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UMA vs. VCC

Why Operators Worldwide are Selecting
UMA over VCC for Deployment of
Dual-Mode Handset Services.

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Kineto Wireless, Inc.

1601 McCarthy Blvd.

Milpitas, CA 95035

Tel: +1 408 546 0660

➔ Introduction

Fixed-Mobile Convergence (FMC) has become a high-priority initiative for mobile and integrated (mobile and fixed) operators worldwide. While FMC is a broad concept with the potential to enable many new compelling services, deployment of dual-mode handsets (DMH) has been identified by many operators as their first major FMC effort. The basic premise of a DMH service is to enable subscribers using new mobile/Wi-Fi handsets to automatically transition between outdoor mobile networks and Wi-Fi networks within homes, offices and public hot spots.

While there are numerous approaches for implementing a DMH service, they generally fall into two categories: mobile-centric, access-based solutions and fixed-centric, core-based solutions (Figure 1).

The mobile-centric, access-based approach to DMH services assumes mobile handsets always receive their services from a single, evolving mobile core network, including all current (and planned) circuit, packet and IMS-based services. This approach assumes subscribers always access one consistent set of services as they transition between various access networks. This approach is represented by the 3GPP Unlicensed Mobile Access (UMA) standard.

The fixed-centric, core-based approach to DMH services assumes mobile handsets receive their voice service from different core networks, depending on the access network to which the handset is currently connected. When the DMH is in the Wi-Fi/IP domain, service is delivered from the fixed core service platforms, and when the DMH is connected to the mobile (GSM/UMTS) network, services are delivered from the mobile core service platforms. Solutions following this approach typically include an interworking function that seeks to mask feature differences between the two service domains (e.g. behavior of supplementary services) as well as enable the transfer of an active call between the two core domains as subscribers come in or out of Wi-Fi coverage. This approach to DMH services is best represented by the 3GPP Voice Call Continuity (VCC) standardization initiative.

