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Analysis of European Mobile Network Operators Strategies towards Next Generation Mobile Networks Deployment

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1. INTRODUCTION

The broadband revolution is fundamentally changing the landscape in European telecommunications. According to (Papacharissi, 2006) – citing (Kirstein, 2001) - broadband can be defined as: "*all flavours of high-speed digital voice, data and video services, as well as the underlying infrastructure, clients and technologies that enable these services*".

Precisely referring to the underlying technology, the recent years have become particularly intense on the debate of the so called Next Generation Networks. Considering one possible definition[1]: "*NGNs are multi-service networks, providing a broadening range of new services to the consumer, running over common IP-based networks, complemented by flexible service platforms and management systems*".

Around the debate of NGN deployment many issues arise, such as the need for intensive investment, the effect of the evolving regulatory framework in an increasing competitive market, or the uncertain demand of new services and applications that should justify any effort. This is even more challenging in the mobile arena, where the need for spectrum is crucial to go a step further.

For this reason mobile industry, despite the barriers to 3G full adoption still prevail[2], has not stopped on their way to develop Next Generation Mobile Networks. Although it is probably too soon to talk about commercial launches, this article intends to show the relevance of the future mobile scenario and present some of the key issues that will affect its final development.

2. THE CONCEPT OF NGMN

The concept of Next Generation Mobile Network emerges as the future platform to provide broadband over an integrated network that facilitates smooth migration from existing mobile infrastructures and allows the commercial launch of new mobile services. Regarding technology, NGMN could be seen as the global concept for all kind of mobile communications a step further from B3G (LTE-4G, Mobile WiMax, etc)[3].

In this context, the main impulse from the mobile industry comes from the NGMN Alliance[4], an initiative to complement and support the work within standardisation

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[1] As defined during the Open Workshop on Identifying Policy and Regulatory Issues of Next Generation Networks, celebrated in Brussels, 22 June 2005. See http://ec.europa.eu/information_society/policy/ecomm/info_centre/documentation/public_consult/ngn/index_en.htm.

[2] See (Ramos et al, 2004).

[3] There are many previous reports focused on the analysis of evolutionary paths for mobile technology and emerging business models. Particularly interesting is the report "The Future of Mobile Communications in the EU: Assessing the potential of 4G". See (Bohlin et al, 2004).

[4] Next Generation Mobile Networks (NGMN) is an initiative by China Mobile Communications Corporation, KPN Mobile NV, NTT DoCoMo Inc., Orange SA, Sprint Nextel Corporation, T-Mobile

bodies by providing a coherent view of what the operator community is going to require in the decade beyond 2010.

The vision of this initiative is to provide a platform for innovation by moving towards one integrated network for the seamless introduction of mobile broadband services. In addition, NGMN will coexist with other networks while it facilitates smooth migration from them. The initial objective of the NGMN Alliance is the commercial launch of a new experience in mobile broadband communications and to ensure a long and successful cycle of investment, innovation and adoption of new and familiar services that would benefit all members of the mobile ecosystem.

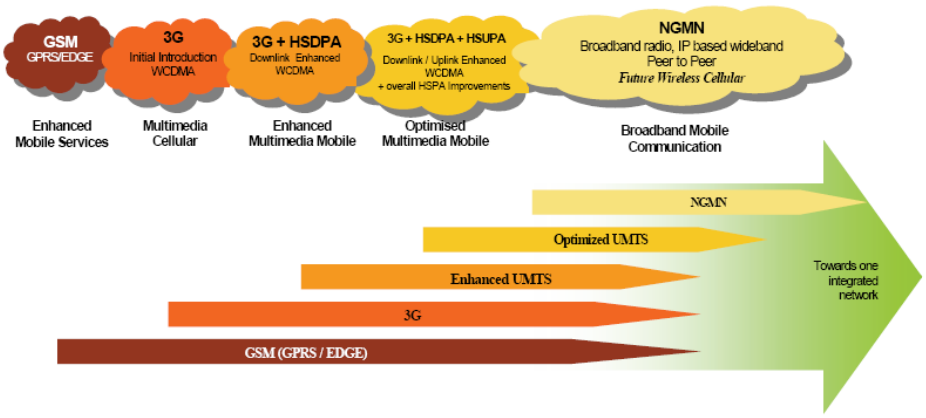

Figure 1. NGMN-GSM-UMTS coexistence and introduction roadmap high level view

Source: NGMN Alliance

From the technology point of view, according to the mobile telecom operators industry, NGMN require the following attributes[5]:

- Seamless Mobility.
- Low-Latency.
- Spectral Efficiency.
- High End-to-End Throughput.
- Quality of Service.
- Security.
- Integrated Network.
- Inter-working (coexistence with legacy networks).
- Simplicity.
- Total-cost-ownership.

