

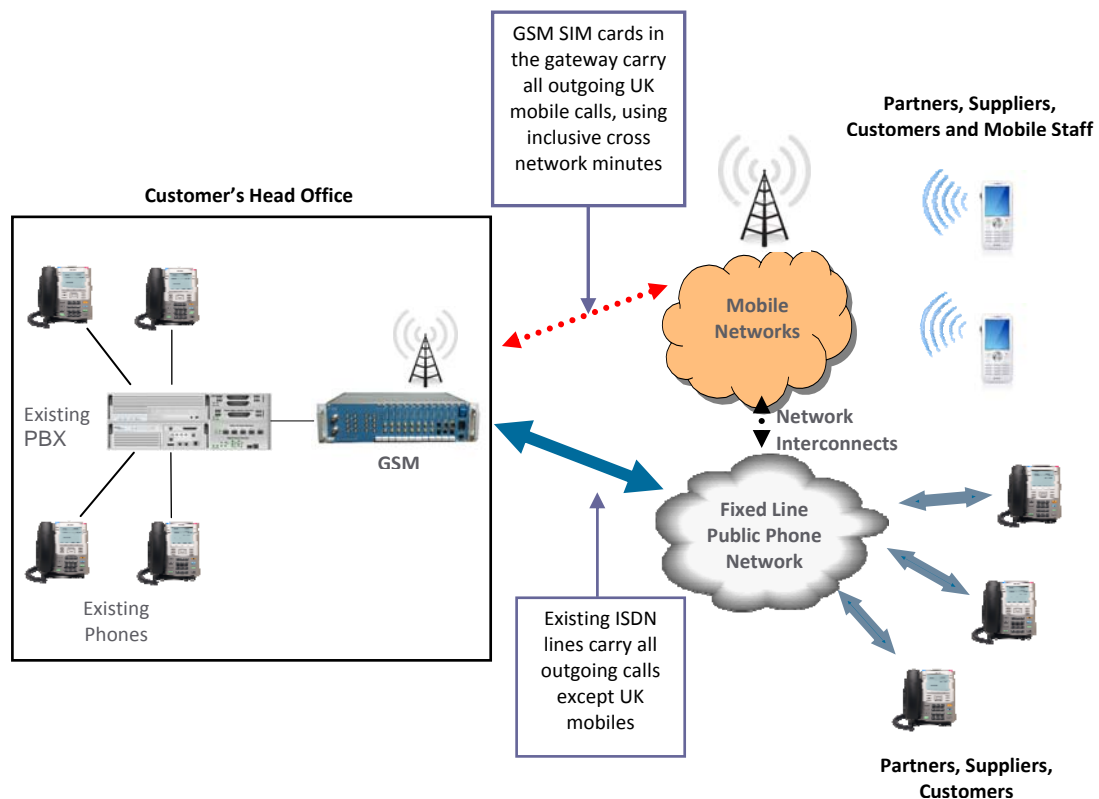
Reducing the Cost of Mobile Communications: GSM Gateways

A GSM (Global System for Mobile communications) gateway is a proven device that enables users to make and receive calls from a fixed handset as though it was a mobile phone. By switching every fixed line to mobile (F2M) call to mobile to mobile (M2M), users can reduce their communication costs by 40-80 per cent.

What is a GSM Gateway?

A GSM gateway (also known as a Fixed Cellular Terminal) is a device which is connected to one or more GSM SIM (Subscriber Identity Module) card(s). Once installed the GSM gateway will intercept all calls made from the fixed handset(s). Using intelligent programming and least cost routing (LCR), the gateway will determine if the call is being made to a mobile phone. If the call is F2M, it is connected to the GSM gateway by the SIM card. This enables all F2M calls to become M2M (Figure 1).

Figure 1: Typical GSM gateway typology



By passing all F2M calls through the GSM gateway, users gain significant cost savings by avoiding the artificially high rates charged by mobile network operators (MNOs) for F2M calls. If the call is not to a mobile phone the gateway will simply handle it in the normal fashion, pushing it out through the standard public switched telephony network (PSTN) line.

