

Demystifying Enterprise Fixed Mobile Convergence

A white paper from
Siemens Enterprise Communications

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Executive Summary – Fixed Mobile Convergence

The adoption and use of the mobile device has grown exponentially since its invention little more than 20 years ago. It is expected that by the year 2010 almost 80% of the global adult population will own a mobile device. More significant than the huge growth in subscribers is the steady increase in mobile minutes of use (MOU's) often at the expense of traditional, lower-cost fixed telecommunications. The trend toward Fixed Mobile Substitution (FMS) is not driven by cost, but by convenience. Within the enterprise, as much as 40% to 80% of all mobile device usage occurs when the worker is stationary and inside their place of work or their home. This 'misuse' of mobile devices is more costly for everyone -- the user, the enterprise and even the mobile network operator.

To reduce the cost of FMS while supporting their user's pursuit of convenience, mobile network operators and enterprises are evaluating and deploying Fixed Mobile Convergence (FMC) solutions. The vision of FMC is simple;

- one device with
- one number,
- one address book and
- one voice mailbox,
- always using the lowest cost network for connectivity.

FMC uses dual-mode devices to take advantage of less expensive, high-speed connectivity within the office, the home or a public hotspot location, while enjoying mobility outside on existing mobile phone networks.

HiPath MobileConnect from Siemens delivers a complete enterprise FMC solution. Together with Siemens' award winning line of IP PBX's and VoWLAN optimized WLAN hardware and software, HiPath MobileConnect provides a number of features that increase an employees "reachability" and productivity within both inside and outside the office. In the longer term HiPath MobileConnect provides least-cost call routing to reduce telecom costs by as much as 40%. With the introduction of Siemens enterprise FMC appliance HiPath MobileConnect, the company is uniquely positioned as the only provider of a complete enterprise Fixed Mobile Convergence solution.

"Demand will rapidly grow as awareness of FMC's benefits reach enterprise decision-makers such as a reduction in and greater control of mobile costs, enhanced productivity and greater mobility."

Source: Nicholas McQuire, Yankee Senior Analyst - December 2005

1.0 Inside the Revolution

We are in the middle of a communication's revolution. Since its commercial introduction in the early 80's, the adoption and use of the mobile phone has grown exponentially. Market researcher iSuppli estimates that the number of mobile phone subscribers worldwide will rise to 2.6 billion by the end of 2006 and grow to over four billion by 2010, an incredible 80% of the world's adult population. But, the proof that we are inside a revolution is not only the number of subscribers. We are seeing changes in fundamental behavior surrounding telephone communications. For many years fixed-line communications using the home phone and/or the desk phone was the standard, but more often these days' mobile subscribers are choosing the convenience of their mobile phone even when a less expensive fixed line is available.

- The French telecom regulator Autorité de régulation des télécommunications (ART) reports that the average fixed minutes of use (MOU) in France declined almost 16% between 1998 and 2003.
- The average wireline residential toll minutes of use (MOUs) in the US have been dropping at a compounded rate of 15 percent since 2000, while wireless interstate MOUs per user grew at a compounded rate of nearly 40 percent during the same period.
- According to Forrester, the number of Europeans who have given up their fixed line ranges from 3% in countries like Sweden to 30% in Finland. An additional 42 percent of mobile phone users said they had a landline phone but used their mobile phones "most."

This trend, the replacement of fixed-line voice communications with mobile voice communications is termed Fixed-Mobile Substitution (FMS). It is important to emphasize that the impetus for FMS is not cost, as fixed line telephony tends to be almost universally cheaper than mobile telephony. What is driving this costly trend? Is this a subconscious response of the user attempting to find a simple solution to their increasingly fragmented communications environment?

Today's business worker has more options for communicating than ever before; paper mail, fax, voice (fixed & mobile), email, conferencing (voice & video), and instant messaging (IM). Unfortunately, the fragmentation of communications "channels" and messaging modes may actually degrade the workers responsiveness at the very time they are being asked to improve their "reachability" and their response time. This is the "Communications Paradox" -- more channels of communications can negatively impact an employee's ability to communicate. Employees are spending as much time managing their daily information flow, i.e. updating multiple contact lists, listening to multiple voicemail systems, and reading multiple email, IM and text messages, than they are actually responding to the core message. The fragmentation of communication modes and channels significantly impacts their effectiveness and the value of the communications network.

Interestingly, there are some emergent worker behavioral trends that oppose this communications paradox, and one of the most significant is FMS. Mobility is one of the key benefits of mobile telephony -- an employee can communicate effectively no matter where they are, or what they are doing. However, there is a growing trend toward mobile use when the worker is NOT mobile, or even outside of the office. Research companies have found that between 20-40% of mobile device usage is conducted within the walls of the enterprise and another 20-40% of mobile device usage is conducted from within the home. Even more startling, is that a significant portion of wireless calls within the enterprise are intra-company calls, often to or from another mobile device. This 'misuse' of mobile telephony poses an interesting question. Why does the average corporate mobile telephony customer accrue 40-80% of their charges in locations where a low-cost fixed telephony line is available? Is it possible that the convenience aspect of the mobile device is becoming more compelling than the mobility? The growth of FMS in the enterprise shows us that workers are willing to spend more money on telecom services to make their life easier.

1.1 Enterprise Mobile Telecom Costs are Increasing

In today's business world, mobility is on the increase -- more workers spend more time on the road and away from their desks. Forrester suggest that almost 41% of US workers can be considered mobile, i.e. spend more than 20% of their time away from their primary workspace. But no matter where a worker is and what time of day, they need the tools to be able to do their job. Portable devices using public mobile networks and WLAN connections are proving to be a popular answer, albeit an expensive one. The large increase in the number of mobile employees and increased MOU's continues to drive the cost of mobile service upwards despite a steady decrease in the average cost-per-minute for mobile telephony services. In Q2 2006, the research company Telephia in San Francisco estimated that the average cell phone bill for business users had reached \$80 per month and that the highest-spending mobile workers average more than \$450 per month on wireless services. Thus, it should be no surprise that companies are spending an increasing percentage of their annual IT budget on mobile telephony services. Yankee Group singles out enterprise voice communications as the largest IT application, accounting for 10-25% of the annual IT budget. The mobile component of the voice communications budget can be as high as 30-40%, and is rising every year. More mobile workers and more MOU's mean more money being spent on wireless services, but there is more at stake than just telecom costs; administration cost, security risk and productivity impacts all contribute to the Total Cost of Mobility (TCM).

