



## Who's your Daddy? [Fixed-Mobile Convergence]

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Date: 7/20/2007

A version of this article appeared in  
Pipeline Magazine, June 2007  
<http://pipelinepub.com>

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## WHO'S YOUR DADDY? [FIXED-MOBILE CONVERGENCE]

### **Summary:**

What are the characteristics and drivers for Fixed Mobile Convergence [FMC] and how will these shape the structure of service providers? Are these drivers sufficiently strong, and the technical and operational hurdles sufficiently low, to allow FMC to succeed? Given the new ecosystem players and advanced service features that FMC brings to our market, can we do planning and business as usual? We review the current environment for FMC success and lay out the operational and OSS/BSS infrastructure requirements needed if we assume FMC succeeds. We are not optimistic that traditional OSS/BSS applications and the current operational processes and organizational domains of operators are up to this task.



## FMC – Is it schizophrenic?

Capital Expense constraints have forced service providers to be more deliberate in prioritizing their spending. This is a reality we have all come to know over the past few years. Today, there are two major, and separate, spending campaigns, building two co-existing, yet separate networks:

- (1) Larger pipes enabling big broadband to the home,
- (2) Greater coverage and bandwidth for mobile service.

These investments are succeeding in providing more termination points with more transmission capacity. Yet these two networks compete – first for development capital, and once in place, for customer use. Nevertheless, all over the world, Fixed-Mobile Convergence (FMC) programs are grabbing the headlines, with Service Providers publicly announcing their intention to move in this direction. Can the build outs of today's isolated networks be integrated via some form of coherent planning? Are current product introduction programs sufficient to yield some synergy from these separate investments? Will the mergers and acquisitions that bring wired and wireless service providers be the catalyst for successful convergence? Are we barking up a tree after the raccoon is gone?

Enter Telecom Italia Lab's **Alice** demonstrations and **Home Network Management** service which included use of the cell phone and PC as integrated access & control stations in the house. This and other similar lab trials set the service provider community ablaze ; so that in 2004, Telecom Italia, BT, Deutsche Telekom, France Telecom, Telefonica , Telstra, and NTT created the **Home Gateway Initiative** (HGI). Would such a service be successful? How can I duplicate this service in my country? This energized the fledgling FMC movement. Basically, the FMC vision is about each customer carrying one access device that does it all. It will:

- operate in the home like a wireless terminal connecting to the home gateway and hence to the land-based network;
- home to an associated provider & connect via mobile 3GPP networks when out of the house;
- and *potentially* connect to any WiFi access point and seek out its homed network.

Simple concept: one device, one unified network, always on, always connected via the most efficient access path available. Or if not one device, one number and unified access and same services on the PC, TV, and WiFi enabled mobile phone.

Role outs of FMC for voice are trickling out. T-Mobile has committed to full role out of their version to all subscribers in North America. BT Fusion offers a service version with UMA technology. The more generalized Voice Call Continuity (VCC) specification within the IP multimedia subsystem (IMS) standard is commercially ready. With everything else occupying the service provider's plate, why the rush? And who is pushing this?

Why such intense concern about FMC today? Perhaps it is because study after study shows that consumers are shutting off their fixed-line voice service and converting into mobile only consumers. "Thus far in the US the substitution effect has been one way: many consumers are substituting a wireless phone for wired phone and making their wireless service their only telephone service. For local and long distance companies this trend has been disastrous—resulting in a steady decline in the customer base and revenue." [[Fixed Mobile Convergence: Single Phone Solutions for Wireless, Wireline, and VoIP Convergence 2005-2010](#)] Profits in the telecom industry are currently so low, that in 2005 just six percent of subscribers switching to mobile-only-service had a heavy impact on the industry. A just breaking 2007 study by Stephen Blumberg of Centers for Disease Control and Prevention finds that a



quarter to a third of adults under 30 now have *only* a mobile phone – and that over 10% of all adults have cut the land-line tie. This switchover is increasing at accelerated rates.