International AG and, Vodafone Group PLC to provide a set of recommendations for the creation of networks suitable for the competitive delivery of mobile broadband services and cost-efficient eventual replacement of existing networks.

[5] See the White Paper: "Next Generation Mobile Networks Beyond HSPA & EVDO". Release Date: 5 December 2006.

- Reliability.

The target architecture defined by these recommendations will be an optimised packet switched network architecture, which will provide a smooth migration from existing 2G and 3G networks towards an IP network with improved cost competitiveness and broadband performance.

Therefore, NGMN can be viewed as a further step in the evolution of current industry efforts in HSDPA, HSUPA, and EVDO arenas enabling a personalised broadband access experience and consolidating the diversity of networks operated by mobile network operators.

3. MARKET READINESS

As it has been presented, technical attributes of NGMN are a clear symptom that mobile networks, and hence services and businesses, are converging towards competing in capacity and adaptability to fixed networks. Then for mobiles the challenge is to make technology and spectrum usage much more efficient, in order to compete for the entire broadband market. Obviously current market conditions will directly affect the development of new mobile systems, due to the tremendous investment efforts required.

Currently the broadband market is evolving towards a global competitive one, with network operators competing based on alternative fixed or mobile access technologies, alternative operators trying to protect their market niche, players from Internet and Media controlling the provision of value added contents and services, and a changing regulatory framework currently under review by the European Commission.

According to the latest EC report[6] on electronic communications development, the number of fixed broadband access lines was more than 99 million at 1 January 2008, compared to 80 million in January 2007, being the EU average penetration rose from 16.3% in January 2007 to 20.0% in January 2008.

DSL is the predominant broadband access technology in the EU, accounting for around 80% of all lines. However, the relative position of DSL lines compared with other technologies evolved, with growth of 22.4% in 2007 compared to 34.5% in 2006. At the same time, alternative technologies, mainly cable but also fibre to the home (FTTH), wireless access (WLL) and mobile, are beginning to provide the potential for significant platform competition.

[6] See (EC, 2008).

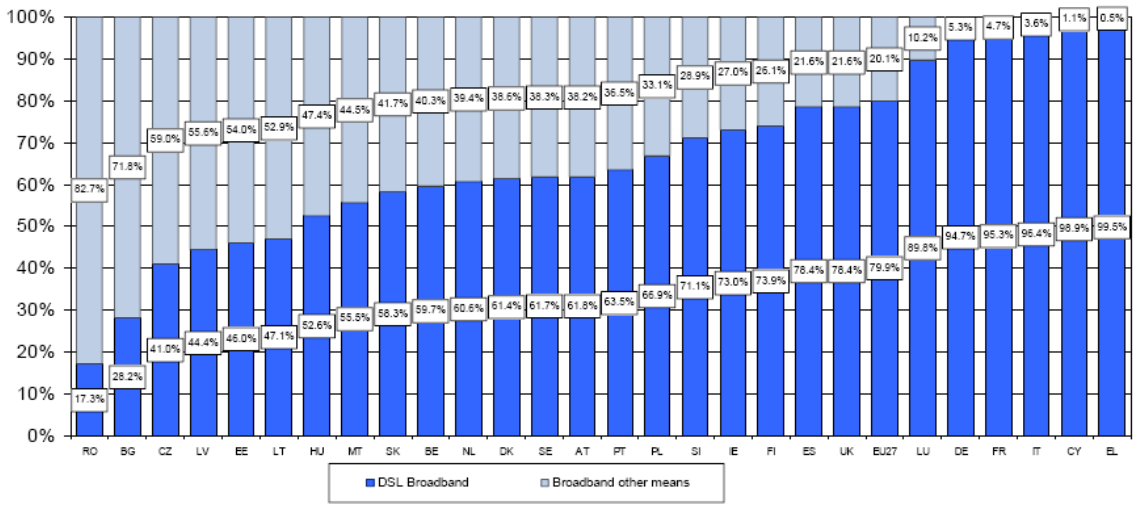

Figure 2. Fixed Broadband lines by technology (January 2008)[7]

Source: European Commission

Regarding mobile data services, SMS continues to be an important revenue source, accounting for around 14% of total revenues in 2007, with other data services showing significant growth and accounting for around 7% of revenue compared to 5% in 2006.

