



## Solution Study

Azaire Networks  
Emerson Network Power

Fixed Mobile Convergence Platform  
AdvancedTCA Solution

# Enabling Fixed Mobile Convergence through Scalable AdvancedTCA\* Communications Servers

## Case Summary

### Background

Mobile operators face declining voice revenues brought on by a highly competitive business climate, including aggressive price wars. New sources of competition are also creating challenges, as the once-distinct boundaries between cellular and IP networks disappear in the trend toward Fixed Mobile Convergence (FMC). The earliest examples: Wi-Fi-enabled VoIP allows traditional fixed line carriers to offer a form of mobile voice, and data-enabled 3G allows mobile operators to serve up a form of data service. The next step on the road to convergence is for operators to begin bundling IP and cellular access into a single service package. For battle-weary mobile operators, FMC may be the key to their renewed success.

### Challenges

Getting to FMC presents unique challenges to operators. They need ways to develop FMC networks without risking their existing investments. They also need systems that offer long-term scalability so that emerging technologies and changing consumer demands can be addressed quickly and cost effectively. They must integrate both IP and cellular technologies to take advantage of efficiencies in existing networks – such as the broad footprint and secure mobility of cellular networks, along with the low cost of IP-based infrastructure. Of course, solutions must also be highly available and capable of meeting the performance characteristics demanded by the telecom industry.

### Solution

Azaire Networks has addressed these challenges with their IP-Converged Network Platform (IP-CNP) that enables operators to deploy FMC services. Known as the Azaire Metro Wireless Service Gateway (Metro-WSG), this communications server supports both cellular (e.g., 2.5G/3G) and wireless IP (e.g., Wi-Fi) access technologies in a carrier-grade platform that is both highly scalable and cost-effective. Vital to the solution is the Intel® Modular Communication Platform (MCP)-based communications server built and integrated by Emerson Network Power's Embedded Computing business (Emerson). The communications server is based on the AdvancedTCA specification and uses high-performance Intel® processors and chipsets.

### Results

By outsourcing the development of the AdvancedTCA-based communications server to Emerson, Azaire Networks was able to deliver its solution quickly and cost effectively. As a result, service providers in Asia are will be among the first to deploy an FMC solution (supporting both 3G and Wi-Fi access technologies) using an AdvancedTCA-based system.



## The Business Side of Convergence

The move toward convergence is well underway. Witness the proliferation of dual-radio handsets being offered worldwide by top tier hardware manufacturers. Widespread use of these handsets requires operators to provide services that take advantage of the dual-radio functionality. As a result, operators are now making preparations to offer systems that allow converged services on their networks.

When fully developed, Fixed Mobile Convergence (FMC) will erase the distinction between fixed (wireline or cable) and mobile operators, and blend the user experience across multiple access networks. Consequently, the trend toward FMC is also permanently changing the competitive landscape for all operators.

FMC is a competitive benefit rather than a threat. It gives operators weary from price wars, customer churn and declining voice revenues the means to redefine their business model through new service packages. Azaire Networks agrees. "FMC represents a significant opportunity for mobile operators to regain their competitive strength by defending their current voice revenue stream and simultaneously extending their business into broadband services," explains Naveen Dhar, Vice President of Marketing for Azaire Networks. An example of such a blended service experience includes the ability to offer seamless access to 2G/2.5G/3G Radio Access Networks (RANs) for outdoor mobile service delivery and Wi-Fi for affordable, high-bandwidth, in-building coverage. "FMC offers various options for enabling 'always-on' mobility in the form of secure accessibility to voice, data and multimedia over a wide range of devices."

### FMC through Multi-Access Networks

Azaire Networks and others use the term "multi-access networks" to define an implementation of FMC that effectively bridges the gap between fixed and mobile networks by seamlessly integrating mobile access network technologies (such as UMTS, EV-DO and mobile WiMAX) with various fixed access technologies (including Wi-Fi and WiMAX). This enables operators to offer 3G services to mobile users outdoors, while Wi-Fi provides high-speed, low-cost, in-building coverage. Future implementations of FMC will include both fixed and mobile WiMAX access networks as well.

"Multi-access networks can give customers a secure and seamless computing and communications experience



regardless of their cellular network or IP access location," explains Dhar. Azaire Networks says multi-access networks address three significant challenges, enabling operators to:

- Reduce capital expenditures (CapEx) by lowering the cost of 3G deployment
- Increase revenues by offering the mobile broadband services consumers demand; and
- Increase customer loyalty by providing a consistently better service

### Technical Considerations

The challenges of moving toward FMC are many. For example, emerging access technologies make it difficult for vendors and providers to develop universal solutions. The 3GPP standards organization recognized this challenge and developed the I-WLAN standard for multi-access networks. (See related sidebar nearby.)

Azaire Networks too is keenly aware that operators moving toward FMC face daunting challenges in rolling out their new solutions, considering both the near- and long-term implications of any core network systems deployed today. These systems must be IMS-ready, meaning that it will be simple and cost effective to upgrade to IMS applications. New systems must also be able to support new and emerging access technologies, like WiMAX, made possible by deploying I-WLAN standards-based systems.