Consumers are switching away from fixed-line to mobile-only voice phone service; yet still buying triple-play & broadband services for their homes. If it were not for bundling phone with DSL and Fiber, would even more be cutting off land phone access? Land-based providers attempting to stem the erosion to mobile-only-service with bundled DSL/voice and unlimited long distance plans are only gaining a stopgap bridge – they need to find new revenue generating service solutions and new ways of insuring customer loyalty. Many industry pundits are proclaiming that the mobile service providers are in the right place at the right time to become the dominant force in the marketplace. Taking a leading role in FMC appears to be one way that the wired service providers can try to retain control and dominance, and maybe, just maybe, turn back the clock. At least one industry veteran sees that as a lost cause:

Telcordia's Grant Lenahan, executive director of wireless mobility and chief strategist, declared in a session on the operational impact of IP multimedia subsystem that the traditional operator business model is dead “The new paradigm, according to Lenahan, splits the layer in two: the operator layer and the third party layer.” [Telcordia: Operator business model is dead *By Tim McElligott*] Success of Blackberry is an example of third party cooperation. Blackberry’s simplicity for delivering email and low power usage resulting in long battery life, made it an enterprise favorite. Blackberry’s network-based mail repository and push server also meshes very well with the architecture of FMC.

Despite the views that the mobile service providers are set to be the big winners, we know that all is not well with mobile providers. They must find ways to increase the Average Revenue Per User. Many of these services rely on content provided by third parties, and that creates a myriad of content management, quality of service, and content vendor partner management challenges. The fastest growing market segment for mobile operators is the youth. They will leap on a newly introduced service and drive it to immediate profitability. They did this with text messaging; ring tones, and taking and sending pictures on their phones. Yet, they are famously not loyal to brands and will switch to another provider lured by the offer of cooler capabilities. And using those cooler capabilities requires ever increasing sophistication in the handsets as well as the networks. So to get that increase in ARPU, mobile providers must provide substantial subsidies of the cost of mobile phones/devices to improve stickiness; most tie that shiny new handset into an extension of the contract too - or their customers will skip to their competition.

IDC finds mobile operators hesitant to embrace FMC in their report on FMC market evolution: “As yet, most pure mobile operators have not been as active in developing FMC services in comparison with fixed and integrated operators. It can be assumed that these operators do not see the benefit of partnering with fixed-line operators to offer FMC services. Rather, many pure mobile operators appear to believe that they can offer end users the benefits of FMC services on their own.” [IDC, CG29M] Instead, mobile operators are considering [femtocells](#) - an “affordable way to provide wireless services indoors by deploying small base stations that operate on existing cellular spectrum.” [NXTcommnews.com] But millions of femtocells will present its own, entirely different management challenge.

While current deployments of FMC concentrate on voice, currently the hot trend in the mobile phone market is video, and on even thinner phones. “Thinness” and increased power consumption required for video add more expense to mobile devices. In its current product release announcements, Motorola is banking on video-enabled phones to reclaim their flagging market share. Getting more TV and Movies on phones is their stated strategy. Motorola’s president says they are moving away from depending on the success of one phone and will focus more on how the phone will deliver applications such as mobile



video and music. Is this an opening up to FMC? Are they committed to the FMC multi-modal network device?

Another source of higher revenues and margins are Enterprise customers, ripe for the introduction of advanced services. The devices which support advanced services and FMC network capabilities (smart phones with WiFi & VCC, UMTS./HSDPA or equivalent) are very expensive retailing for \$400-\$700 USD - beyond the budget threshold of most consumers. Mobile service providers are hoping to get unified services first to enterprise customers: in part because the enterprise customer can afford the high cost of smart, convergent devices; in part because they want the higher prices business customers pay.