1.2 The Total Cost of Mobility (TCM)

For the enterprise IT department, the rising cost of mobile telephony service is just the tip of the iceberg. Mobile workers are depending on new mobile technologies and more capable mobile devices to perform their job anywhere and at anytime. However, there is rarely any forethought around device usage or any adjusting of usage patterns in an effort to reduce costs. The complexity and dynamic nature of mobile telephony billing and LD plans makes it difficult for company's to create policies to reduce their mobility spending. Most companies do not have the staff, resources, expertise or necessary reporting capabilities to consistently track, monitor and analyze employee mobile device usage. In many cases, managing costs is limited to tracking the largest spenders within a company or simply identifying the employees with the most significant usage pattern shifts from month to month. There is yet another hidden cost to increased enterprise mobility. There is a burden on the company to manage the growing number of mobile devices. These new devices and services must be managed as corporate assets with efficient processes in place for selection, approval, ordering, configuration, updates, and distribution. By not managing mobile device usage and creating mobility policies, many enterprises are paying far more for enterprise mobility than they should be.

In addition to the management costs of mobility there is also a risk associated with the transmission of information from a mobile device. A mobile worker will carry a laptop, a Smartphone or a PDA capable of transmitting sensitive company information and unencrypted email from almost anywhere. Secure transmission of information is vital to a corporation for competitive advantage, and also to comply with federal regulatory policies. For example large corporations, financial institutions and healthcare providers in the US must comply with Sarbanes Oxley or HIPAA. Lapses in security could result in leaked customer or patient information and bring severe federal fines as well as damage to the firms' reputations. The inappropriate use of mobile devices could spell a financial public relations catastrophe for these customer/patient sensitive firms. Security risks must also be managed by establishing effective procurement, inventory control and access procedures.

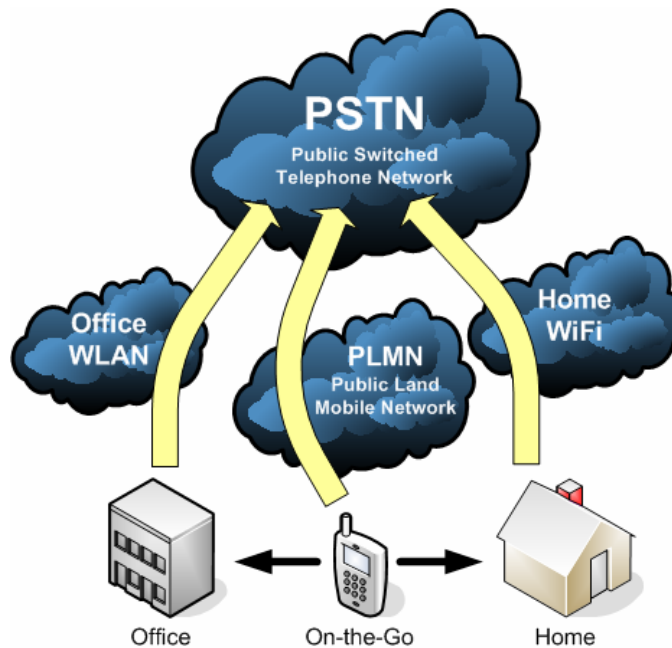
"Mobile devices will become the No. 1 management struggle for more than 75 percent of enterprises through 2006."

Source: Gartner 2004, Control Cost and Boost ROI for Wireless Networks

2.0 Demystifying Fixed Mobile Convergence

These days Fixed Mobile Convergence (FMC) gets a lot of attention, but there seems to be a lot of confusion about what FMC means. The vision of FMC is for people to use one device with one number, one address book and one voicemail system, taking advantage of less expensive, high-speed connectivity in their office setting, fixed-line home environment or public hotspot location, while enjoying wide-ranging mobility on existing Public Mobile Networks. FMC should provide the subscriber a consistent user experience regardless of location and time-of-day with no interruption of service when roaming between fixed-line and mobile networks. The goal of FMC is to break the paradox that arises from the fragmentation of communications channels and to make multiple channels (networks) appear and behave as a single channel thus restoring the core value of communications; improved productivity and 'reachability.'

The vision of FMC is for people to use one device with one number at home, in the office and on-the-go.



The potential to complement existing mobile services with innovative VOIP capabilities and low-cost WLAN access is appealing to both enterprises and mobile network operators. Thus there should be no surprise that there are FMC solutions available for both spaces. The FMC solutions target different primary target markets; consumers for the operator-centric solutions and corporate worker's for the enterprise-centric solutions. Both categories of FMC solution depend on the availability of new "Dual-Mode" handsets. Some of these additional requirements for enterprise centric FMC, such as a SIP-compatible PBX's and a VoWLAN ready enterprise-wide WLAN, may already be in place within the enterprise. For each solution, there is a new infrastructure component required located either within the core network of the wireless operator, or within the enterprise. For more information on VoWLAN ready enterprise-wide WLAN, refer to Siemens Enterprise Communications whitepaper entitled [Building Solid Foundations: Open Mobility in the Enterprise.](#)

2.1 VOIP and VoWLAN

Voice over Internet Protocol (VOIP) is a technology that enables routing of voice conversations over the Internet or any other IP network. The voice data flows over an IP-based, packet-switched network like a corporate LAN or WLAN, instead of the traditional dedicated, circuit-switched voice transmission of the PSTN. The primary motivations for adopting VOIP within an enterprise are cost, convenience and the simplicity of integrating new applications. VOIP leverages a single infrastructure, which saves management cost and operational costs in the long run. Other drivers include scalability and the desire to consolidate voice and data networks, as one high speed internet connection can serve for multiple voice lines and data pipes. Implementing and managing multiple wide area networks is expensive, and complexity only increases as the number of networks and sites grows. Large organizations especially are interested in future-proofed network convergence, and SIP-compatible VOIP systems are the way to get there.

