Electronic Communications Committee (ECC)
within the European Conference of Postal and Telecommunications Administrations (CEPT)

SERVICE PROVIDER ACCESS IN MOBILE NETWORKS

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EXECUTIVE SUMMARY

This document analyses the current situation for service providers who are seeking access to mobile networks and facilities for the distribution of their own services. Both technical and regulatory issues are identified as the industry is now in a transitional period between 2G and 3G mobile networks, and the new regulatory framework is about to be implemented.

The aim of this report on mobile access is to identify the current arrangements for access to mobile networks, to outline what are the current difficulties experienced by service providers in accessing these networks and to make clear what are the requirements for access as set out in the current and new regulatory frameworks.

The conclusions are that there are both technical and regulatory issues associated with access to mobile networks that need to be addressed in light of several disputes between service providers and mobile operators :

a) The access arrangements usually offered by current 2G mobile operators provide only limited scope for innovation and service packaging by service providers. Consequently, most of the service providers are only resellers and do not offer much added value.

b) Interconnection agreements for non-voice service providers are not very common. Several mobile operators are refusing to accept such agreements with MVNOs and service providers. The current directives enable NRAs to grant service providers access to networks on fair terms, and some countries are already following this practice.

c) Essential facilities in 3G mobile networks need to be identified and investigated to ensure that access is available. In particular ECC PT2 should assess standards and other related activities concerning possible lock-in mechanisms that prevent customers having open access to competing ISPs and third party mobile portals.

d) NRAs need to continue to influence the development of new API standards to ensure a more open environment for service providers who wish to exploit the capabilities of next generation networks. Service providers should also influence these developments.

e) The new directives empower the NRAs to intervene in the case of a failure of undertakings (such as between a service provider and GSM operator) to commercially negotiate access and interconnect arrangements, in order to secure an agreement that delivers benefits to end users and promotes effective competition.

f) In those cases where operators who have been determined to have significant market power (following a market analysis), fail to provide reasonable access to other undertakings, such that the restriction of access, hinders growth in effective competition and reduces benefits for users, NRAS will have the possibility to impose regulations (from the regulatory tool kit) with the aim of achieving a similar outcome to what would have been in place if the market were fully competitive

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1 INTRODUCTION

ECC (ECTRA) has previously produced a recommendation on Special Network Access as defined in EU Directive 98/10/EC (part of the existing regulatory framework), and also monitored the development of technical standards related to service provider access requirements. Initially, most of this work was concentrated on access to fixed networks. But over the last couple of years the focus has shifted more to mobile networks. The concept of "Mobile Virtual Network Operators" (MVNO) has been introduced and new service providers have emerged in the market seeking access to mobile networks for distribution of their own services and content (e.g. SMS). European regulators have had to deal with a number of disputes between network operators and service providers in this area.

Future 3G mobile networks are expected to be characterized by a transition from traditional voice telephony to multimedia services where new business models are likely to emerge. In the new regulatory framework, fixed and mobile networks are both part of the wider concept of "electronic communication networks" where regulations in general should be made more technology neutral. Hence in future, regulation will be applied in a technology neutral manner and mobile network services will be one of a number of new electronic communication services.

2 ACCESS TO EXISTING MOBILE NETWORKS

2.1 Service provider categories

In the current 2G mobile environment, most service providers offer (enhanced) voice telephony and/or content for data services like SMS. They can be divided into three main categories:

- Resellers
  A service provider offering mobile subscriptions and services with his own branding and customer billing, but the services are produced by a mobile network operator. The interface between the two players is mainly administrative.

- Enhanced service providers
  A service provider who controls a larger portion of the value chain by enhancing the basic service produced by the mobile operator. Examples are call forwarding, voice mail, VPN, location services, SMS, WAP etc. A technical interface between the mobile network and the service platform of the service provider is required.

- Mobile Virtual Network Operator (MVNO)
  A service provider who has all the capabilities of a mobile network operator except the radio access network and frequency spectrum. A MVNO needs interconnection and (unilateral) roaming arrangements with other network operators.

Resale agreements are quite common as mobile operators usually see benefits for themselves since traffic is increased on their networks. It is also common for mobile operators to offer a data interface to their SMS,WAP or GPRS platform for content providers. Such agreements often also include charging of the end user on behalf of the content provider, much in the same way as for premium rate services in fixed networks. However, some specific problems have been identified with SMS based services and their numbering arrangements.