*GSM gateways turn all fixed-
line-to-mobile calls into
mobile-to-mobile, enabling
lower rates to be charged per
minute*

The implications of such a gateway are significant. Any business with a monthly F2M spend in excess of £1,000 can cut their costs by 40-60 per cent for UK mobile calls and approximately 80 per cent for international mobile calls. Importantly, GSM gateways are completely legal under UK law for end-users¹ and there is no compromise to voice quality². Furthermore, 'GSM gateways are adding functionality to what was in the past a pure cost saving proposition, providing features such as personal numbering and fixed line disaster recovery'³.

Why Should Businesses Consider a GSM Gateway?

Market drivers supporting the installation of a GSM gateway

Established more than 20 years ago, the GSM standard is the most popular standard for mobile phones in the world. There are over three billion global connections to GSM networks, enabling subscribers to use their phones around the globe. New connections are being added at the rate of 15 per second by the 700 plus mobile operators across 218 countries and territories around the world. The GSM association which is responsible for over 86 per cent of global mobile connections informs that 'the growth of mobile communications continues to soar... one cannot underestimate the importance of mobile phones as a communications tool'⁴.

¹ Ofcom (2005). Future regulation of GSM gateways under the wireless telegraphy act.

² Communications Management Association (2005). The business benefits of GSM gateways.

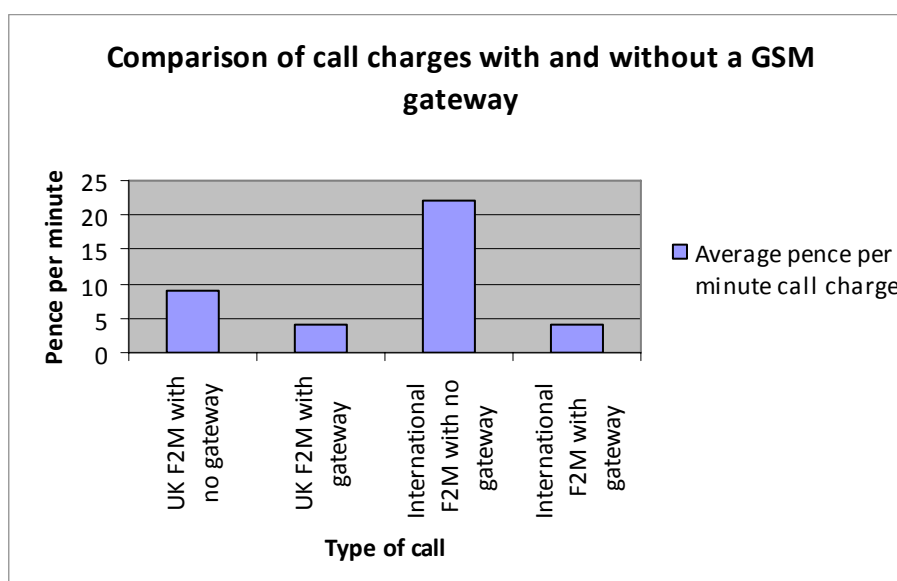
³ Communications Management Association (2005). The business benefits of GSM gateways.

⁴ Global System for Mobile Communications (2008). Three billion GSM connections on the mobile planet.

Mobile phones have moved away from being an expensive luxury, to become an affordable necessity. In countries across the world the number of mobile numbers now exceeds that of fixed line numbers. The global mobile culture that has emerged has been a key driver behind the installation of over 12,000 GSM gateways across the UK.

As a result of the explosive growth in the use of mobile communications, an increasingly high proportion of calls are made to mobiles as opposed to fixed lines. For businesses offering sales or services, such as recruitment agencies, legal advisors and call centres, as much as 50-90 per cent of corporate call expenditure is on mobiles. The problem however is that artificially high rates are charged for F2M calls. Airtime providers have to charge considerably higher rates in order to recoup the billions spent on 3G licences. Typically, UK and international F2M calls from MNOs cost 9p and 22p per minute respectively⁵. In contrast, the typical call cost for both UK and international F2M calls when using a gateway is just 4p per minute (Figure 2).