More fuel for the continued merger of wired and wireless service providers, driving the rush toward Fixed Mobile Convergence. Again, we see an abundance of technological and marketing enthusiasm with its accompanying side-kick, *High Expectations*:

"FMC will combine the convenience, freedom of movement and personalised services of the wireless world with the high quality and speed of fixed communications. Customers will be "always on" while the communications service optimises routing through balancing quality, coverage and bandwidth efficiencies. As a result, an FMC service presents the customer with the best possible experience at home, at work or on the move. ... The groundwork for FMC is now underway, but all potential players in the FMC ecosystem need to work out how they will participate in developing these new services." [Fixed-Mobile Convergence: Unifying the Communications Experience; Jill Finger Gibson, et al; IDC; November 2005]

### **Personalization and Presence in the FMC world**

FMC products will enable the end user to decide on the set of services they receive as well as the look and feel of the device user interface. In fact, this personalization is an indirect necessity for multi-homing devices to work with uniform service features. This availability of converged CPE will give users a consistent, unified identity. For example, rather than users having to configure a fixed handset and a mobile handset twice, each with the same set of services such as personalized address books, they will only have to do this once, likely on a user-friendly system like a computer, thus merging their internet "identity", their fixed "identity", and their mobile "identity". Personalization is now associated mainly with the mobile world, as mobile handsets include a greater variety of personalization options than fixed handsets. FMC will bring personalization into the fixed-line environment.

Integrated directories and voice dialing are so convenient that they influence the choice of which device is used in a house with a dual connection environment. Mobile devices have directories. This trend has resulted in current mass market household wireless phones storing selectable number directories. But advanced mobile phones have one overriding advantage – they can sync to your computer and its extensive contact database.

Presence has already succeeded as a service as first introduced in computer-based messaging applications initially in AOL Instant Messenger and later in Yahoo Instant Messenger [YIM] and Windows Messenger. Computer messaging services have it, but currently mobile phone messaging services do not have it. As voice calling has been added as a feature to YIM and Windows Messenger, voice services on the computer have presence as a feature. *You know that* that person is available to take your computer-to-computer call before you launch it. As FMC seeks to be *the one* communication device with every service, so it must incorporate the highest service feature set of all the interacting devices. So Presence is seen as a key requirement for FMC.



Presence is also a key technological enabler for social networking. Social networking and FMC share many overlapping market characteristics. It is likely that they could each synergistically drive the other. Enriched and converged presence includes not just who is on line and available (or not), but what applications they are using, what services they can support, and what information about their presence they wish to broadcast to who.

Personalization and Presence are Advanced Services - some of many that planners and IT shops are preparing. The argument is that efficiency alone will not win customer loyalty. Further this efficient network usage may actually *reduce* the revenue received for access from customers. Therefore FMC must be accompanied with a large stable of new Advanced Services. But then there is the other side of the coin, not so loudly heralded: that FMC must, in some way, uniquely enable these advanced services.

### New Services drive market success

In this argument, efficiencies lower cost basis for networks, but revenue growth comes from providing new services. Advanced Services are also the driver for IMS. But even without IMS or FMC in wide deployment, Advanced Services are being introduced today - but they are available only on the most expensive handsets. The Fixed Mobile Convergence Alliance [FMCA] is a trade organization, a forum if you will of mostly converged operators, devoted to laying out the business drivers and requirements for FMC.

"Convergence applications will typically be composed of server side components that reside in the converged operators' networks, and client-side components resident in the terminals. These terminal-resident applications may be provided as embedded applications by the handset vendor or be provided by third party developers who make use of capabilities exposed by the handset vendor, through the native operating system APIs or virtual machine APIs... It is expected that while there may be a core set of applications that are best provided by handset vendors (since they may rely on tight integration with the device hardware), the market will be reliant on innovation among third party application developers to stimulate new convergence opportunities." FMCA sees the following early converged applications driving the marketplace:

- Converged Contacts (one network resident list available to any device)
- Personal Multimedia (sharing home libraries on mobile sets)
- Multimedia Call with Data Sharing (SIP/IMS enabled calls)
- Combinatorial Services (a catch bag for using any network for any service group)
- Electronic Program Guide (phones as anywhere remotes)
- Automation Control and Monitoring (mobile phone as home automation console)
- Convergent Call Control (another incarnation of smart agent secretaries)
- Multimodal Services (mixed voice, video and data sessions)

[FMCA Convergence Application Scenarios] We're sure you can immediately think of more.