3G took off in 2007, and eighty-six operators are currently offering 3G on a commercial basis across all Member States, up from 70 last year. 3G penetration rose from 11% at the end of 2006 to an estimated 20% at the end of 2007, representing over 88 million subscriptions.

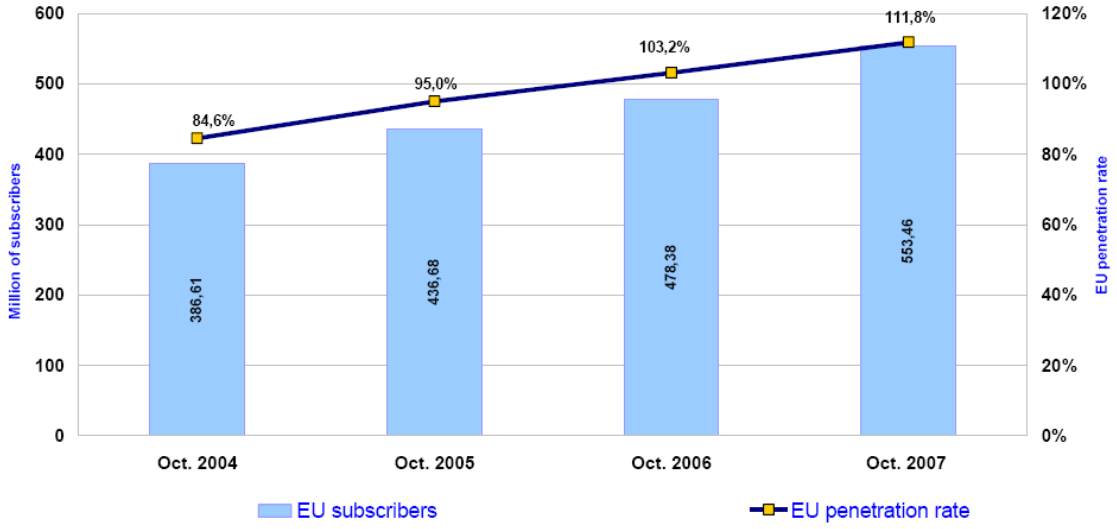

Figure 3. Mobile subscribers penetration in EU (2G and 3G)[8]

Source: European Commission

[7] Data for Estonia, France, Lithuania, the Netherlands and Austria as of October 2007.

[8] Where available, data include 2G and 3G mobile network operators' subscribers as well as mobile service providers' subscribers. Data are not comparable with previous reports (updated figures for previous years have been provided by some NRAs).