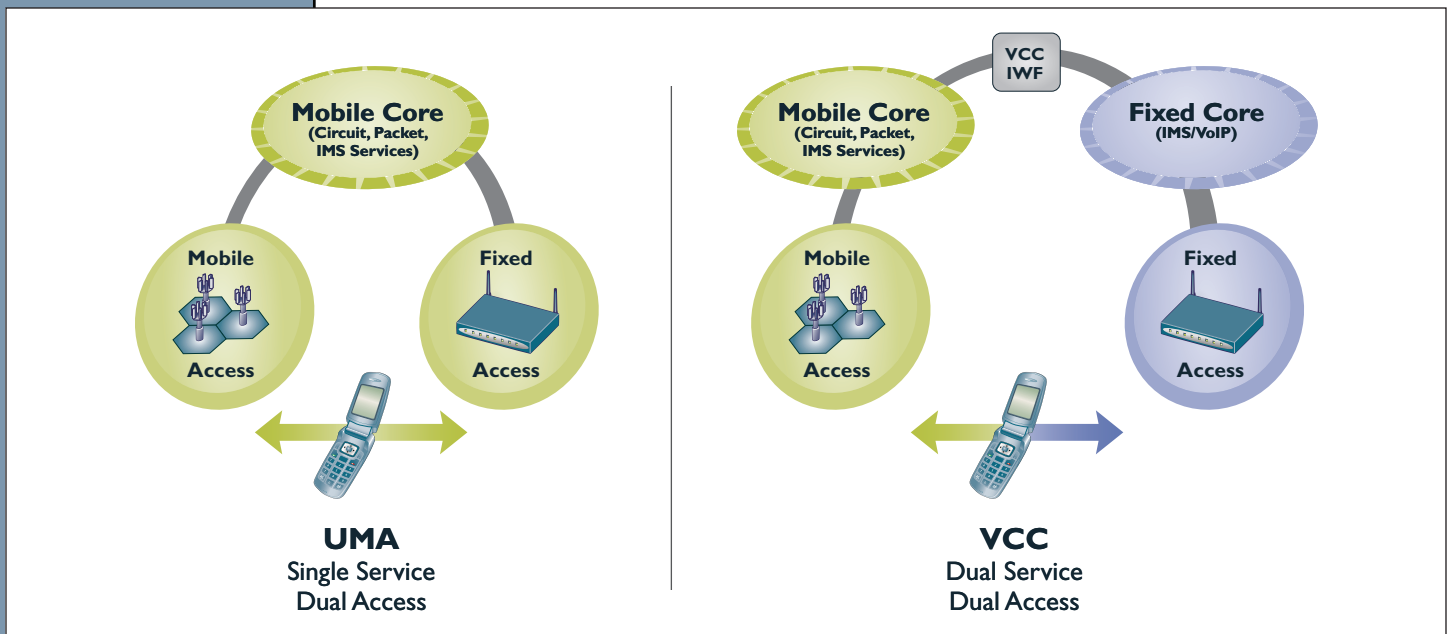


Figure 1. Dual-Mode Handset Approaches

While multiple approaches for implementing a DMH service exist, the vast majority of mobile and integrated operators are choosing UMA as the basis for their service offering. This paper examines why operators are making the UMA decision by comparing how the two DMH approaches meet several key operator decision criteria including end-user service experience, deployment cost and complexity, maturity and industry support, as well as network evolution support.

→ Superior End-User Experience

A key success factor in the introduction of any new mobile service is the end-user experience. In the case of a DMH service, the primary goal is to enable subscribers to leverage Wi-Fi access networks to stay “always best connected” to their mobile services. To be successful, a DMH service must enable subscribers to continue receiving all mobile services (voice, messaging, entertainment, collaboration, gaming, data,...) as they automatically roam and handover between mobile and Wi-Fi access networks. In today’s competitive mobile market, subscribers will not accept a “dual-service” experience, where they receive a limited and/or alternative set of services when on Wi-Fi.

UMA: A seamless, mobile experience

UMA meets this goal, delivering a complete mobile service experience to subscribers as they transition between mobile and Wi-Fi access networks. UMA enables subscribers to receive all mobile services when on Wi-Fi, whether circuit, packet or IMS-based, as well as the handover of those services between networks. As UMA enables handsets to access the same (evolving) mobile core network through existing standard interfaces when on Wi-Fi, all mobile services are available and function the same way, requiring no behavioral change by the subscriber. From a subscriber’s perspective, they continue receiving the same mobile services; and the services sound better, run faster and cost less.

VCC: A non-transparent, voice experience

By definition, VCC will not deliver a seamless end-user service experience. VCC is a “dual-service” approach to DMH services defined to deliver a non-transparent, voice-only service. VCC is non-transparent because it presumes mobile handsets access a fixed core voice network when connected via Wi-Fi and a mobile core network when connected to GSM, which by its very definition, will result in a different end-user service experience.

While attempts are being made to mask service differences, the method for supporting features as basic as supplementary services is still undefined. In addition, VCC is “voice only” because it seeks only to transfer a voice call between service domains and does not address access to, or mobility of, all other existing mobile services when on Wi-Fi, including SMS, MMS, WAP, PoC, video sharing or other upcoming IMS-based services. If an operator wished to deploy a DMH service providing service transparency using VCC, they would also need to investigate standards and solutions for SMS continuity, MMS continuity, PoC continuity, GPRS continuity, etc.

→ Lower Deployment Time, Cost and Complexity

Deployment time, cost and complexity are critical decision factors for operators evaluating technological approaches for delivery of a new service. How significant are upfront capital costs? How long will it take to deploy? What are the ongoing operational costs? How disruptive will it be to the current network and operations? These are just a few of the questions operators ask themselves as they evaluate alternative solutions.

UMA: Low investment, low disruption

The 3GPP UMA standard was created with this specific requirement in mind. Developed by major mobile and integrated operators as well as leading mobile equipment vendors, the UMA standard leverages existing, standard interfaces into core networks. As a result, UMA enables rapid deployment with a relatively low up front capital investment and little disruption to the operations of the existing network. Adding UMA to a mobile network is a straightforward exercise, akin to deploying additional BSCs or RNCs. As a result, UMA solutions map well into existing operational and billing systems and are operationally familiar to network personnel.

