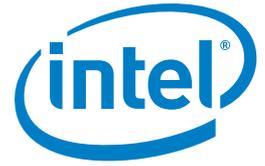


CASE STUDY

Intel® Atom™ processor E6xx Series
Telecom/Service Provider
IT Efficiency



Far South Networks heads North

South African IP telephony specialist turns to embedded Intel® architecture processors to enter lucrative new territories

Far South Networks (FSN) is a South African company that specializes in developing next-generation telecommunications platforms for voice, data, and voice over IP (VoIP) networks. The company's range of innovative products helped it carve out significant market segment share in South Africa, a notable achievement given that multinational incumbents dominated the marketplace. To cut manufacturing costs, gain product design flexibility, and access new territories—such as Europe, the Middle East, and the U.S.—FSN used the Intel® Atom™ processor E6xx Series to develop innovative, industry-leading IP telephony products.



“When the benchmark results were considered and we added up the benefits of the Intel® Atom™ processor E6xx, it made far more sense to base the planned new product on the Intel technology, rather than the other processors we looked at.”

*Grant Broomhall, Managing Director,
Far South Networks*

Challenges

- **Reduce costs.** A key element of existing FSN products, the x86 network appliance motherboard, is a standard product sourced from Taiwan, resulting in high import costs and non-optimal design fit
- **Increase design flexibility.** Because its server boards were sourced from a third party, the company didn't have the design flexibility to meet new customer needs
- **Expansion constrained.** This hampered FSN's long-term growth strategy to expand from its local South African base into other territories, as well as target the more voluminous, smaller market segments such as small office, home office (SOHO)

Solutions

- **Local production.** Designed and produced its own custom single-board computer in South Africa to take 100 percent ownership of product manufacturing and gain design flexibility and lower costs
- **Powerful chipsets.** Because of performance, design, and cost benefits, FSN has developed its next generation of IP telephony products around the Media Processor Xtreme* (MPX)* board, based on the Intel Atom processor E6xx and Intel's Platform Controller Hub EG20T chipset.
- **Down-the-line support.** To help in product development and design, Intel provided in-depth technical support, from schematics to production

Impact

- **Lower production costs.** By developing the MPX board in-house, FSN has reduced production costs and significantly increased design flexibility
- **Superior products.** The increased design flexibility enabled FSN to produce a product suitable for the high-volume, low-end market segment as well as high-end users
- **Overseas growth.** The Intel-based MPX board has opened the door into new territories including Europe, the Middle East, and the U.S.

Internet telephony

FSN was founded in 2006 by Grant Broomhall and Michael Walton. Based in South Africa, the two electronics engineers had long offered telecom consulting services for both local and international companies. They decided to formalize these services by creating FSN, focusing on designing and developing next-generation telecommunications platforms for voice, data, and VoIP networks.

The company's first product was the Comma iTA* (intelligent telephony adapter), a flexible and comprehensive telephony interface solution for gateway installations, PBX and call centers. Based on the popular Asterisk* open-source software, the product can transform an ordinary computer into a communications server. As a result, the Comma iTA proved to be very popular among South African small and medium-sized businesses (SMBs).

To develop the product even further, and to address wider market segments, the company developed the Com.X1*, Com.X10*, and Com.X2*. These IP-PBX and IP gateway platforms provide distinct differentiation from comparable products in the areas of price, features, integrated third-party applications, and future-proofing. They are also specifically designed for harsh African climates.

Industry recognition

With these products, FSN has gained significant industry recognition and positioned itself in the marketplace as a serious challenger to the large, multinational incumbents that previously dominated the space.

At a technical level, the company can attribute its success to its decision to design an electronic board running the Asterisk server software and custom-designed Ethernet local area network (LAN)-based support for legacy time-

division multiplexing (TDM) telephony interfaces such as analogue, Basic and Primary Rate ISDN*. This product architecture supports a robust and reliable performance with highly scalable I/O. The products also deliver business innovation through a full range of IP features with little or no license upgrades. Taken together, these components are compelling for both information communication technology (ICT) service providers and end users.

However, there were several disadvantages, which constrained FSN's expansion plans. The server boards are standard x86 network appliance products, produced and manufactured by a supplier in Taiwan. Grant Broomhall, managing director at FSN, said: "This product line is a popular mainstay, but because we were reliant on a third-party supplier, we were not in control. Import costs were high and we had no control over the price if component prices climbed or import duties and shipping costs rose. As a result, FSN was exposed to large exchange rate variations. In addition, there is always the threat of future obsolescence."

The cost of the motherboards also raised the cost of product sales to service providers and, in turn, the end user. Furthermore, there was no flexibility in terms of BIOS design and a lack of support for plug-in cards, which effectively put a brake on introducing new interconnectivity options. This restricted the company's ability to enter the high-volume, lower-cost market segments associated with IP gateways and hosted telephony deployments.