Generally it is thought that these services will require IMS and the use of an HSS. But with everything that is being piled into the Home Subscriber Server, will it will be too stressed if deployed as a centralized, network owned and controlled application. Other technological solutions are possible and

may be much easier to deploy – provided handsets support them. Enter Microsoft's call control technology and their new announcement of mobile services:

(Reuters, May 14, 2007) - Microsoft Corp. introduced on Sunday phones, headsets and other devices to work with its software that aim to replace the traditional office phone and deliver e-mails, instant messages and phone calls over the Internet. Microsoft, the world's largest software company, said it worked with nine technology manufacturers including Samsung Electronics Co. Ltd. and NEC Corp. to develop hardware to work with its unified communications strategy. Instead of one system for phones and another for e-mails and instant messaging, Microsoft wants all communications to run over Internet networks on its Office Communicator program. Microsoft forecasts that the shift to Web-based phone systems will gain momentum during the next three years, eventually generating billions of dollars in new revenue for the company.

And never dismiss the Java and the open source community. A smart phone Linux is likely. Even the FMCA folks agree “to achieve commercial viability the convergence service must be capable of being deployed as mobile Java-based application, but this is problematic {for phone vendors and service providers}” [FMCA Convergence Application Scenarios]

Christian Borrman, for one, is cautionary. The Mobile Director of icom states on his blog:

“As phones and users get smarter, and data requirements soar way above the capacity or even time available to transfer this data over the mobile network, fixed-mobile convergence is the only way for a mobile operator or virtual mobile operator to be part of the whole value chain. ... Enterprises are still slow at buying into mobile data, as any device that can only connect over a mobile network, will remain just that; a mobile device. To become the main device of any enterprise user, from an operator terminal to an executive productivity tool, the device must be able to communicate in the office and home over local access network before mass adoption can occur.”

Further, he states “... the two types of network are so fundamentally different, not only in their provision, complexity and cost base, but also in the way that they are perceived and consumed that they will never truly converge.” He continues, “the amount of data that is transferred between the mobile device and the network becomes too large and too diverse in its value to the customer, for all this traffic to be transferred purely over the mobile network.” Christian is rightly worried that FMC might lead to the erosion of the “mobile premium”, the higher pricing for mobile calls over land-based services. This premium is what makes mobile operators so (relatively) profitable. So why would mobile operators support introduction of FMC?

And why would wired providers, who hope that erosion to mobile phones will reach a threshold and stop. Complete conversion to only mobile phones is in our opinion unlikely. Resistance comes from the user difficulty to get data/internet service integration on the mobile phone and the generally poorer quality of mobile calling. Providing advanced service products on a mobile phone is complex and costly.

That said, many of the technological enablers for FMC are present today. SIP is likely to play a big role in FMC. It was invented to enable multi modal services. But all of these enablers will require significant technical evolution. Some examples of important others include:

- SIM cards, or some equivalent next-generational smart card, will become universal for all devices and will include biometric authentication data to establish the user and mobile devices will include biometric readers to verify the user and to proxy it to the network and external services. [Phil Homes, a noted industry analyst, is betting there will be a range of credential mechanisms, probably using EAP.]