In developing their multi-access networks solution, "the biggest technical challenge for Azaire Networks was the need to develop a carrier-class, fault-tolerant subscriber edge gateway with both control and data plane functions that can scale on both fronts, with scope for hardware-assist functions," says Zaheer Allam, Vice President of Engineering for Azaire Networks. And because operators

## **I-WLAN: the Key to Multi-access Networks**

Recognizing the dilemma posed by the emergence of different access technologies, the 3GPP standards organization developed the Interworking with Wireless LAN (I-WLAN) specification (3GPP Release 6 TS23.234) that calls for six scenarios for interworking different network access technologies. They are:

**Scenario 1:** Common customer care and bill presentment

**Scenario 2:** Common authentication and authorization; secure roaming; 2.5G/3G based access charging using (U)SIM credentials

**Scenario 3:** Access to 2.5G/3G packet-switched based services

**Scenario 4:** Access to 2.5G/3G packet-switched based services with session continuity (Mobile IP)

**Scenario 5:** Access to 2.5G/3G packet-switched based services with seamless mobility (Enhanced Mobile IP or Carrier Mobility Management)

**Scenario 6:** Access to 2G/3G circuit-switched based services with seamless mobility (VCC) and continuity between circuit-switched and packet-switched.

In essence, the I-WLAN standard provides a mechanism where the IP access network interfaces to the existing cellular core network in the same manner as the cellular Radio Access Networks (RAN). The resulting multi-access networks deliver common services across various access networks using multi-radio (3G & Wi-Fi) handsets for Always Best Connected service.

are racing to deliver such solutions quickly, "we had a very aggressive time-to-market requirement."

### **Azaire Networks Delivers Industry's First I-WLAN-Compliant Product**

The Azaire Networks flagship product, the IP Converged Networking Platform (IP-CNP\*) is believed to be the industry's first I-WLAN-compliant product that enables operators to deliver "always-on" continuous services using the best available access network.

The Azaire Networks IP-CNP is compatible with an operator's existing infrastructure, allowing them to provide

a unified experience between 3G and Wi-Fi. Additionally, because the Azaire Networks IP-CNP was designed to conform to industry standards, deployment does not require changes to the operator's existing core network. This will allow operators to incorporate IMS applications and emerging access network technologies (such as WiMAX) cost effectively without service interruption.

Azaire Networks is quick to note that the successful launch of its next-generation Metro-WSG was not without help. They made two very important design decisions that enabled them to deliver their solution and meet their customers' demanding goals.

### **AdvancedTCA for a Converged Network Platform**

"We examined many platform technologies and found that the AdvancedTCA\* architecture was most suitable for a converged network platform," explains Allam. "Only AdvancedTCA offered the carrier-class performance, modularity, scalability and features needed to support FMC, as well as the immediate availability required to meet our aggressive timeline."

Azaire Networks believes the AdvancedTCA architecture is the ideal solution to bridge today's access-specific networks with the networks of the future that enable FMC. This is because the AdvancedTCA family of specifications (PICMG\* 3.x) is flexible enough to be used in a wide range of applications including WiMAX and IMS. Complementary specifications and industry efforts, including AdvancedMC\*, MicroTCA\* and Service Availability Forum\*, extend the benefits of open standards into other application areas such as network-edge or radio access.

"Ultimately, we believe that a converged network platform built on the AdvancedTCA architecture can reduce our customers' TCO, because the open architecture allows operators to change applications or usage models to match customer demand," says Allam. "This is crucial, because competition requires operators to deploy only the most versatile, flexible and agile solutions that can maximize their investment and minimize the potential for risk."

### **Source an AdvancedTCA-based communications server from Emerson**

At the same time Azaire Networks was studying different platform technologies, the company was searching for a solution-ready communications server on which to deploy their converged network solution. "We felt our best option

was to use a readily available, MCP-based communications server," explains Allam. "We could not build such a system on our own, without expending an extraordinary amount of time and resources on engineering, and missing our time-to-market goal." This decision led Azaire Networks to choose the Emerson Centellis\* 31KX platform with blades based on Intel® processors, providing maximum performance, availability and scalability in an off-the-shelf design.

The Emerson Centellis 31KX is the AdvancedTCA-based hardware and enabling software platform in the Azaire Networks' Metro-WSG\*, which functions as the gateway in the company's IP-CNP system. The Metro-WSG is designed to integrate multi-access networks into the mobile operator core for seamless service delivery. It allows operators to cost effectively deliver a complete set of voice, data and multimedia services regardless of the access technology preferred by users. It enables operators to be more competitive by lowering the cost of service delivery through the deployment of multi-access networks and offering the full range of broadband services from one platform.

Azaire Networks says the decision to use an AdvancedTCA-based communications server from Emerson was especially beneficial to the timely and successful delivery of the IP-CNP. "We chose Emerson's communications server because it was more established than other designs," explains Allam. "Because it was already generally available and shipping, and Emerson had a clear, long-term roadmap for the AdvancedTCA design, we felt confident that we could rely on Emerson for the long haul. This is especially important as we work to stay ahead of our competitors."