Voice over WLAN (VoWLAN) is a wireless extension for VOIP over LAN. With today's standards, VoWLAN can be easily supported with advanced QoS and CAC services as provided by 802.11e. In addition, for most enterprises with WLAN deployments, there is bandwidth to spare which allows the overlay of voice traffic on the data WLAN to make use of a common infrastructure. The support of a common system for both data and voice traffic is generally simpler and significantly less expensive than two separate entities. Historically wireless telephony has been deployed in industries with highly mobile workers such as retail, manufacturing and healthcare — enterprises that need "un-tethered" voice communications for their employees as they roam around the facility. But more enterprises require mobility for connectivity from meeting rooms, cafeteria and even break rooms.

VOIP and SIP are the clear winners in today's enterprise telephony market. According to Infonetics Research's new Enterprise Telephony report, worldwide PBX systems revenue totaled \$8.1 billion in 2005, a 12% increase over 2004. IP-based PBXs accounted for 77% of the 2005 PBX revenue and will continue to increase through 2009 at the expense of TDM PBX's.

"Voice makes wireless LANs more desirable and mobility makes VoIP more valuable; it is natural that they are converging into a powerful enterprise mobile voice solution. Healthy VoWLAN growth is projected through 2009, when WiFi phone revenue will hit almost \$1.9 billion."

Source: Infonetics Research, Jan 2006.

2.2 SIP-based IP PBX's in the Enterprise

An IP PBX is a private branch exchange (telephone switching system within an enterprise) that switches calls between VOIP users on intra-company lines, while allowing all enterprise users to share a certain number of external phone lines. One of the main advantages of an IP PBX is that it uses converged data and voice networks. This means that Internet & Intranet access, as well as VOIP communications and traditional telephone communications, are all possible using a single wireless or wireline connection to each user. With a conventional PBX, separate networks are necessary for voice and data communications. The typical IP PBX can also switch calls between a VOIP user and a traditional telephone user, or between two traditional telephone users in the same way that a conventional PBX does. This makes it easy for companies to migrate from traditional PBX's to IP-based ones.

The key to making the new dual-mode devices work with IP PBX's is an important new signaling protocol called Session Initiation Protocol (SIP). SIP (see sidebar – What is SIP?) is extremely flexible and can be adapted to a number of innovative solutions including many different types of multimedia applications for new business process applications. It is extremely popular with the telecommunications industry and because it is a standard, it integrates well within the data center and IT environments. From client devices, to corporate appliance and operator infrastructure, SIP is the preferred language of communications and is a prerequisite to allow dual mode phones in the enterprise.

2.3 Mobile Devices and Clients

Dual-mode mobile phones are a recent development. A dual-mode phone is a mobile phone that includes a standard cellular radio (GSM, CDMA, W-CDMA) and an IEEE 802.11 (WiFi) radio for voice and data communication. In fixed locations — offices and campuses, hot spots and homes — the device will connect using a low-cost VoWLAN call. When the signal fades the call will automatically be transferred to the wider area mobile network. This method of operation can reduce cost (for both the network operator and the subscriber), improve indoor coverage and increase data access speeds. The flexibility and cost reduction potential of dual mode devices are important to both the consumer and enterprise mobile device markets. By 2011, shipments of dual-mode (cellular/voice over Wi-Fi) wireless handsets will be well in excess of 300 million worldwide, according to a new study from ABI Research.

"FMC will drive the adoption of next-generation handsets, primarily dual-mode Wi-Fi/cellular handsets, which will enable users to seamlessly handover from a cellular mobile network to a Wi-Fi one and vice versa, so as to provide optimum quality of service,"

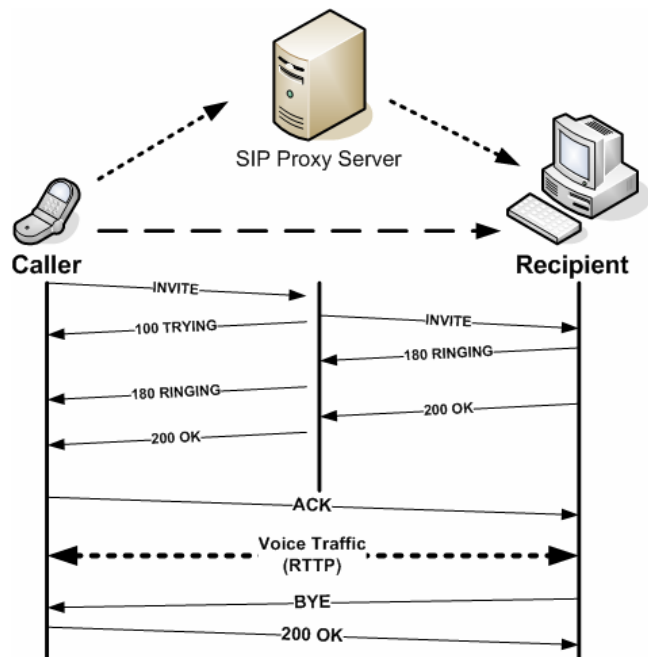
Source: Frost & Sullivan - November 2006

What is SIP?