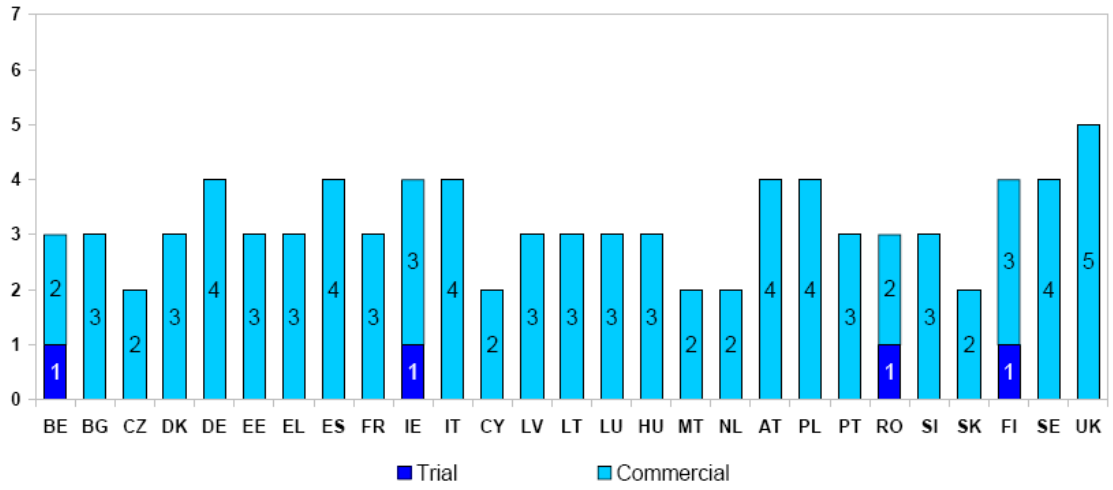

Figure 4. UMTS operators offering commercial services, July 2007[9].

Source: European Commission

As the EC report shows, consumers again benefited in 2007 from lower prices in particular for mobile voice services. These gains were supplemented by the increased availability of offerings such as mobile broadband and higher-speed fixed services, in particular over fibre.

These market facts suggest that mobile markets are mature regarding voice services, but have a bright future in terms of data. However current mobile technologies are a bit far from competing to fixed broadband.

The declining tendency on prices is an important issue, as the mobile sector is facing the EC pressure on price reduction. In addition this trend is also supported by strong competition in most European markets, which is driven by new entrants or additional brands from existing operators.

Mobile data/broadband growth is another key trend that has started to gain momentum driven by data-specific devices such as BlackBerry or i-Phone as well as surging use of mobile phones and notebook datacards for Internet access.

In summary, mobile sector in Europe is at a turning point, as the huge revenues from voice decline every year and the need to go further in order to compete with fixed

[9] According to the information provided by the EC report:

Denmark: 3 operators commercially active. One operator is not active.

Estonia: 4th licensed 3G operator. One operator is not active.

France: The coverage of one specific 3G operator on the market is 20%. 3G service includes data cards.

Cyprus: One operator has the obligation to build a 3G network until 2013.

Poland: Service definition includes data cards.

Netherlands: 2 3G operators commercially active.

Austria: One mobile operator has a license but is not active, frequencies traded to another operator.

players on broadband access and offer new attractive mobile services need for fresh business models and additional investments.

4. BUSINESS MODELS PERSPECTIVES

From the mobile business perspective, broadband has been traditionally seen in a different way, as mobile business, in opposition to fixed broadband, is characterized by operators' leading position, controlling as many elements within the value chain as possible[10].

This model, in the case of Europe, has eased competition infrastructure development, with quite successful results until the migration towards 3G networks started in 2000. From that moment on, the mobile business sector experienced great difficulties that forced operators to delay 3G commercial launches by almost three years on average.

For that reason, mobile players are usually not considered broadband players as they have been more oriented to mobile value added services than broadband capacity. Obviously this tendency is rapidly changing as the demand for greater mobile capacity increases.

In addition, the increasing pressure from demand to enjoy unrestricted and wide choice of content and applications and the changes in the mobile industries structure are causing an evolution of the business model for mobile operators.

Citing Juniper Research (2008): "*the level of control exerted by [mobile] operators rankles with, and exasperates, the content providers, an environment not necessarily conductive for the introduction and mass adoption of innovative mobile services […]companies which specialise in a given area of content (be it music, games or adult content) are unconvinced as to the operator's efficacy in marketing their particular product, in that operators, after all, are mobile specialists and not specialists in music / games / adult content*".