Figure 2:



⁵ Typical costs for November 2008. Subject to MNOs' tariffs.

With more calls than ever being made or received using a mobile phone, and mobile call cost rates 40-80 per cent cheaper when sent via a GSM gateway, the installation of a GSM gateway is an attractive solution to achieve significant cost savings.

*On average, a GSM gateway halves
the cost of UK and international calls
made to mobiles*

Further driving the trend towards GSM gateway installations is the clarification and support for their use from by Ofcom, the independent regulator for the communications industry. 'Ofcom has clarified that it is entirely legal under UK law for end-users (whether businesses or ordinary consumers) to buy, install and use GSM gateways for their own use'⁶.

*In 2005 Ofcom confirmed that it is
entirely legal for end-users to install
GSM gateways*

Additionally, 'the technology behind GSM gateways has evolved considerably in recent years to the point where calls routed over a GSM gateway are almost indistinguishable from those made over the PSTN'⁷. The combination of static signal enhancing equipment with antennas and combiners ensures excellent signal is received.

Benefits of a GSM gateway

In addition to reducing mobile call costs by 40-80 per cent, GSM gateways offer a full range of benefits:

- **Cheapest call rate 100 per cent of the time:** GSM gateways have sophisticated routers to ensure that every call is routed in the cheapest way possible. The fixed cellular terminal intercepts which calls are to be routed via the gateway and which are to be routed by the PSTN line.

⁶ Ofcom (2005). Future regulation of GSM gateways under the wireless telegraphy act.

⁷ Communications Management Association (2005). The business benefits of GSM gateways.

- **Optimal call sound quality:** Antennas and combiners ensure that optimal signal is received so that no compromise is made to the sound quality of the call. Further, GSM gateways feature EFR super sound voice quality to ensure clarity of the call.
- **International calls to 28 countries at no additional cost:** Some airtime providers include 28 international countries on their call plan. This means that mobiles in locations such as the European Union, America and Asia can be called at no extra cost (Table 1).
- **Eliminate run-on rates:** Using the dynamic SIM management capacity, you can set when and how SIM cards are used. Importantly, this means that you can automatically turn off SIMs which have used all of their inclusive minutes. This ensures that each SIM is used to maximum capacity and that no additional charges are made.
- **Suitable for small, medium and large corporate organisations:** With a capacity to simultaneously handle any number of calls, GSM networks are able to meet the demands of organisations with copious numbers of inbound and outbound calls.
- **Only one GSM gateway required:** Organisations operating in multiple locations or countries can take advantage of central breakout. Central breakout means that only a single gateway placed at any one location is required. All calls to mobiles will then route over the internal network and breakout (leave the network) from this location. Central breakout using one gateway maintains call costs at a lower rate than if two or more gateways were used. It also eliminates the need to invest in more than one gateway, eliminating additional expenditure on equipment.
- **Multiple means of communicating:** Short messaging service (SMS) connection enables SMS messages to be sent from network PCs. SMS messages can also be sent to no reply calls to inform the customer of the purpose of the call and provide call back details.
- **Free SMS messages:** Under certain packages SMS messages are free, enabling further savings to be gained.
- **Eliminate risk of line failure:** GSM networks provide failsafe lines to provide valuable business continuity. If British Telecom (BT)/PSTN lines fail, calls can still be made.
- **Remote system management:** 95 per cent of faults can be fixed without requiring an engineer on site, saving on down time and inconvenience.

- **Compatibility with most types of phone lines:** GSM gateways have Q931 and QSIG protocols enabling them to be installed in most organisations.
- **Proven performance:** There have been more than 12,000 installations of GSM gateways across the UK. This number is rapidly increasing.