SIP is the IETF signaling protocol (RFC 3261) used for presence, messaging, VoIP, audio/video conferencing and events notification that is becoming for IP-based communications what HTTP is for the Web. In telephony, network engineers have always made a clear distinction between two different phases of a voice call. The first phase is "call setup," and includes all of the details needed to get two telephones talking. Once the call has been setup, the phones enter a "data transfer" phase of the call using an entirely different family of protocols to actually move the voice packets between the two phones. In the new world of IP telephony and VOIP, SIP is the "call setup" protocol. It manages call setup, routing, authentication and other feature messages between endpoints within an IP domain. Once the call is established, transport protocols such as RTP (the Real-time Transport Protocol) actually send the voice data between phones.

SIP Clients can setup and execute a real-time data transfer between each other, but it is more likely that SIP Proxy servers are mediating the connection between the two client devices. Similar to the way SMTP servers work with Email, SIP Proxy servers are

just network servers that forward SIP requests to other Proxy servers and to end-user SIP clients. They manage sets of SIP users and can act as a registrar to provide presence information. End-user management means that SIP Proxy's within a distributed enterprise can work together to provide a HLR/VLR-like service to facilitate a SIP connection to a client device within any physical location of the extended enterprise. The SIP Proxy server also provides call logging, security features and billing records. Because of its power and simplicity, SIP has quickly become the primary standard of Internet telephony and continues to speed the adoption of VoIP in the enterprise. New versions of SIP are already making their way onto the scene, promising to add business-class features such as caller ID, missed call support, and other useful features.



2.4 Operator-centric FMC – Unlicensed Mobile Access

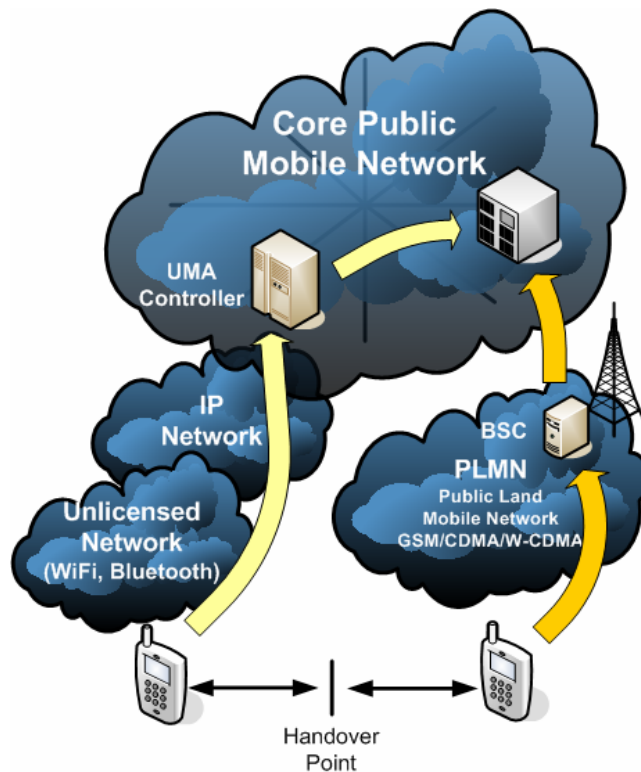
Network operators are intensely aware of the growing trend toward Fixed-mobile Substitution (FMS). In early 2004, a number of network operators and some equipment manufacturers started work on an open specification for extending mobile voice and data GSM/GPRS services over unlicensed spectrum technologies (including both Bluetooth and WiFi). The finished specification, Unlicensed Mobile Access (UMA) was forwarded to the 3GPP for further ratification in late 2004, and then released in mid-2005 as the Generic Access Network (GAN) protocol. However, most people still refer to this solution as UMA.

Since Network Operator’s had a hand in its creation, it makes sense that UMA is an operator-centric approach to FMC. The new infrastructure components and much of the cost benefit and control reside within the mobile network operator. By deploying UMA technology, service providers can enable subscribers to roam and handover between cellular networks and public and private unlicensed wireless networks using dual-mode mobile handsets. With UMA, subscribers receive a consistent user experience for their mobile voice and data services as they transition between networks. Although UMA has some value for the SME, it is not really a viable solution for the enterprise. UMA does not provide a true integration between the enterprise and mobile voice networks. Workers must still manage multiple numbers and voicemail boxes, and many advanced calling features are not available.

“Operators are seeing their core voice revenues come under pressure from VoIP, and they need to minimize call substitution. One way is to provide services over the broadband fixed network using a mobile device. Both dual use and single use devices will be able to do that over Wi-Fi and micro cellular access points in the home and office.”

Source: ABI Research analyst Ian Cox - November 2006

Unlicensed Mobile Access (UMA) gives mobile network operators a quick consumer focused FMC solution.



2.5 Enterprise-centric FMC

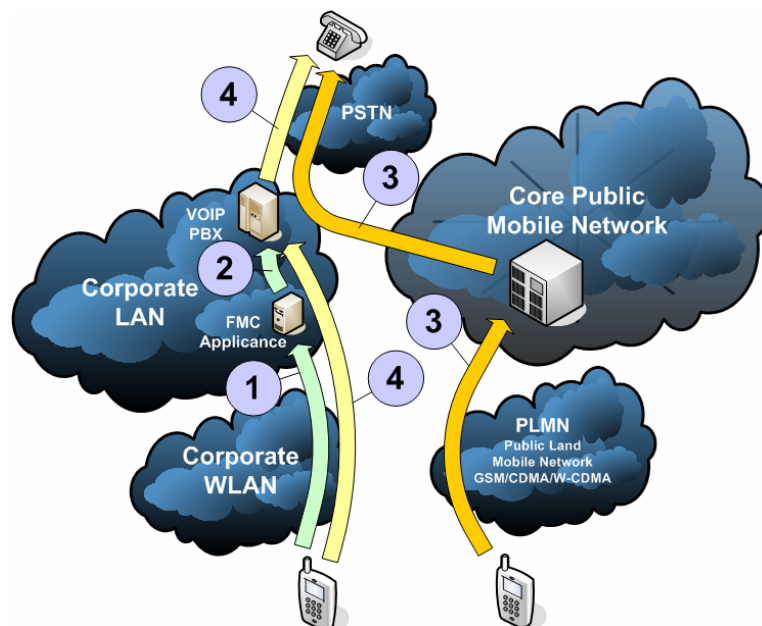
Enterprises are also very interested in FMC. In 2005, Forrester released their Business Technographics report that showed almost 60% of US enterprises are evaluating dual-mode technology to bridge WAN cellular and in-building VoWLAN coverage. For most enterprises, the operator-centric UMA solution is not good enough -- they want more control and a tighter integration between the corporate PBX voice system, and the operator's mobile telephony system. They want a solution that sits within their premise and helps to coordinate the voice traffic between the existing wireline corporate telephone system, the cellular wireless network, and the new facility for VoWLAN using the WiFi radios for dual-mode phones. This solution must work to reduce telecom costs for all inbound and outbound calls, and it must tightly integrate with the existing telephony system to provide an integrated voice mailbox and advanced calling features.