2.2 Access arrangements

In order to produce or enhance services, a service provider needs a technical interface between his own service platform and the mobile network. A general configuration for 2G networks is illustrated below:

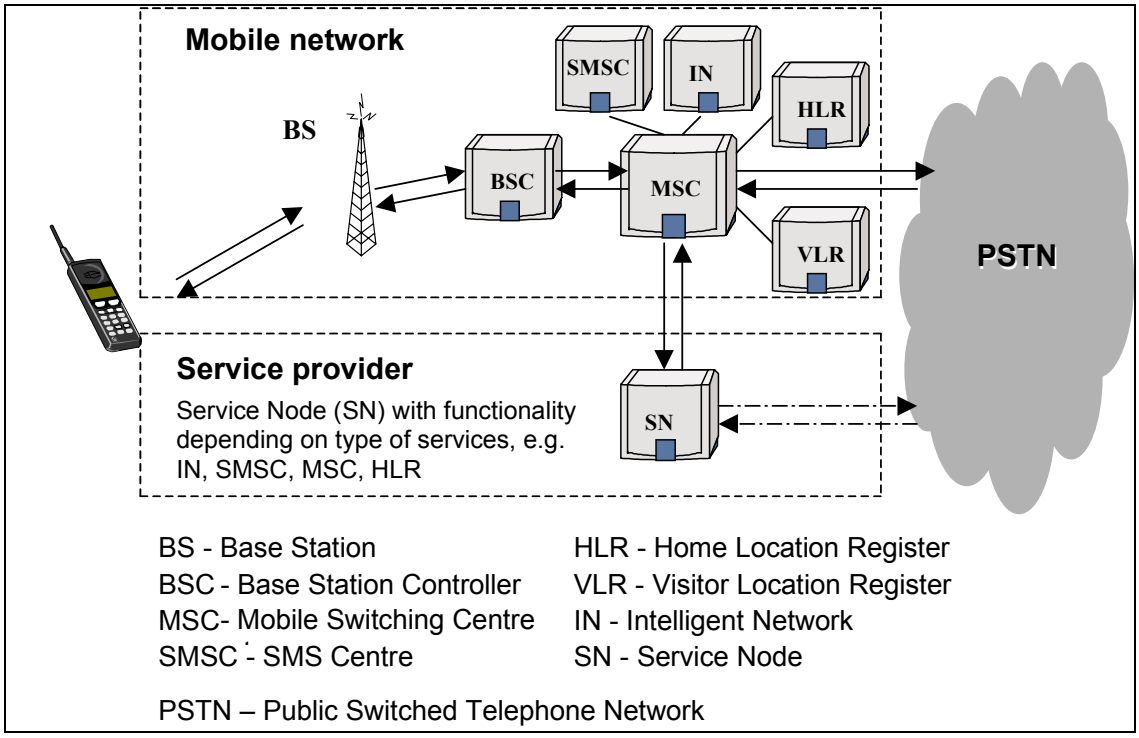

Figure 1: General Configuration for Service provider access in 2G mobile networks

Specific SMS Example

For the provison of SMS services in particular, the following diagram shows an example of a different arrangement where general service providers act as brokers between various content providers and various network operators. However, content providers are sometimes also directly connected to mobile operators without having to go through a broker. However in the specific case shown in Figure 2 the service providers are required to interconnect with all GSM networks.

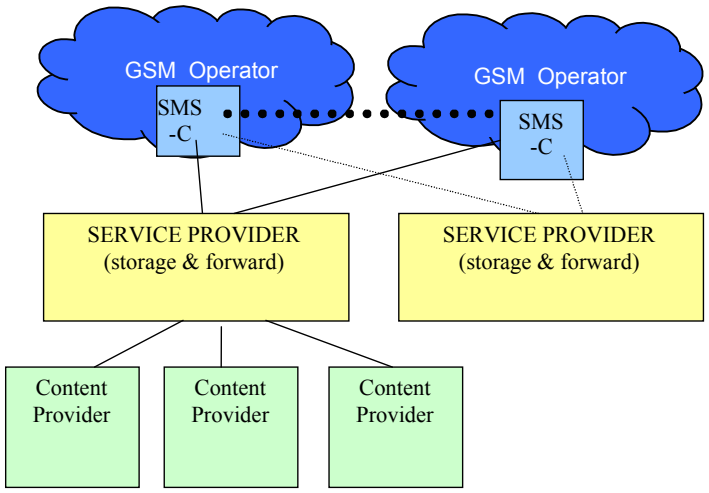

Figure 2: Relationship between providers of SMS based services

Example of services over GPRS

In the case of GPRS networks ("2,5 G"), independent service providers such as Internet Service Providers and WAP server operators may be connected at the Gi interface, which is shown in the following figure:

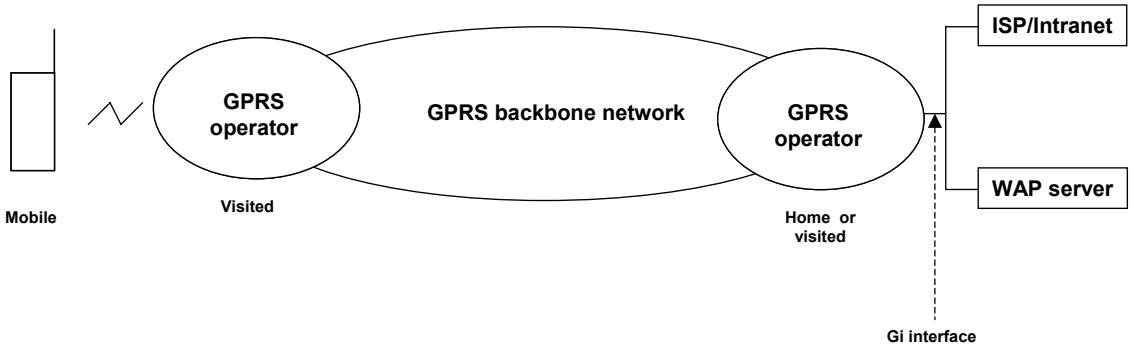

Figure 3: Access arrangements for GPRS

The services provided by third parties over GPRS could include information services and services such as Instant Messenger. The practical arrangements for GPRS are still at an early stage of development.

So far, enhanced service providers or MVNOs as defined above are not very common. In a report made for the European Commission on access to mobile networks (ref.4), only a few companies are mentioned as examples of service providers in this category. In many countries, SMS has become a large market and there are mobile service providers who specializes in

SMS based services. In order to produce the SMS service itself, and not just provide the content or act as brokers, some service providers are seeking network access for their own SMS server (usually called SMS-C). Attaching external SMS-servers to GSM networks is not seen as a major technical problem but only a few cases are known, e.g. in Finland and Sweden. In Norway, a service provider has requested such access but was refused by the network operator and the case was referred to the regulator who ruled against the network operator who was then forced to make an offer for such access.

There are also other cases in Europe where commercial negotiations for access to mobile networks have failed and disputes have been referred to the NRAs (see ref.4). In some cases, mobile operators have disputed their SMP status while in other cases the type of access requested has not been seen as ”reasonable”. The stated reasons for refusing access often include ”technical difficulties” with implementing the type of access requested by the service provider. Note that ETSI has already provided standards for service provider access requirements (see para 2.4).

2.3 Interconnection

Traditionally, interconnection agreements in GSM networks have been established for voice services only. Terms and conditions for data services like the transfer of SMS messages have usually been added later, handled on an ”ad hoc” basis or SMS messages have just been exchanged between networks without any proper agreement at all.

One company offering mobile data services in several European countries has reported experiencing problems of obtaining non-voice interconnection agreements with European GSM operators and has therefore written to the Independent Regulators Group with copies to the individual NRAs expressing its concern. In this case, no specific technical difficulties or obstacles are known and the problem is claimed partly to be related to the approach and policy of (some) mobile operators and the GSM Association.

2.4 Standards

In ETSI, a lot of work has been done to identify access requirements for service providers and to map these requirements into existing signalling systems such as ISDN (DSS1) and various protocols in Signalling System 7 (ISUP, INAP, MAP, CAMEL). Most of this work is now finished and documented in several deliverables named SPAR (Service provider access requirements) which cover both fixed and mobile networks.

Further work in this area is now focused on Application Programming Interfaces (API) and the OSA architecture (Open Service Access) defined for UMTS. A joint working group has been established between ETSI SPAN, 3GPP and the Parlay consortium.

Although both fixed and mobile operators are supporting the standards work on creating an open environment for service provision, they have not yet implemented the APIs nor published the technical and commercial details of such offerings as far as we know.