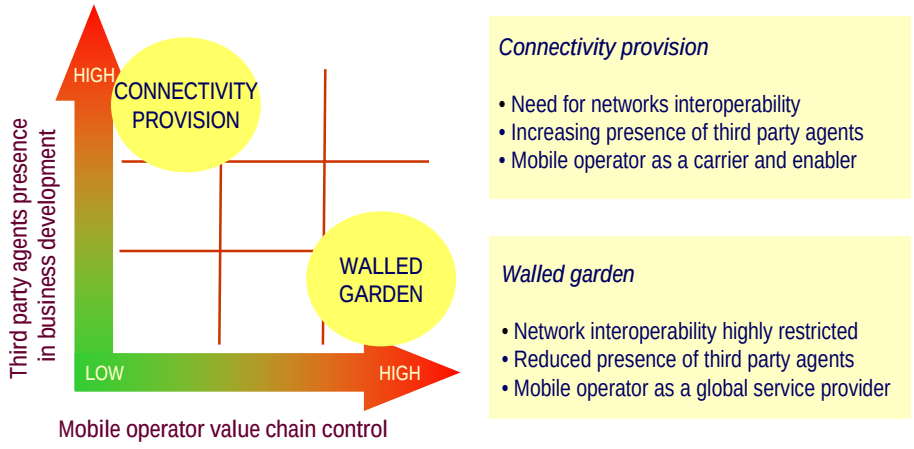

Figure 5. Mobile content business models from the mobile operators perspective.

Source: Own elaboration.

[10] See (Sabat, 2002).

As an initial consequence of these new pressures, what it is average allowed by walled gardens[11] is and will be changing over time. Now all the major operators have standard agreements for such contents as ringtones, wallpapers, games, but, in general they do not have it for reach media content like mobile TV, radio, video on-demand, music streaming and downloads. The restrictions also are dependent upon the type of the device (not every smartphone behaves the same within the mobile system), the type of delivery mechanism (e.g., videos clips could be delivered via MMS but not via media players), and by the particular platform.

All of these difficulties lead to envisage the opposite model: the mobile operator as a mere provider of connectivity. Here the revenues for mobile content accrue to content providers, enablers and brokers. Obviously, few mobile operators are willing to embrace this model in the short term.

Between the walled garden and the connectivity models, there will be intermediate possibilities, attractive enough since they could represent having (at least a part of) the best of both worlds. All of them use to some extent the chance of mobile operators to become wholesale providers of services for content related players, or also offering their own private brands to users. The result of using this model resembles that of department stores, shopping malls or, better, multidepartment stores, hypermarkets and superstores. This model might also be seen as a reaction against the possibility of losing the entire retail content revenues to third parties through off-portal and side activities by end users.

In this sense NGMN would potentially give to mobile operators the opportunity to fully develop any possible strategy, as it would not have any technical restriction. For that reason and from a mobile operator's perspective, the investment in a new network deployment that extends current capacities and complements mobile network for IP broadband services would be an advantage.

Considering NGMN deployment as a proactive response from mobile operators towards competing in equal conditions to any other broadband operator, they should additionally concentrate their efforts on exploring new business opportunities around broadband and mobility, as pure voice revenues will increasingly decline as shown before.

From the authors' point of view, the main drivers for making NGMG profitable would be around the following:

- **New flavors for existing data services**. Although text messaging will probably continue to grow (as a percentage of wireless data revenues it now represents closer to 35% of data revenues), there are many other alternatives like multimedia bundles, e-mail, laptop cards, and downloaded content (ringtones, games, wallpaper) that still have potential for growth.

[11] See (Ramos et al, 2002).

- **Enhanced market segmentation, focused on younger users**. Substantially more data oriented than the rest (much of this is text-based), as younger users' incomes increase, it could also be expected that they use more the costlier data services that they may have considered too expensive when their incomes were lower.
- **New devices**. Another crucial element would be the effect of devices to foster demand. Recent cases such as Blackberry or i-Phone prove it. The Blackberry offers an easy-to-use email service with security protection that has supported a sharp rise in business and consumer email use. In addition to its voice functionality, the i-Phone is a multi-media player (i-Pod) and offers an attractive full HTML web browsing experience with a large, touch-activated screen.

  Furthermore, laptop cards and chipsets represent a substantial growth opportunity for mobile operators (many computer manufacturers are now embedding laptop cards in computers).
- **Open access and mobile operator-content provider /manufacturer models**. This should be another incentive for future businesses. There will be diverse business models in future, i.e., more devices with more collaboration between operators and content providers or manufacturers, diverse operating systems, and exclusive devices. In some cases, as with i-Phone, the operator will give away some aspects of control over applications and the customer to the vendor.