How eFMC Works

An application server called the FMC Appliance is located within the enterprise's IP network. It gives mobile employees key PBX benefits such as a unified voice mailbox, directory and a single number service. The FMC Appliance is a communication proxy that allows dual-mode devices to send and receive voice calls within the enterprise. The dual mode device works hand-in-hand with the FMC appliance to select the best available network. Calls are automatically transferred between networks to maintain a high level of service while optimizing costs.

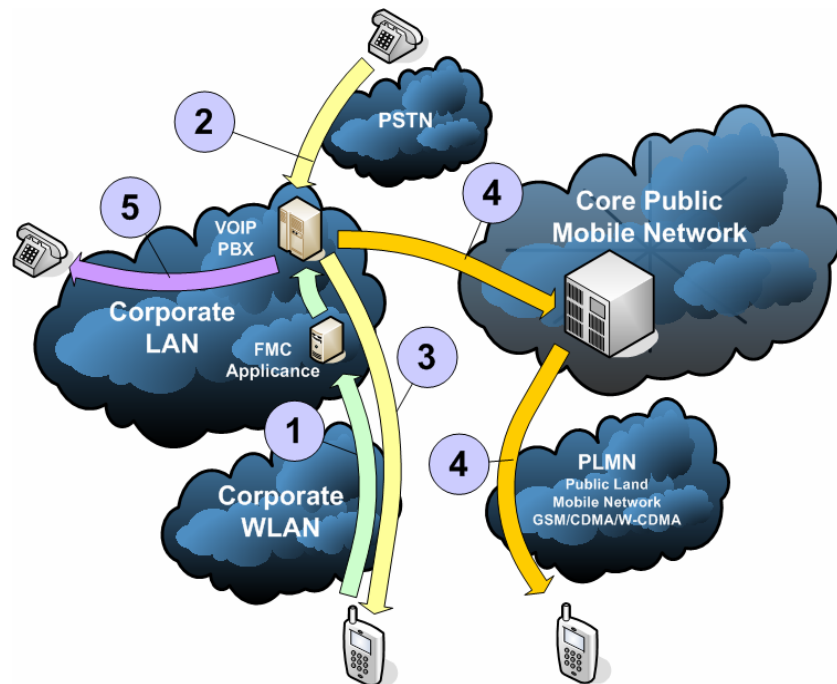
Outbound Calling	
1	When an enterprise dual-mode device connects to the enterprise WLAN, it registers with the FMC Appliance using SIP which requires an authentication to ensure that only permitted dual mode devices are allowed to connect to use the service.
2	Once the client device passes authentication, it registers with the FMC appliance, which in turn register with the SIP PBX (or SIP gateway) that this user is available. The FMC Appliance stores the IP address of the client device to establish connections in the future.
3	If the user is outside the office, outbound calls to PSTN or any other mobile network recipient will be established via the standard wide-area cellular network. When using the single number feature, DTMF is used to identify the user with the one phone number (PBX number).
4	When the worker is inside the enterprise, the connection request from the dual-mode client device is passed outward to the FMC Appliance, and then VOIP PBX which uses a Media Gateway to forward the call to the PSTN.

Based on the caller location, outbound calls can use the low-cost enterprise voice network or the public mobile network.



Inbound Calling	
1	When an enterprise dual-mode device connects to the enterprise WLAN, it registers with the FMC Appliance which requires an authentication to ensure that only permitted dual mode devices are allowed to connect to the appliance. Once the client device passes authentication, it registers with the FMC appliance, which in turn tells the SIP PBX or SIP Gateway that this user is available. The FMC Appliance stores the IP address of the client device to establish connections in the future.
2	All incoming calls to a user are received at the IP PBX which knows the status of the intended recipient. For example, the PBX knows when a user's device is in-use, "Busy," and so that another incoming call will be forwarded to the user's voicemail.
3	Inbound calls for dual mode devices that are "registered" with the SIP PBX and forwarded to the client device at the known IP address. When the dual-mode device is registered on the WLAN, and it is not Busy, then the PBX makes a SIP connection to the device to establish a call.
4	Inbound calls to devices that are NOT registered on the WLAN are forwarded to the wireless network to make a connection to the mobile device that is out on wide area wireless network. If the device is not available, i.e. off-network or Busy, then the call goes back to the PBX and forwarded to the subscribers voice mailbox.
5	The SIP PBX has the ability to "parallel-ring" in response to an inbound call. Both the registered dual mode device and the standard office desk phone can ring simultaneously.

Inbound calls can go to the mobile device, the desk phone or both places at the same time.



Roaming and Handovers

One of the key benefits of the enterprise FMC solution is the ability to Roam-in to the enterprise WLAN and to Roam-out onto the wide area cellular network.