The open, standards-based communications server also ensures that Azaire Networks and their customers have access to a broad ecosystem of vendors and an array of components. "This ultimately allows us to deliver a better overall solution – features, performance and price – to our customers," explains Allam. "The standards-based design ensures interoperability among vendors, which truly helps operators – and us – keep costs down."

Citing worldwide product and engineering support, Allam also explains that Emerson's integration expertise and support made a big difference in their ability to meet their goals. "We received important help from Emerson's engineering team in porting our application and enabling the IP-CNP platform to run on its communications server.

They understood our requirements, proposed different options, and helped us through the various stages of producing our application on the system. This support saved us a great deal of time and effort."

Ultimately, the decision to source the Intel MCP-based communications server from Emerson helped Azaire Networks meet their customer's need for a timely, cost-effective FMC network solution. "With help from Emerson, our engineers were able to accelerate the development cycle so that we could in turn help our customer become one of the first operators in Asia to deliver FMC. That was our goal – and we did it," says Allam.

### **Intel® Building Blocks Add Value**

Although it's easy to spot the value of the Azaire Networks design and the contribution from Emerson, the use of Intel® building blocks is just as critical. Both Emerson and Azaire Networks believe that using an AdvancedTCA-based communications server from Emerson is vital to meeting the overall performance qualities that mobile operators need for FMC. Among the reasons Emerson's communications server was developed using Intel processors:

- Scalability of the Intel Architecture, enabling Emerson, Azaire Networks and others to choose the right level of performance and features to suit almost any communications application, without need to redevelop the blade architecture.
- Performance support for both control and bearer traffic, without compromise.
- Off-the-shelf availability of the Intel components, further speeding the time-to-market advantage.
- Wide selection of compatible components from an established community of solution providers through the Intel® Embedded and Communication Alliance (Intel® ECA), which also helps speed the development cycle.



Emerson offers a range of processing blades based on Intel processors and the AdvancedTCA for the Centellis 31KX MCP. "The ATCA-7107 with the Intel® Pentium® M processor (previously known as the ATCA-717) is one of the blades available for customers requiring flexibility between multiple processor architectures and light I/O. The ATCA-7221 with dual Intel® Xeon® processors is one of our blades for those customers interested in high performance," says Hans Zillner, product marketing manager from Emerson.

As a premier member of the Intel® ECA, Emerson is on the cutting edge of new communications technologies and system designs. Emerson gains access to Intel roadmaps and engineering support to develop products more quickly, further speeding the time it takes to deliver new solutions to customers like Azaire Networks and service providers in Asia. "Our relationship with Intel and our membership in the Intel® ECA is an important reason that we can meet the aggressive timeline established by both Azaire and their customers," says Zillner.

### **Product Details of the Emerson Blades**

The ATCA-7107 features a managed, multi-layer 16 port Gigabit Ethernet switch that delivers the flexibility required for routing Gigabit Ethernet interfaces between the base board control processor, the PMC-based processing or I/O nodes, and the PICMG\* compliant base and fabric interfaces. It is available with 2GB and 4GB memory configurations and supports optional on-board parallel and serial ATA hard drives.

Emerson says the ATCA-7221 is one of its high performance processing blades in the AdvancedTCA form factor, providing Gigabit Ethernet interfaces to the PICMG 3.0 base interface and the PICMG 3.1 fabric interface in a dual star configuration. This allows the base interface to be used for control, signaling or management while the fabric interface can be used for high performance data transport providing control data traffic separation. An array of memory options, including 16 GB of main memory, SAS and SATA storage interfaces and multiple hard drive options add to the performance and flexibility of this blade.

### **Conclusion**

Some operators may still believe that 3G and Wi-Fi are competitive technologies, but Azaire Networks suggests this is not the case. "Multi-access networks offer the means to achieve FMC today, while allowing users to continue using the best available access," explains Dhar. "Additionally important, standards-based products allow for quick and easy market availability of FMC solutions."

This makes it possible for some traditional wireline applications – such as TV access, video on demand, music downloads, real-time gaming, and instant messaging – to be enjoyed on the go. With always best-connected access delivered via a multi-access network, subscribers can receive continuous broadband service on the best available technology – whether that network is based on Wi-Fi, WiMAX, or 3G, and whether it exists in an office, hotel, airport, or driving down the highway.

The challenge for operators today is in finding ways to deliver services over multiple access technologies. Standards-based solutions like AdvancedTCA-based communications servers from Emerson, and Azaire Networks IP-CNP platform show how it's possible to set a course to FMC while delivering such services today.

### **For more information, please visit these websites:**

[www.azairenet.com](http://www.azairenet.com)

[www.emersonnetworkpower.com/embeddedcomputing](http://www.emersonnetworkpower.com/embeddedcomputing)

[www.intel.com/go/netcomms](http://www.intel.com/go/netcomms)

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