New marketplaces

The generic Com.X* products were popular due to their flexibility and easy integration. However, at the low end of the marketplace such as SOHO SMB, they could not scale down in price to be competitive at eight or fewer channels. Also, at the higher end, FSN wanted to provide a

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customized product with networking and IP components that would meet the needs of new market segments while supporting existing telephony hardware.

FSN's overarching aim was to provide both the SOHO and high-end marketplaces with feature-rich IP gateway products that offer a cost-effective and simple path to IP-enable legacy PBX equipment. This provides the business user with more cost-effective IP telephony services and improved business efficiencies. Furthermore, FSN's IP gateway products offer a powerful migration path via a simple license upgrade, to include the full PBX feature set on the device or to a hosted, Centrex* (cloud) telephony service model supporting multiple tiers of connectivity and services failover. In this way, users of FSN IP telephony products have access to a product with features that grow with their needs.

Broomhall said: "In short, we wanted to offer more interesting IP features and greater connectivity options than those available on the generic Com.X products we were producing and, by doing so, to also break into new market segments."

To achieve these goals, and to reduce production costs, FSN needed to develop its own electronic server boards customized with networking and IP components and its own BIOS replacement. FSN began by developing a blueprint for the potential new product which included determining which processor to design the product around.

It benchmarked the Intel Atom processor E6xx against two competitive processors running the Asterisk open source software. In terms of the cost of the processing power, the tests results were strongly in favor of the Intel Atom processor E6xx. The integration opportunities afforded by the Intel chipset were also greater than rival chipsets.

A future full of support

The company then carried out an architecture review and discovered that while the chipset cost was approximately USD 10 higher on a board powered by the Intel Atom processor E6xx, the overall benefits still stacked up in favor of the Intel Atom processor.

Broomhall added: "When the benchmark results were considered and we added up the benefits of the Intel Atom processor E6xx, it made far more sense to base the planned new product on this Intel technology rather than the other processors we looked at."

From concept to creation, it took FSN about six months to develop its MPX motherboard, based on the Intel Atom processor E6xx. The flexibility of the Intel Atom processor allowed easy connection of a Marvell Linkstreet* Ethernet switch and an embedded Altera Cyclone* IV GX PCIe-connected FPGA peripheral to create a unique solution for advanced telecommunications applications.

The MPX offers communications-specific features that go beyond conventional motherboards, while retaining a PC-like architecture. This allows the development of specialized applications that make use of a large ecosystem of freely available open-source software which the Asterisk server software is developed on. This has the benefit of allowing MPX end users to develop their own bespoke applications.

During the design and development process, Intel delivered detailed documentation and in-depth technical support. Broomhall said: "Intel provided fantastic support, from proof of design to schematics and a design reference kit for the chipset. This support was extremely valuable and helped us accelerate the design and development of the MPX."

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Intel also provided FSN with an Intel® Boot Loader Development Kit (Intel® BLDK), free of charge, together with the source code. The Intel BLDK is a software toolkit that has allowed FSN to create its own customized and optimized initialization firmware solution for the MPX board.

Before Intel provided the Intel BLDK, FSN considered outsourcing the BIOS development. However, the development kit ensured FSN could design its own solution at minimal cost. The Intel BLDK, together with Intel's commitment to the open source community, has allowed FSN to develop and optimize an Asterisk* communications server solution in-house.

Driving profit

This enabled FSN to develop a very powerful value-added network support tool for the MPX, which can potentially reboot and reinstall a device from the cloud or from a wide area network. This feature alone provides a strong and compelling service element that FSN can offer to customers.

The Intel Atom processor E6xx-based MPX board has been used to develop two IP telephony products, the Com.

X5* and the BlueBox*. The Com.X5 is designed for larger enterprise industrial racks, so it can co-exist with existing telephony infrastructure. The BlueBox is a desktop edge router box for the SOHO marketplace that can be integrated with smaller businesses peripherals while supporting wireless telephony, Wi-Fi, and ADSL.

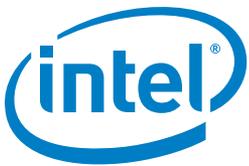
Both products ensure that customers have access to the wide range of benefits that IP telephony delivers, ranging from lower costs to easy management, greater flexibility, and the integration of new IP-based applications. FSN also met its objective of providing many levels of automatic failover to traditional telecom trunks if the need arises.

Broomhall said: "The MPX board and the two products we have developed on this Intel processor board, Com.X5 and the BlueBox, have enabled us to cut the cost of production and provide our customers with an easy-to-integrate IP telephony product. And, in terms of our growth strategy, this new product is going to open doors into profitable new marketplaces including Europe, the Middle East, and the U.S."

Spotlight on Far South Networks

Far South Networks specializes in developing next-generation telecommunications platforms for voice, data, and voice over IP (VoIP) networks. The company was founded in 2006 by engineers with over 50 years of experience working with top international and local telephony brands. Its software-based telecommunications platforms provide simple and affordable access to the latest telephony features. The company's systems are designed and manufactured in South Africa, for South African conditions, using open standards and open architectures.

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