3 ACCESS TO FUTURE 3G MOBILE NETWORKS

3.1 New business models and new types of service providers

The introduction of 3G is expected to provide more opportunities for third party service providers. The mobile telecommunications market is expected to move from the current circuit-switched voice services and SMS to the provision of packet-switched multimedia services using GPRS and UMTS technology. Voice will still be an essential component in this multimedia environment, but other key services are expected to include:

- Mobile internet access and M-commerce
- Multimedia messaging services
- Location based services
- Customised information and entertainment services

The introduction of APIs for service creation in 3G should shift the focus to providing value added services with less interest in pure resale of basic services. Different categories of service providers may include:

- Telecommunications service providers
  This category includes existing fixed and mobile network operators who want to offer a complete package of integrated fixed/mobile services to their customers. Access requirements may include several core network entry points and gateways.

- Content providers
  This category may include a range of existing players who adopt mobile services as means of access to their existing information based services e.g. retailers who want to promote commerce/advertising via mobile networks, banks and financial organizations offering banking applications. The mobile network operators will need to offer access to location data, billing and authentication data in order to support such M-commerce applications.

- Value added mobile service providers
  This category includes new service providers who develop services and applications based on specific network facilities, e.g. location data. Support of these service providers will focus on the Mobility Management system and Application Programming Interfaces (APIs)

3.2 Access requirements

The anticipated access requirements that service providers may have to various network facilities in 3G mobile networks are summarized in the table below:

'Generic' Infrastructure / *Service Provider*	*Core Network Entry Points*			*Network Intelligence*		*SGSN*	*Radio Access Network*	*Mobile Portal*	*MNO Subscribers*
	Internet		*PSTN*						
	GGSN	*MGW*	*GMSC*	*MM*	*ASP*				
Mobile Telecoms Services	X	X	X	(X)	(X)	X	X		
Content				X	(X)			X	
Value Added Mobile Service				X	(X)			X	X

Key

GGSN	Gateway GPRS Support Node. Provides access to services area over IP data networks (eg the Internet) – hides complexity of mobile network from the Internet
MGW	Media Gateway. Responsible for interworking with the PSTN
GMSC	Gateway Mobile Switching Centre. Connects mobile network to other voice networks (PSTN, …)
MM	Mobility Management (System). Contains user ID, security info, location data, user profile. Enables a device to use the network (authentication). Lists unique numbers to identify devices – enables billing & prevents fraud (equipment identity)
ASP	(Application) Service Platforms including, for example, SMS, IP Multimedia, Location Services, …
SGSN	Serving Gateway GPRS Support Node. Provides network access and mobility management

Figure 4: Potential Access Requirements in 3G networks (from ref.4)

No major technical problems associated with service provider access in 3G networks are foreseen, but capacity limitations need to be taken into account. The terms, especially the commercial terms, under which the service providers gain access to the mobile networks via APIs will be a new area of negotiation and competition.

There could be structural ”bottlenecks” associated with access to 3G mobile networks that need to be considered by the NRAs, such as

- Access to subscriber information (location data, handset characteristics, billing data, authentication data) residing in the Mobility Management system.
- Lock-in mechanisms in mobile portals restricting open access to other competing ISP’s and portals.
- Availability of open Application Programming Interfaces (APIs).

4 New regulatory framework

In the new regulatory framework, fixed and mobile networks are both part of the wider concept of ”electronic communication networks” where regulations in general should be made on a market basis and be technology neutral.

There is a general presumption in the new regulatory framework that ex ante regulation should only be considered and imposed if there is proven evidence of a market failure and where competition has not been effective. Hence in the new framework NRAs should only seek to intervene where there is evidence of a market failure.

The following are the key principles and requirements relating to the new framework for access and interconnection:

- In an open and competitive market, there should be no restrictions that prevent undertakings from negotiating access and interconnection arrangements between themselves, in particular on cross border agreements, subject to the competition rules of the Treaty.

- In the context of achieving a more efficient, truly pan-European market, with effective competition, more choice and competitive services to consumers, undertakings which receive requests for access or interconnection should in principle conclude such agreements on a commercial basis, and negotiate in good faith.

- In the event of a dispute between undertakings in the same Member State an aggrieved party that has negotiated in good faith but failed to reach agreement should be able to call on the national regulatory authority to resolve the dispute. National regulatory authorities should be able to impose a solution on the parties. The intervention of a national regulatory authority in the resolution of a dispute between undertakings providing electronic communications networks or services in a Member State should seek to ensure compliance with the obligations of the new framework directive and access and interconnection directive.

