information and order items online. The actual product can be delivered by the vendor to the buyer either via a CD-ROM, by downloading it from the vendor or even as a service on demand.

This direct connection between the service provider and the developer reduces overall costs for both parties and allows more flexibility in the pricing of services.

With its innovative technology, commitment to industry standards, comprehensive range of network elements, support for network development and the terminals and user services to bring it all to the subscriber, Nokia is the all round EDGE supplier.

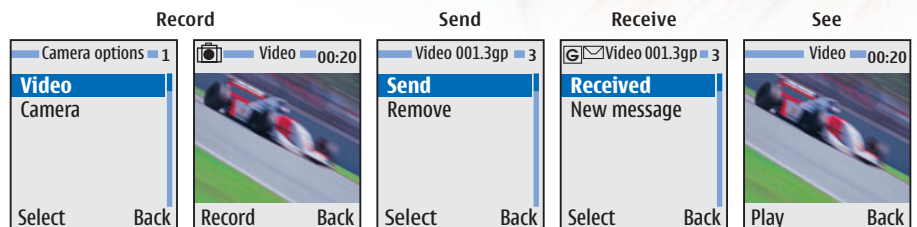


## Seeing the real benefits of EDGE

The three most common applications available today will greatly benefit from EDGE technology

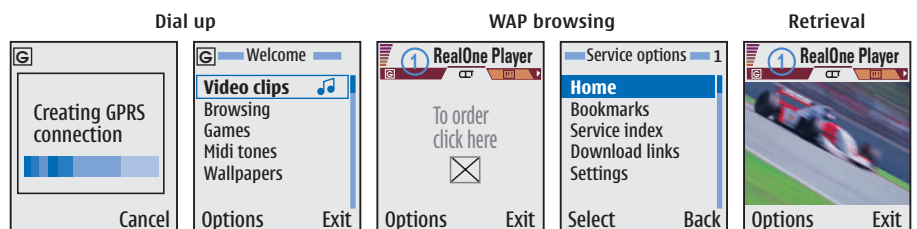
### Application 1: Record video clips and send them over EDGE

Sending and receiving video clips is faster, more convenient and potentially much cheaper.



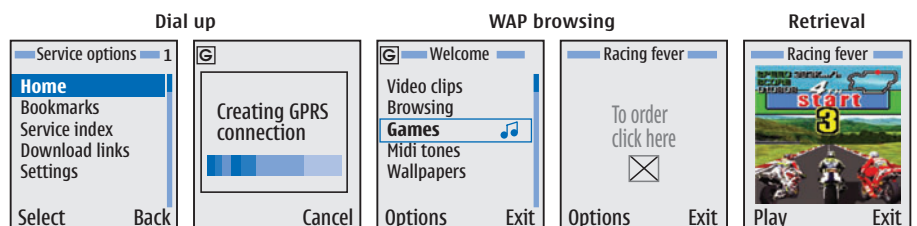
### Application 2: Order video clips over EDGE

Fast dial up and WAP browsing and faster retrieval of video clips makes ordering video clips faster, easier and potentially much cheaper.



### Application 3: Ordering Java games over EDGE

Faster dial up, WAP browsing and retrieval makes ordering Java games more appealing, easier, more fun and potentially much cheaper.





# An end-to-end solution and broad EDGE product range

Nokia is in a strong position to offer complete EDGE solutions, including base stations and networks, as well as operator services for deploying EDGE networks. We also offer Operations Solutions to optimize network and service performance and we can even operate the network on your behalf.

Nokia EDGE is typically implemented through a quick remote software upgrade. In one recent project, for example, the EDGE upgrade process took just eight months, from decision making through vigorous trials to public EDGE launch, with a range of new bundled services.