- Security services will need to be in device to perform true authentication of the user and non repudiation of the transaction. Basically the phone will need to be at least a fingerprint reader - if not some stronger authentication mechanism.
- Data synchronization is going to be a big technical problem to overcome. Many devices and many data sources will need to remain in constant synchronization, while still securing all data that is sensitive. It is difficult to imagine that anything other than a network resident central repository could provide this synchronization. Certainly the service providers want this and clearly Microsoft, Yahoo, and Google also are scrambling to own this business. However we learned with the original Groove application that sources and syncs of information can maintain queue's and logs that allow complex synchronizations from diverse source services coming and going. Coupled with web services or Tuple Spaces, this would solve the synchronization problem without recourse to a network controlled central repository.
- Metadata standards that describe devices, capabilities and services and their configuration, is a real enabler for these services. Again a standard would make life so much simpler and XML, XRI, WSDL and like are providing static descriptions. But eventually, to be distributed and always available, an advertising protocol and service lookup market will become necessary. Jini taught us how to build these, but the service provider and device manufacturers have proven very resistant to these ideas.

Clearly, FMC has some significant problems to overcome before it can be successful. It is complicated on the wire-line side by the sporadically poor performance of VoIP calls and the lack of service controllers that allow true voice-data integration. Despite Skype, Yahoo and Microsoft, few computers dial and coordinate wired calls. And then there are homing ownership issues when providing WiFi network access to phones, the complications of Municipal Wireless. For example, if the operators allow convergent devices to be released, will municipalities co-opt services and access when these are deployed?

National regulatory issues could slow deployment of FMC. Around the world rules were developed to separate fixed and mobile operators as a way of fostering competition. Truly integrating these networks is not something regulators see as a good thing. And when some countries do see FMC as fostering competition, and others do not – the consumer suffers and may just throw up their hands and not buy FMC. The only break to this logjam may be to outlaw locking the FMC device to one operator.

Owners of wireless access points will become strong new players in the ecosystem. Today companies like Starbucks & McDonalds partner around the world with network providers to pass their customer's traffic into the internet. With FMC, the bandwidth requirements will increase but so does the value proposition. Companies like McDonalds are bigger than operators and may dictate the business arrangements.

At its root, we find FMC is the result of several conflicting trends:

- (1) The consumer's desire for simplicity while still getting many services.
- (2) The wired operator's desire to stem the erosion to mobile-only customers.
- (3) The limitations of device power efficiency vs. the service efficiency gained by choosing the highest bandwidth or cheapest network technology within reach of a device.
- (4) The desire of consumers to integrate and simplify their lives and have their priorities reflected in a personalization of their every consumer device.



(5) And of course, the old BSS stand by: one bill.

So, where are we headed?

We asked Alan Quayle [alanquayle.com] an early entrepreneur in service product invention for FMC. Alan tells us that FMC is off to a rocky start:

“Fixed mobile convergence has not had the greatest start with respect to market acceptance. BT Fusion has struggled with consumer adoption, and both Deutsche Telekom and Korea Telecom have closed down their T-One and OnePhone services respectively. Is this the beginning of the end, or the end of the beginning of FMC? A common theme to these services was a technology-led approach, where because a new technical enabler was possible a new service was launched on that enabler.”

Nevertheless, there are clear early successes as well:

“Looking beyond fixed mobile convergence for voice services, we are seeing success in content and bundled services. For example; H3G (UK) is the number two music download site in the UK with a music download service to both the PC and mobile handset, with innovative use of their customer knowledge for targeted marketing of the music download service. Bundling of voice and video services is making good business for the cable operators in the US, where the proposition is quite simply saving money.”

Alan concludes:

“The common themes we are witnessing for service success is the important of delivering substantial value to the customer through targeting, savings and / or convenience. Perhaps FMC should be viewed as just another technology enabler, and our focus should be on finding services with substantial customer value.”

Ultimately, big expensive solutions with centralized control of service, data, presence, and connectivity are going to be under extreme competitive pressure from simpler distributed technologies. The industry may be fighting this trend, but it is a battle that can only be won in the short term. The war may very well go to distributed Software-as-a-Service [SaaS] technology.

Lots of questions remain. For example: how will game systems evolving to home control and access points play into this? Will emerging service uses for phone, like authenticating purchases or displaying a virtual ticket drive FMC or just mobile conversion from land?