- In markets where there continue to be large differences in negotiating power between undertakings, and where some undertakings rely on infrastructure provided by others for delivery of their services, National regulatory authorities should have the power to secure, where commercial negotiation fails, adequate access and interconnection and interoperability of services in the interest of end-users. In particular they may ensure end-to-end connectivity by imposing proportionate obligations on undertakings that control access to end users; control to means of access may entail ownership or control of the physical link to the end-user (either fixed or mobile), and/or the ability to change or withdraw the national number or numbers needed to access an end-user's network termination point**.** This would be the case for example if network operators were to unreasonably restrict end-user choice for access to Internet portals and services

- Mandating access to network infrastructure can be justified as a means of increasing competition, but national regulatory authorities need to balance the rights of an infrastructure owner to exploit its infrastructure for its own benefit, and the rights of other service providers to access facilities that are essential for the provision of competing services. Where obligations are imposed on operators that require them to meet reasonable requests for access to and use of networks elements and associated facilities, such requests should only be refused on the basis of objective criteria such as technical feasibility or the need to maintain network integrity. Where access is refused, the aggrieved party may submit the case to the dispute resolutions procedure referred to in Articles 18 and 19 of Directive 2002/21/EC (Framework Directive). An operator with mandated access obligations cannot be required to provide types of access which are not within its powers to provide. The imposition by national regulatory authorities of mandated access that increases competition in the short term should not reduce incentives for competitors to invest in alternative facilities that will secure more competition in the long term. imposition of technical standards should comply with Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations and of rules of Information Society Services [1].

- A national regulatory authority may, in accordance with the provisions of Access and Interconnect directive impose obligations on SMP operators to meet reasonable requests for access to, and use of, specific network elements and associated facilities, inter alia in situations where the national regulatory authority considers that denial of access or unreasonable terms and conditions having a similar effect would hinder the emergence of a sustainable competitive market at the retail level, or would not be in the end-user's interest. (SMP)

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[1] OJ L 204, 21.7.1998, p. 37. Directive as amended by Directive 98/48/EC (OJ L 217, 5.8.1998, p. 18).

- Market definition and analysis will therefore become more important when the new framework is implemented. If the NRA finds examples of market failure, those players who are designated as having SMP (Significant Market Power) may be subjected to obligations as described in articles 9-13 in the new Access & Interconnection Directive. These measures are often called the ”NRA toolkit” , and requirements for ensuring network access are outlined in art.12 (Obligations of access to, and use of, specific network facilities):

  ”Operators may be required inter alia:
  - *(a) to give third parties access to specified network elements and/or facilities;*
  - *(b) to negotiate in good faith with undertakings requesting access*
  - *(c) not to withdraw access to facilities already granted;*
  - *(d) to provide specified services on a wholesale bases for resale by third parties;*
  - *(e) to grant open access to technical interfaces, protocols or other key technologies that are indispensable for the interoperability of services;*
  - *(f) to provide collocation or other forms of facility sharing, including duct, building or mast sharing;*
  - *(g) to provide specified services needed to ensure interoperability of end-to-end services to users, including facilities for intelligent network services or roaming on mobile networks;*
  - *(h) to provide access to operational support systems or similar software systems necessary to ensure fair competition in the provision of services;*
  - *(i) to interconnect networks or network facilities.”*

Consequently, NRAs will have a range of measures at their disposal in order to ensure access to networks and facilities operated by SMP players. On the other hand, market analysis is likely to be more complex with the introduction of new services and value chains, providing new challenges for regulators. Also, the variety of interfaces and network facilities will increase in 3G networks compared to the present 2G networks.

5 CONCLUSIONS

There are both technical and regulatory issues associated with access to mobile networks that need to be addressed in light of several disputes between service providers and mobile operators :

a) The access arrangements usually offered by current 2G mobile operators provide only limited scope for innovation and service packaging by service providers. Consequently, most of the service providers are only resellers and do not offer much added value.

b) Interconnection agreements for non-voice service providers are not very common. Several mobile operators are refusing to accept such agreements with MVNOs and service providers. The current directives enable NRAs to grant service providers access to networks on fair terms, and some countries are already following this practice.

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REFERENCES

1) Directive (2002/19/EC) on access to, and interconnection of, electronic communications networks and associated facilities.

2) ETSI Guide EG 201 897: "Service provider access requirements in a fixed and mobile environment"

3) ETSI Guide EG 201 916: "Development of standards to support open inter-network interfaces and service provider access"

4) "Regulatory aspects of access to mobile network infrastructures and network intelligence" Report for the European Commission by Euro Strategy Consultants, July 2001

5) Directive 2002/21/EC of the European parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communication networks and services.