## Radio Access Network

The Nokia EDGE solution is built on the best available Core, Service and Base Station platforms, Nokia MetroSite™ and Nokia UltraSite™. They keep your options open by allowing any combination of GSM and GSM/EDGE transceivers. You can prepare for EDGE coverage today by rolling out Nokia UltraSite and Nokia MetroSite BTS and adding further GSM/EDGE transmitters later as your network needs grow.



Designed for 800/900/1800/1900 frequencies, Nokia UltraSite and Nokia MetroSite BTS provide unlimited potential to grow an EDGE network, providing full functionality for both micro and macro cellular networks.

## Evolving the GSM/EDGE network

Streaming services are available today in many operator networks. For mass markets, EDGE bit rates and 3GPP Streaming QoS are vital components, providing a high quality video streaming experience for users. Later, conversational class support will further enhance the EDGE bearer for real time services such as video calls.

Furthermore, the GSM/EDGE network is being continually evolved to offer higher quality, capacity and coverage for voice services. One of the key features is AMR (Adaptive Multi Rate) and its evolution EAMR (EDGE AMR is a roadmap circuit voice feature).

As EDGE capable WCDMA terminals are introduced to markets, users are able to enjoy the benefits of seamless service handovers between EDGE and WCDMA radio bearers. Nokia has a strong range of features in its multiradio GSM/EDGE/WCDMA network solution, which will increase operator profitability through higher network use, better spectral efficiency, improved service quality and lower coverage building costs. All this means increased revenues, lower costs and hence greater profitability for GSM operators using both EDGE and WCDMA.

## Nokia MetroSite Solution

The Nokia MetroSite EDGE Base Station is a complete 1–4 transceiver, sectored or omni EDGE Base Station for 800/900/1800/1900 systems. It can also be used as a 900/1800 dual band base station. The Nokia MetroSite Solution comprises not only a high capacity base station, but also complete sites equipped with transmission and auxiliary equipment.

## Nokia UltraSite Solution

The triple-mode Nokia UltraSite EDGE Base Station is a complete macro cellular solution offering high traffic and transmission capacity along with extended cell ranges. Nokia UltraSite can house up to 12 GSM/EDGE transceivers or six GSM/EDGE transceivers and six WCDMA carriers in a single cabinet and can be set up in chains for higher capacities. Nokia UltraSite EDGE BTS can also be used for cost-effective upgrade of legacy base stations to EDGE.

And, when you're ready for WCDMA services, Nokia triple mode UltraSite BTS is ready too, which all means that 3G services can be delivered seamlessly with a single multi-access GSM/EDGE/WCDMA network.

## Nokia BSC3i

The Nokia BSC3i is the highest performing GSM/EDGE Base Station Controller (BSC) on the market and offers full support for the further evolution of GSM/EDGE. The new compact, one-cabinet design continues to offer Nokia customers industry-recognized high reliability and modularity. The increased processing power guarantees powerful circuit and packet switched traffic





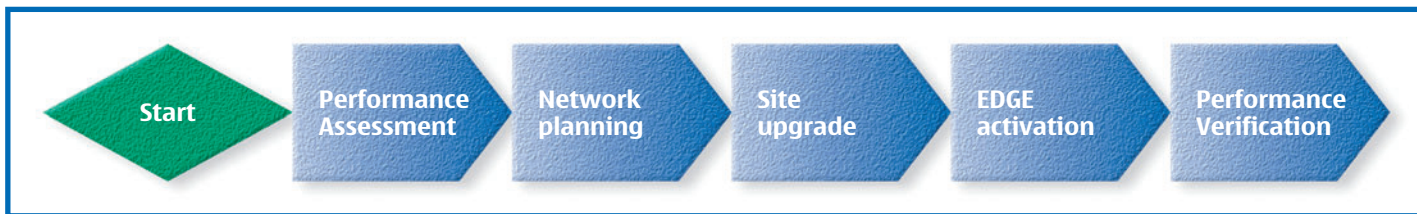


Figure 4. For EDGE upgrades, Nokia follows a streamlined process using specific services from its portfolio.

throughput for GPRS and EDGE, reducing the cost per Erlang and Mbit/s to entirely new levels. With only a single rack, it provides high capacity in a small space.