Table 1: Typical F2M international call cost savings (November 2008)

Country	Typical pence per minute F2M call charge with no gateway	Typical pence per minute F2M call charge with gateway	Savings
Switzerland	26.5	4	84.91%
Germany	17.5	4	77.14%
Italy	19.5	4	79.49%
Ireland	15.5	4	74.19%
Japan	29.5	4	86.44%
Hong Kong	26.5	4	84.91%

The Evolution of GSM Gateways

Over the years GSM gateways have evolved. A number of gateways with varying degrees of technological capacity are currently available on the market.

Analogue

Analogue gateways (Figure 3) are the earliest form of gateway available. By enabling up to eight simultaneous calls, they are an ideal cost saving solution for small and medium sized enterprises (SMEs). With LCR capabilities every call is routed in the cheapest possible way. Further, analogue gateways enable both voice and data transmission through general packet radio service (GPRS), SMS sending and receiving, and PC fax transmission. Analogue gateways are compatible with any PABX system or analogue line and offer a choice of dial through or dedicated connectivity.

The sound quality provided by analogue gateways however is poorer than the digital forms which are now available. Digital gateways also provide more channels making them better suited to larger organisations. Further, analogue gateways do not offer dynamic SIM management. This means that the SIMs cannot be managed to ensure that the allocated minutes are not exceeded. If any additional airtime is used, higher charges per minute will be applied.

Figure 3: Typical analogue gateway⁸

BRI / ISDN2

The basic rate (BRI) integrated services digital network (ISDNe) gateway (also known as ISDN2) (Figure 4) provides an excellent means for small businesses to cut their call costs by enabling up to two simultaneous calls. As with the analogue gateway, the BRI has LCR capabilities to ensure all calls are routed in the cheapest way.

The BRI gateway additionally boasts excellent programming and management facilities. Dynamic SIM management enables each SIM to be used as efficiently as possible and excessive call charges to be avoided. Further, if there is no answer the BRI offers a call back function and SMS notification to inform the customer of the purpose of the call.

BRI gateways offer two SIMs per two channels with a maximum of 4,000 minutes per month per channel. There is no limit to the maximum number of channels but it is unusual to have more than eight because at this point, the PRI gateway becomes a more cost effective option.

PRI / ISDN30

Primary rate (PRI) ISDN30 gateways (Figure 5) are the most cost effective option for businesses that require more than eight SIMs. The PRI gateway facilitates up to 500,000 minutes per month by up to 30 simultaneous calls, using up to 256 SIMS. Furthermore, for businesses that require greater call capacity, load balancing solutions can be applied to accommodate any number of simultaneous calls.

With LCR, dynamic SIM management, detailed call statistics and remote system management, PRI gateways deliver the complete cost saving solution to medium and

⁸ NeoWave Distribution (2008)

large organisations. PRI gateways offer EFR super sound voice quality and Siemens GSM modules for maximum performance and reliability.

Figure 4: Typical BRI gateway⁹



Figure 5: Typical PRI gateway¹⁰



VoIP

As the most capable gateway on the market, the voice over internet protocol (VoIP) gateway (Figure 6) enables up to 500,000 minutes per month by up to 32 simultaneous calls, using up to 256 SIMS. Load balancing solutions can additionally be applied to accommodate any number of simultaneous calls.

The VoIP gateway will complement any session initiation protocol (SIP) or H.323 based IP PBX and can also be used as a substitute to any SIP based IP PBX by adding the SIP Proxy Server. In addition to boasting all of the features of other digital

⁹ NeoWave Distribution (2008)

¹⁰ NeoWave Distribution (2008)

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gateways, the VoIP gateway offers autoCLIP routing to route unanswered calls to the right IP phone, a user defined voice message for incoming calls, and STUN services to assist devices with their packet routing.