Roaming is a feature of the FMC appliance working in concert with the software on the dual-mode device. The Roaming and Handover mechanism on dual mode devices is quite straightforward. When the user makes a manual handover request the FMC appliance, the IP PBX and/or the Switch on the mobile network work together to establish a second call to the mobile device. Once the second call is setup, the call control is handed over and the original call is torn down. All of this occurs in milliseconds and the mobile device user is usually unaware of the handover.

Home WLAN and Public Hotspots

Another advantage of the enterprise FMC solution is the ability to extend low-cost coverage to Public IP hotspots and to Home WLAN's. WiFi at hotspots and at home are rapidly growing in popularity. Gartner Inc. of Stamford, Connecticut estimates that the number of public hotspots is likely to grow from just over 1,200 in 2001 to more than 160,000 sites worldwide by 2007. Meanwhile, in the home, In-Stat (<http://www.in-stat.com>) reports that the SOHO/consumer AP [Access Point] market will almost double from approximately 17.6 million units in 2004 to roughly 32.6 million units in 2009. Both of Home WLANs and Public Hotspots provide a usable on-ramp for a dual-mode device to connect back to the enterprise and initiate and low-cost fixed line call out onto the PSTN from the corporate IP PBX. This can be a tremendous cost saving since anywhere from 20-40% of all mobile device calls are made/received from within the user's home.

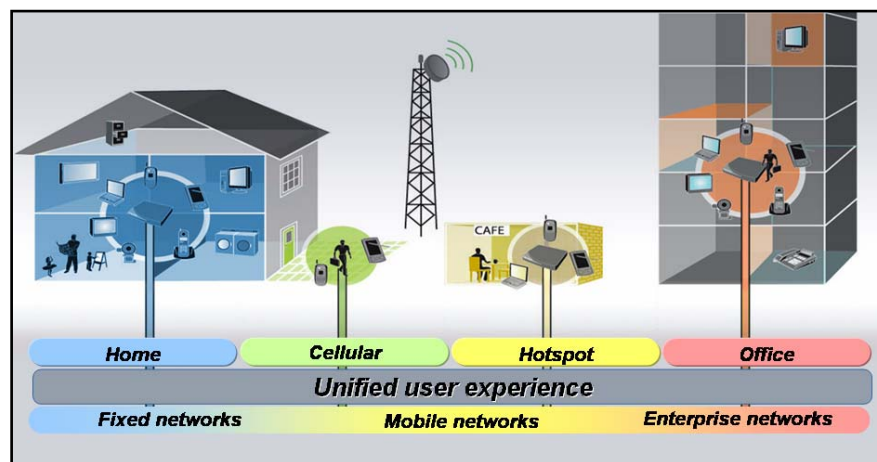
3.0 Enterprise FMC from Siemens

All enterprise FMC solutions are not the same. Many are standalone and not integrated with the enterprise PBX. These 'partial' FMC solutions do not have the full range of features needed to deliver on the promised savings and improved productivity. Siemens is the industry leader in providing innovative solutions for unified communications. In Europe, the company recently received the Frost & Sullivan "Market Leadership Award 2006" in the category of Enterprise Telephony. Siemens is uniquely positioned to provide the complete FMC solution for the enterprise -- from award-winning IP PBX's and softswitches, best-of-class WLAN hardware and management software, to a new, innovative line of FMC appliances for enterprises of all sizes. Fixed-Mobile Convergence is a natural evolution to Siemens award-winning LifeWorks strategy.

3.1 The OpenPath to LifeWorks

LifeWorks is Siemens' view of an innovative communications future. In this future, enterprise communications are no longer a utility, they're an enterprise enabler. The core of the LifeWorks vision is the integration of home, business and carrier networks as well as wired and wireless networks. By integrating communications among home offices, small offices, branch offices, regional offices, and headquarters, including Centrex-type solutions, the Siemens' solution creates a unified domain across both carrier and enterprise market segments and lifts the artificial boundaries imposed by today's technologies. The result is an integrated user experience regardless of location or device.

The user experience on the path to LifeWorks is unified and consistent; any device, any network, any application in any place.



LifeWorks is the vision and "Open Communications" is the strategy that will realize this vision. In this future, enterprise communications are no longer a utility, they're an enterprise enabler and Siemens' portfolio-wide commitment to Open Communications will break down the boundaries between fixed, mobile and enterprise networks and permit a unified user experience irrespective of location, network type or device. Siemens' OpenPath is a deployment roadmap that allows the enterprise to migrate at their own pace from a legacy TDM telecom infrastructure to a full range SIP-compliant PBX's and VoWLAN support as they target the ultimate goal of enterprise FMC. Siemens has created a broad portfolio of innovative HW & SW products that come together to form the enterprise-wide Foundation for Mobility.

The Siemens HiPath portfolio provides a solid 'Foundation' for the integration of multiple voice and multimedia solutions on a single wireless network and delivers the converged voice and data features, quality and reliability needed to un-tether workers from their desktops and launch them on the path true enterprise mobility. HiPath Wireless' hardware products are architected for scalability -- they enable the seamless integration of multiple mobile solutions, Open Mobility Solutions, on a single infrastructure.

Open Mobility Solutions are the suite of network aware mobile business applications created by Siemens, third parties or by your own development teams. The Siemens HiPath Ready Partner Program gives third-party partners – such as developers, systems integrators, and VARs – access to the globally recognized HiPath Ready certification program for integrating the world's leading 3rd party and custom mobile business solutions. The Partner Program provides Open Mobility solutions that are tightly integrated with mobile business processes, and customers can be assured that these solutions will have passed rigorous HiPath Ready certification requirements. Siemens HiPath partners provide best-in-class solutions for VoWLAN, location services, site planning, network management, and guest services.

3.2 A Solid Foundation for Enterprise FMC

The HiPath 3000, 4000 and 8000 from Siemens are a family of cost-effective IP convergence platforms for small to large enterprises. HiPath Real-time IP systems are optimized to support voice, data and video across any wired or wireless IP network, from any device. Siemens has a range of flexible IP and convergence platforms for very small business networks, as well as huge global networks with 100,000 or more users.