### Core networks

The Nokia Core Network is designed to fully support the EDGE radio interface. EDGE is provided with different software features in the Nokia core, such as EGPRS (data) and EAMR (roadmap voice feature). Using the same core network with GSM, GPRS, EDGE and WCDMA makes it possible to offer seamless services, achieve fast implementation of services and the lowest cost of ownership.

### Operations Support System

Nokia offers network and service providers a comprehensive operations support solution for managing the EDGE capable mobile network and monitoring the mobile services enabled by EDGE. With Nokia NetAct™, operators can introduce new technologies, such as EDGE and launch related services quickly and effectively while controlling costs.

### Nokia is the leader in planning, building and optimizing the EDGE chain

As well as all the network elements for EDGE implementation, Nokia also provides a comprehensive range of operator services that will help you get the most from the Nokia EDGE solution. For complete system deliveries, this support covers the entire process of planning, deploying and operating EDGE networks, maintaining and optimizing network performance, training operator personnel, and integrating solutions that enable new and exciting mobile services.

In the network planning phase, for instance, Nokia brings a clear understanding of the dynamic nature of both GSM/GPRS/EDGE and multiple service environments. Our operator services cover rollout planning consultancy and optimization to achieve target Quality of Service levels. Services for integrating

multi-vendor networks are also included, as well as competence development to ensure that your personnel have the right skills and expertise in place.

Smooth project management, using well defined processes and quality criteria, is the cornerstone of a successful deployment process. Nokia has a long record in managing very large network delivery projects and currently has more than 100 rollouts underway in nearly 40 countries. For one EDGE project alone, we have integrated 13,500 BTSs and nearly 10,000 expansions in just three months.

Once the network is up and running, our service support combines the benefits of our end-to-end customer care model and Nokia Online Services, which provide 24/7 support via the Internet. In the care phase of network operations, we help maintain network availability and improve day-to-day procedures to enhance network efficiency and further develop network and service performance.

### More from network operations

To help achieve even greater efficiency at every operational phase, Nokia also provides Operations Solutions that focus specifically on mobile service quality, mobile network operational efficiency and technology and service evolution. These solutions, which are delivered as projects, help you increase revenue from EDGE technology by raising the quality of mobile services and reducing operating costs by making operations more efficient.

Operations Solutions build on the strengths of expert operator services and Nokia NetAct, the only fully-featured, multi-vendor, multi-technology operations support system on a single platform. This network and service management framework, which is based on open systems and industry standards, gives a secure evolution path to EDGE.

Nokia works with you so that your new Nokia EDGE solution achieves maximum network performance – now and into the future.



## A reliable partner for long term success

Selecting a partner to supply an EDGE solution for your current GSM/GPRS network is a major decision that needs great care. Many business aspects must be evaluated. Experience in GSM/GPRS/EDGE and WCDMA networks is vital and most importantly, experience in building and optimizing EDGE networks is crucial for early launch success.

Nokia is by far the leading EDGE provider, with hundreds of thousands of EDGE carriers and dozens of EDGE capable cores delivered and taken into commercial use globally since August 2003.

In addition, we have carried out more GSM replacements and modernizations than any other vendor. In all, we have replaced tens of thousands of transceivers and base stations.

With the Nokia EDGE solution, you can multiply your current business and improve your users' experience with higher data bit rates and capacity.

For Nokia EDGE references, please visit [www.nokia.com/networks/references](http://www.nokia.com/networks/references)

### Nokia first with EDGE

- First EDGE call made in 2001
- First EDGE volume deliveries in 2001
- First with EDGE terminals in world markets in 2003
- Of the first 11 public EDGE launches, ten were based on the Nokia commercial solution in 2003

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