Figure 6: Typical VoIP gateway¹¹



GSM Gateways in Practice

The importance of selecting the right gateway supplier

Selecting the right gateway supplier is of critical importance to ensure that you get the most from your gateway. In particular, make sure your supplier offers:

- **A free, no obligation site survey to determine the feasibility of a gateway:** Before you have a gateway installed make sure you have an initial site survey. A site survey is required to determine whether the premise is able to support a gateway with no compromise to the performance of the gateway. For premises that have poor signal strength or incompatible equipment, a gateway should not be installed.
- **An inclusive price with no upfront capital costs or hidden extras:** The simplest gateway solution that you can be provided with is a single monthly price which includes everything from account management to equipment maintenance. This prevents any unexpected extra costs arising at a later date. Importantly, gateways with no upfront capital costs enable significant savings to be gained with minimal demand on cash flow.

¹¹ 2N (2008)

- **A gateway from a reputable manufacturer:** A poorly manufactured gateway may lead to performance inconsistency problems. Choose a supplier that installs gateways made by 2N, the world's number one GSM gateway manufacturer with over 80 per cent market share. 2N's gateways are the most robust and reliable on the market and most come with a 24 month warranty.

Further, all of 2N's products are distributed and maintained by UK accredited NeoWave Distribution. This support infrastructure ensures that should a problem arise, a solution can be provided either remotely or at your own premises. Importantly, there has not been a complete outage on any 2N GSM gateway maintained by NeoWave within the last five years. Moreover, both parties have an open and transparent relationship with the airtime providers. In over 12,000 installations, NeoWave has never experienced a single disconnection of service.

- **Gateways which are guaranteed to not be second hand or unofficial:** Unfortunately, some gateway suppliers install second hand or unofficial equipment without the customer's awareness or consent. Verify that your gateway it is brand new and covered by a full service agreement and manufacturer warranty.
- **Regular meetings to review your satisfaction with the gateway:** Your gateway provider should offer you regular meetings to monitor your satisfaction and ensure that you are getting the most out of your gateway.

What you need to consider before installing a gateway

Before arranging the installation of a GSM gateway it is important to remember that the caller line identity (CLI) is usually withheld when calls are made via a GSM gateway. If the CLI is shown it will be the mobile phone number on the SIM. Alternatively, for an additional charge a different mobile CLI or local inbound number (LIN) can be displayed.

As a result of the *withheld* CLI, all return calls can be returned to a central location. Further, channels can be split depending on product or service so that the return call can be directed to the relevant department. To illustrate, an insurance company with a 32 port GSM gateway, could send "Life Insurance" to channels 1 to 8, "Home Insurance" to 9 to 16, "Car Insurance" to 17 to 24 and "General Insurance" to channels 25 to 32. An alternative to showing CLI is SMS on no reply. The SMS can inform the recipient of the purpose of the call and a number that they can call back if they wish.

Some MNOs do not like the use of GSM gateways as it reduces their revenue and profitability. Your gateway supplier will therefore need to check prior to installation that you are not violating any terms and conditions.

It should also be remembered that it is still 'currently illegal under UK law for anyone to use GSM gateway equipment to provide a communications service by way of business to another person or organisation, irrespective of where the gateway equipment is located, or how many or few end-users are connected to each gateway. This prohibition on 'commercial' use applies equally to the MNOs as to other organisations, since the MNOs' licences do not currently extend to the installation and use of GSM gateways'. This use of gateways is also known as a SIM farm. In contrast however, the private use of gateways is entirely legal¹².

About L2MC

L2MC Limited is one of the few companies that exclusively specialise in GSM technology solutions. Further, L2MC Limited is one of the largest dealers of NeoWave Distribution (UK) Limited, the sole UK distributor for 2N GSM gateway products.

If you are considering installing a GSM gateway, L2MC Limited will provide a no obligation initial site survey to determine its feasibility within your organisation. They will also provide a detailed GSM gateway cost saving projection.

For more information you can speak to an L2MC Account Director directly by calling Stuart Goodman on 07738 377 422 or Jo Spencer on 07850 751864. Alternatively you can call the L2MC head office 0800 833 599 or visit www.L2MC.co.uk.

¹² Ofcom (2005). Future regulation of GSM gateways under the wireless telegraphy act.