The HiPath 3000 is the cost-effective IP convergence platform for small and medium-sized enterprises. It can be used in stand-alone as well as in IP networked configurations to combine the benefits of VOIP with the availability of circuit-switched systems. The HiPath 3000 communication platform is architected to connect standards-based IP workpoint clients, e.g. SIP and H.323 based devices or applications. The HiPath 3000 platform can mix and match workpoints of all kinds (IP, TDM, analog and wireless) with full feature transparency, leveraging prior investments and saving money. In network configurations, the HiPath 3000 platform supports up to 1,000 workpoints across IP infrastructure.

The HiPath 4000 is a powerful IP convergence platform for corporate enterprises that is optimized for medium to very large-scale configurations. It operates in packet-switched, circuit switched or mixed system environments, without compromising full feature richness, reliability and security of traditional communication systems. HiPath 4000 delivers practical convergence, supporting the migration from circuit-switched to IP while retaining the value of in-place investments.

The HiPath 8000 is a unique, carrier-grade, native SIP softswitch, designed for data-center deployment. It provides open interfaces, particularly SIP and SIP.Q for signaling and SOA / Web Services for integration to make it easy to add new applications. This provides great flexibility for customers to build the network configuration that best supports their business, and to integration communications functions directly into their business processes. These qualities also make it particularly attractive to Managed Service Providers (MSPs) to enable them to offer hosted communications services to multiple businesses.

HiPath Real-time IP Systems also deliver a number of FMC features that help extend mobile users' enterprise telephony presence out to the mobile network. Simultaneous ringing makes it possible for users' desk phones and cellular phones to be dialed at the same time, ensuring that calls won't be missed. This capability also provides limited "one-number" functionality, as callers only need to dial the users' corporate extension in order to reach them on the local or mobile networks. Finally, integration with HiPath Xpressions ensures that users have a single unified voice mailbox.

"HiPath 8000 is an example of SIP at its finest. It supports everything we tried that uses SIP, and its flexibility demonstrates what can be done when a company tries to follow the standard."

Source: - Wayne Rash – InfoWorld

3.3 WLAN Optimized for VoWLAN

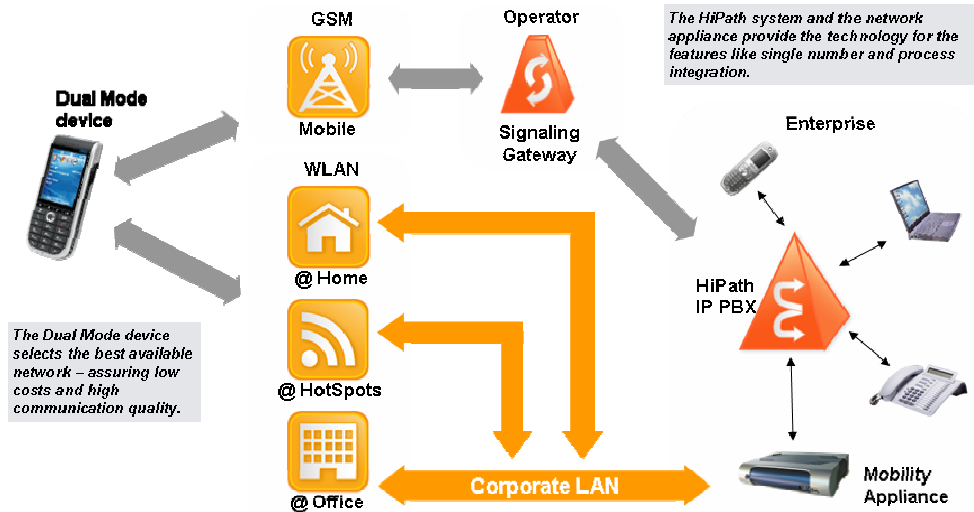
The HiPath Wireless product family is a third general WLAN solution that includes centralized WLAN controllers, access points and management software. The HiPath Wireless Access Point is an enterprise-class dual band (802.11a/b/g) access point that provides radio frequency coverage anywhere that wireless service is required. Together with the SCALENCE W line of “ruggedized” indoor/outdoor access points, complete fence-to-fence enterprise WLAN coverage is easily achievable. APs terminate RF traffic and handle dynamic functions including QoS, encryption, and traffic segmentation. HiPath Wireless networks are extremely scalable; they can support thousands of AP’s and tens of thousands of client devices. High-availability features in the controllers and dynamic RF compensation in the AP’s create a robust, fault tolerant WLAN infrastructure that is required for mission critical enterprise solutions.

VoWLAN optimization is an integral feature of the HiPath Wireless product family. HiPath Wireless supports high-performance voice-over-WLAN (VoWLAN) with standards-based features such as;

- Fast secure L3 roaming.
- TSPEC support for guaranteed QoS.
- Call Admission Control (CAC) for AP congestion management
- Non-intrusive security for VoWLAN implementations
- Self-configuring and self-healing RF coverage with DRM
- High availability
- High QoS for both APs and controllers

3.4 HiPath MobileConnect for Enterprises

While some customers may be satisfied with the limited cellular extension capabilities offered natively on HiPath Real-time IP Systems, many may wish for a more comprehensive enterprise FMC solution. The HiPath MobileConnect solution is an enterprise-grade FMC system that allows enterprises to seamlessly expand PBX functionalities to a SIP-based dual mode mobile device. The HiPath MobileConnect appliance resides within the corporate LAN and connects to the IP PBX. MobileConnect is entirely standard based (SIP) which enables a simple and future-proof integration with telecom equipment. It also guarantees that the system will be compatible with the many new dual mode devices that are being released. The solution supports up to 1500 typical dual mode users and up to 500 simultaneous voice sessions with transcoding and inline DTMF detection.