## Requirements for OSS & BSS

Since it is not yet clear yet how FMC will evolve, it is hard to pin down how it will be managed. Regardless, the FMC network and the advanced services which it enables will be very complex to manage. Detailed billing will be extremely complex to represent in a statement, and perhaps even more challenging will be billing between the service providers and the content providers – thousands of content vendors. Handling disputes about quality of services delivered and breaches of the underlying service level agreements with each content provider could add thousands of dollars to the cost per customer account. Then add in the requirements to offer and manage things like parental control; allocation of budget per service; and transfers of budget allocations between members of a family or group – in real time. We are just beginning to see where all of the short comings are in our current OSS/BSS capabilities.



“One of the major steps that operators owning separate fixed and mobile divisions have begun is to merge the two divisions at several layers: technology strategy, corporate strategy, back-office functions, customer care and billing, and sales and marketing. Integrated operators have an advantage in owning both fixed and mobile infrastructure, but also face an enormous challenge if those divisions have been managed separately with different financial targets and working methods.” [IDC, CG29M] So to, these divisions have completely different OSS/BSS infrastructures and Operations departments. They use very different process with wildly different service delivery time expectations. A new home owner cannot walk out of a store with a house phone and expect it to be operational on a network by the time they arrive home to plug it in... but this happens thousands of times a day with mobile operators.

It is quite possible that FMC and its use as a platform for Advanced Services may be too complex to manage via centralized systems. One clear necessity is the mobile phone resident management agent specified as an option in 3GPP release 7. The rapid and dynamic way in which devices will switch networks and services means that new methods will be needed to know what is the state of a device and what services are active. It certainly puts another nail in the coffin for network-based stovepipe management architectures.

Even NGOSS ESB technology may be insufficient for knitting together this, although the TMF’s Service Delivery Platform may become a key enabler. *But bottom line – OSS/BSS applications and the different operational processes associated with mobile, land voice, and internet data may be the single biggest obstacle to realizing and successfully marketing FMC!*

This all makes FMC a strong supporter of our notion that a new management paradigm is needed. Key to this new approach will be gird based network application infrastructures and distributed smart management agents. These will move through the network following and watching their assigned users and devices. These agents will form a virtualized model of the state and connectivity of the FMC devices. But more than just watch and mange, these agents are likely to evolve to become service gateways to SaaS and Web Services needed by the devices.

### The bottom line

Our ability to see the future is limited, but our past experience gives us some concerns that the idealistic view of FMC saving the operator is not a likely outcome. At principle fault is the failure of Service Providers to build a New Product Introduction (NPI) strategy which meets this vision of the future and will excite consumers into placing their \$ inside the industry. Then the OSS/BSS applications and processes have to be redesigned to support dynamically convergent devices and services. All FMC terminals are always in a state of dynamic discovery. “**Who’s your Daddy?**” becomes the first question any management application must ask of a device – or a service.

Instead of service providers leveraging network resident, centralized IMS and multi-modal network devices for access (that are still locked to a specific provider) to keep ownership and control of services and customers, we see a distributed infrastructure and a service marketplace. We see it playing out as so: The device market will be owned by consumer electronic giants selling directly to the consumer through mega electronic chains. The service market will be dominated by 3<sup>rd</sup> party providers utilizing web services and SaaS. Service Providers will become a quality QoS-enabled transport utility owning the home & business access network, but not the home terminal, nor the municipal/commercial terminals. That battle is between Microsoft, Sony and Google and a topic for another day. \*

To succeed, a technology must have, or lead to, something the consuming public wants. Today’s consumer is met with a very big product/desire gap: too many required devices, not enough services.



FMC in its broadest definitions actually excites us and we expect it will excite the general consumer as well.

The only clear outcome of Fixed-Mobile Convergence is the death of traditional OSS/BSS applications.

- *End* -

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\* But not everyone sees it this way, Phil Holmes believes the local service providers have on spectrum licenses will keep them in play for a long time.

The authors also considered a world of millions of femtocells, but believed the issues of regulation, spectrum interference, cost, and manageability doom this approach.