VCC: High investment, high disruption

Implementation of a VCC-based approach to DMH services will be a major undertaking. In addition to deploying the new VCC functional elements, operators will need to deploy an IMS-based core voice network (including necessary operational, billing and support systems), as well as an Interworked-WLAN solution to provide IP access.

→ Global Standard with Widespread Support

In the mobile industry, it has been proven time and again that standardization is required before operators can successfully leverage any new technology. Only through standardization can operators get a portfolio of compliant handsets from the major suppliers as well as interoperable equipment from multiple infrastructure vendors. Having recently reached two billion subscribers in record time, mobile operators have benefited tremendously from standardization, and it is an absolute requirement for any new mobile technology.

UMA: A widely adopted global standard

UMA is a well-defined global 3GPP standard. Having completed the formal standardization process in April 2005, fully compliant mainstream mobile handsets from leading suppliers (i.e. Nokia, Motorola and Samsung) are available to support commercial UMA service rollouts. Fully-compliant UNC infrastructure solutions from major vendors (i.e. Nokia-Kineto, Motorola-Kineto, Ericsson and Alcatel-Lucent) have been in development for several years and are now available to support commercial UMA service deployments. In addition, a large and growing eco-system of enabling technology companies have announced UMA solutions including NXP, Texas Instruments, Infineon, Reefpoint, Stoke, Tekelec, Audiocodes and Nethawk.

VCC: A standards initiative

The VCC effort was initiated within 3GPP in June 2005 and, as of the end of 2006, has only fully completed the requirements stage, which is the first of three stages in the standardization process (requirements, architecture, protocols). While it is not possible to know the precise timing for completion of the standardization process, most industry insiders predict completion near the end of 2007. Once the standard is fully defined, the vendor community can complete development and begin interoperability testing of systems and solutions. For technologies as complex as VCC, it typically takes a year from standards completion for mature, compliant, interoperable infrastructure and device solutions to become commercially available, making VCC deployments possible sometime later in 2008.

→ Smooth Evolution to “All IMS” Service Core

Understandably, operators are reluctant to invest in transitional technologies, especially those with a limited lifespan. It is essential any new technology be supportive of operator plans to evolve their networks. For example, the solution should serve a continuing role aligned with other RAN technology evolutions as operators make the transition to IMS for the majority of their services, including mobile telephony.

UMA: Full investment protection

UMA supports all major mobile core network evolution initiatives, including the transition to IMS Telephony. When IMS-based mobile telephony is deployed, UMA will still function as the RAN technology providing seamless access to (and mobility of) services between the Macro RAN and Wi-Fi. As a result, operator investment in UMA is leveraged through all currently defined stages of mobile network evolution. For a detailed discussion on this subject, please refer to the white paper “The Role of UMA in Mobile Network Evolution,” available on the Kineto Wireless website (www.kineto.com).

VCC: Dead-end street

VCC, by definition, will be a transitional technology. The stated intention of the VCC initiative is to enable voice calls to transition between two voice core domains (an existing circuit-based core and an upcoming IMS-based voice core) until delivery of real-time VoIP services is technically and economically feasible on macro cellular networks. Once delivery of real-time VoIP services is practical over macro networks, the need for VCC will be eliminated.

In addition, as mentioned above, once mobile operators upgrade their mobile radio networks to support real time VoIP, UMA is the technology that will enable access to, and mobility of, IMS telephony between mobile and Wi-Fi networks.

Within the mobile industry, history has shown time and again that attempts to force two different service “domains” together typically fail to provide sufficient transparency to be widely adopted. One recent example is GAIT (GSM ANSI-136 Interoperability Team). While the GAIT effort resulted in a set of specifications enabling the development of dual-mode GSM/TDMA phones, most operators determined the service restrictions were too great to be acceptable for subscribers.

→ Conclusion

The goal of this paper has been to provide insight into why the vast majority of mobile and integrated operators around the world are selecting UMA as the basis of their dual-mobile handset services. Suppliers of solutions supporting alternative approaches to DMH services have tried to argue UMA will be a short-term solution, potentially to be replaced by future alternatives. With consideration to key operator decision factors when selecting a new technology, this paper illustrates that UMA is not only the best approach for meeting operators immediate DMH needs, but fits well into their long-term network evolution plans.