Some of the key features available from the Siemens MobileConnect solution include:

- Internal Dialing** Dual mode device users can use 4-digit extension dialing using the corporate IP PBX from wherever they are making the call; inside or outside the enterprise. Workers only need to manage one telephone number for their co-workers.
- Session Access Control** Network Address Translation for Dual Mode Devices registered on the WLAN. The Siemens MobileConnect appliance includes a SIP Registrar capability that applies Presence. When a dual mode device is connected to the FMC appliance, the IP address is NAT'ed and made available to IP PBX for future call setup.
- Roaming In & Out** Mid-call handovers of calls between WLAN and Mobile Network (Roam-in & Roam-out). The Siemens MobileConnect Solution provides a SIP client application for MS Windows Mobile and Symbian devices. This client allows device to make SIP connections and to Roam-in and Roam-out.
- Single Device, Single Number** Single number feature means that calls made from the mobile device appear to be coming from the office number even if the mobile network is being used.
- PBX Calling Features** Support for advanced calling features on the IP PBX including; Caller ID, Call Transfer, Call Hold, Parallel Ringing, and Conferencing.

3.5 Siemens Open Services

Siemens offer a broad portfolio of solutions and services to enhance the reliability, availability and security of wireless networks and applications – from professional consulting and system integration through to managed services for operations.

- Professional Services are important in today's communications arena. It is difficult to implement any kind of new technology these days without experienced and expert help. Siemens has expertise in many industries, technologies, platforms, and software.
- Managed Services are growing in popularity. They help you manage day-to-day operations and IT initiatives. Siemens can help with mundane tasks like asset management, user help desk support, password resets and general network management.
- Hosted Solutions have always been an attractive solution for SME's but recently they have become more popular in the large enterprise market. Siemens can host and manage everything from basic voice telecom services to WLAN/VoWLAN and FMC solutions.

4.0 The Benefits of HiPath MobileConnect

The long-term goal of an enterprise FMC solution is to provide workers with a single dual-mode device, and a single inbound number that works for voice and data in the office, at home and while mobile on the public wireless network. With an FMC solution in place communications becomes much simpler for workers inside the enterprise, and for those trying to reach them. Users can start to discard some of their specialized devices and instead use a single device for all of their communications needs no matter where they are, or what they are doing. The facilitation of communications as a result of enterprise employees being equipped with one device, one number, one Voice mailbox can result in significant increases in productivity. Workers no longer have to carry around multiple specialized devices, nor do they have to manage multiple contact lists or deal with multiple voicemail boxes. Instead everything is on or accessible from a single device using a consistent user interface. Outside the company, the people that deal with your workers now have a single phone number to reach the employee thus increasing responsiveness and improving customer satisfaction.

For most companies a clear motivation for deploying FMC is cost savings. An enterprise-wide FMC solution can be expected to reduce the cost of mobile phone service by as much as 40%. The primary cost reduction is from eliminating the mobile-to-mobile calls within the wall of the enterprise. Also, remote workers that use the corporate PBX to access the PSTN can take advantage of their company's low-cost Long Distance (LD) plans instead of paying for more expensive LD minutes on the mobile network. Hard ROI in the form of reduced telecom costs and reduced LD is definitely possible as a result of an enterprise-wide FMC deployment. However, real costs savings are likely a long-term benefit to the enterprise once FMC is widely deployed and used. In the short-term, the enterprise will benefit from improved worker productivity and reachability.

In addition to short-term productivity increases and long-term costs savings, HiPath MobileConnect solution provides additional benefits such as;

- Extending valuable corporate PBX telephony features such as call forwarding, messaging, and conferencing, and onto dual mode devices.
- Provide valuable network redundancy between the VOWLAN network and the Public Mobile Network. Users can enjoy uninterrupted voice coverage in the office, the stairwell and storeroom.
- High Availability backup to the Enterprise PBX.

5.0 Conclusion

We are in the middle of a communication's revolution. The pace of change in global telecommunications is staggering. It's hard to believe that an invention less than 20 years old could reach close to 80% penetration of the world's adult population within a few years. But more interesting than the popularity of the mobile device, is the change in how people are using them. Mobile device usage, as measure by monthly Minutes of Use (MOU's) is growing all over the world and often at the expense of fixed line usage even though wireless services are more expensive to use. This trend toward Fixed-Mobile Substitution (FMS) is clearly not driven by cost, but by convenience.

While FMS can be called "interesting" in the consumer space, most telecom managers are likely to label it as "disturbing" when it happens within the enterprise. Voice communications, specifically mobile voice, are demanding a larger share of annual IT Budgets. Workers within the walls of the enterprise calling co-workers mobile-to-mobile instead of using the corporate telephone system are a large factor in this expense growth. IT and Telecom managers are looking for a solution, and Fixed-Mobile Convergence (FMC) is the answer -- one device with one number, one address book and one voicemail system, taking advantage of less expensive, high-speed connectivity within the office, the home or a public hotspot location, while enjoying mobility outside on existing mobile phone networks.

Siemens is the only global company with a complete enterprise FMC solution. At the core is a lineup of award winning HiPath SIP compliant PBX's suitable for enterprises of any size. On top of this infrastructure goes the HiPath Wireless WLAN solution which includes innovative VoWLAN optimization. The final piece of the puzzle is the new HiPath MobileConnect enterprise FMC appliance. Together these systems create an enterprise wide FMC solution able increase employee productivity and improve customer satisfaction in the short-term and save IT/Telecom managers up to 40% of their annual mobile telecom bills out into the future. More information about Siemens strategy of Open Communications is available at <http://www.siemens.com/open>.

Siemens Enterprise Communications is a thought leader and innovator in the enterprise communications industry. We're one of the leading players in the market with full coverage of all the relevant markets from a strong European base with global reach. Our people have the passion, commitment, skills and know-how to deliver a broad range of cutting-edge technologies, outstanding products and professional services. All with the support of an enterprise that has the financial strength to outperform the rest in this competitive, consolidating market.

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