  But we would expect the operator to continue to maintain substantial control over the customer and the value chain in most cases, (operator-branded devices, billing service, etc). We think this is important because it will allow the operators to capture value rather than simply be a 'dumb pipe' for data traffic.
- **Multimedia and social networks as killer applications (Mobile 2.0)**. These trend would refer to mobile TV, mobile creative content (mainly audio, video, games and books), and social networks (Facebook, Twitter) interaction and presence in mobiles.

  This is probably the most challenging driver for NGMN business models.
- **Mobile advertising**. Mobile advertising is an extension of the traditional media broadcast model, in which the mobile content player provides content (typically free, but not necessarily) and applications mixed with advertising. Although current market research shows that there is a significant part of mobile users that are not willing to pay for access to content, mobile advertising is seen increasingly as the "machine within" in the business models for applications and contents in mobile.

5. REGULATION

Regulation is one of the key elements for any telecom business, and seems to be crucial for mobile evolution in the future.

For the last ten years, mobile sector has enjoyed a non-intrusive regulatory model that has led it to be a reference worldwide. However these favorable conditions for mobile operators are changing rapidly, as the latest EC decisions suggest.

In terms of regulatory changes, the introduction of Pan-European regulation of mobile voice roaming charges, which became effective in mid 2007, was an example of the EC will to progressively reduce tariffs across Europe.

In fact, the EU Commissioner for Information Society and Media, Viviane Reding, recently declared that[12]: "*Sending text messages or downloading data via a mobile phone while in another EU country should not be substantially more expensive for a consumer than sending text messages or downloading data at home. This is the logic of the borderless single market which we in Europe agreed to create already 50 years ago. Higher retail charges abroad must be justified by additional cost of operators, or they will have to disappear*". This speech shows clear similarities to the procedure that ended in strict roaming tariffs cut.

In addition to this trend, spectrum regulation will be a key aspect for developing future mobile networks, services and businesses. Then Mobile TV spectrum needs (management of the so-called "digital dividend"), or the ease of use of current GSM bands for mobile broadband systems (3G and beyond) will be directly affected by the upcoming regulation, and require clear positions from the EC.

The current context of change in regulation with the European framework under review[13] is a negative factor for assuming risk on intensive investment in NGMN. Although the present article is not focused on regulatory aspects, regulation affecting mobile sector will probably have a clear impact that can either define the rules for a new virtuous circle or lead the sector to stagnation.

6. CONCLUSIONS

As explained previously, electronic communications markets are evolving to an increasing complex configuration where mobile operators compete among them and fixed players for providing combined services and broadband connectivity.

Future necessities will require higher capacity to achieve 50Mbps downstream (at this moment, commercially possible only for cable operators, as mobile or wireless access technologies demand for wider spectrum bands to compete).

From a technical point of view, NGMN deployment would be the strategic response to these challenges that would guarantee mobile operators competing in equal conditions

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[12] See the speech at GSMA Mobile World Congress (Barcelona, 11 February 2008): *Key Challenges for Mobile Ubiquity in Europe's Single Market*. http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/70&format=HTML&aged=0&language=EN&guiLanguage=en

[13] See http://ec.europa.eu/information_society/policy/ecomm/tomorrow/index_en.htm.

with any other operator and player, as network functionality and capacity would be no longer a constraint.

Mobile data/broadband growth seems to be guaranteed, driven by data-specific or multimedia devices such as Blackberry or i-Phone as well as surging use of mobile phones and notebook datacards for Internet access. In order to maximize the benefit from this growth, mobile operators have to evolve from their old fashioned business models and look for differentiation in a very competitive environment, where contents, media and social interaction around mobile will be key drivers.

From the previous considerations presented along this article, a crucial aspect for the upcoming NGMN deployment would be the definition of a proper scenario by policy makers and regulators for investment in NGMN as a way to stimulate and guarantee innovation that is transferred to markets and users in the form of new services, applications and businesses.

Regulatory pressure on prices has proved wrong in many occasions when new businesses are emerging. Then taking into account the importance of spectrum management, future policy and regulation should be focused on relaxing rules to ease spectrum flexible usage, and on defining attractive conditions for competitors that can potentially add value to the market instead of cutting prices dramatically.

In summary, we envisage that the mobile sector future in Europe is bright and challenging, but will be very dependant of the market conditions and regulation. We expect the players to collaborate in order to define the proper scenario for making NGMN deployment successful and achievable in the mid-term.

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