



Case Study: Sonim Technologies, Inc.¹

The Sonim Instant Communications Solution* (ICS): Enabling Voice Services Over Wireless Data Networks, Push-to-Talk and Direct Messaging

Summary

The traditional solutions development model – everything proprietary and custom-built from the ground up – no longer offers advantages in the fiercely competitive communications industry. The effort put into such applications is costly and time-consuming, and requires enormous post-deployment resources to maintain. So why do vendors still use this approach?

Sonim Technologies wonders the same. “When you have access to reliable components, why try to create all of that functionality on your own?” asks Joakim Wiklund, Chief Technology Officer, Sonim Technologies. “It makes no sense.”

Indeed. That’s why Sonim Technologies, Intel and members of the Intel® Communications Alliance are leading the move toward modular, standards-based solutions. It’s a strategy that’s beginning to pay off for leaders throughout the

communications industry. In fact, Sonim credits this approach to its fast launch of the Sonim Instant Communications Solution (ICS).

The Sonim ICS is a robust Push-to-Talk (PTT) application with more features than existing services. But don’t let the “off-the-shelf” configuration fool you: The Sonim ICS is truly carrier grade, offering virtually unlimited scalability and flexibility, along with high availability and outstanding performance. What’s more, when the Sonim ICS is deployed throughout the world later this spring, it will be the first PTT solution fully compliant with the new Push-to-talk over Cellular (PoC) specification.

In fact, everything about the solution is unique. This case study takes a closer look at the pre-integrated components and Intel Communications Alliance member community that helped Sonim cut 50 percent off the typical development cycle for incredibly fast time-to-market.

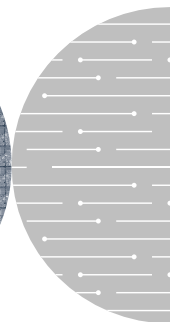
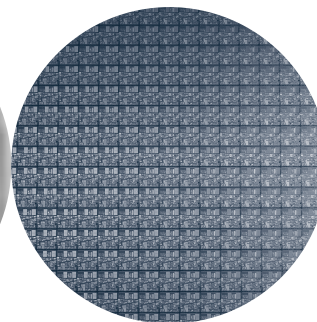
¹ Along with members from the Intel® Communications Alliance:

Force* Computers

Solid* Information Technology

MontaVista* Software

GoAhead* Software



Walkie-Talkies – Born Again

It's perhaps the hottest new communications service in years: Push-to-Talk (PTT) or "walkie-talkie" style calling via cell phones. Several carriers currently offer variations on the service, while others are gearing up for launch.

While observers may question the utility of such a service, early users are hooked. Establishing an instant connection to other phones without dialing saves calling time, making PTT less expensive than traditional cell calls. Parents love the idea of keeping closer tabs on their kids. Businesses that operate with a geographically dispersed workforce – such as delivery services, trucking firms, construction companies, medical groups, and warehouses – find it easier to gather input, relay information, and develop ad-hoc meetings, all in a matter of moments.

Carriers and providers also like PTT because it's the first new service that subscribers will readily pay for, as seen by the popularity of the earliest programs. And because customers quickly become hooked, the PTT service can reduce turnover; so far, PTT subscribers appear to be more loyal than other cellular users.

However, the earliest PTT services are not without their flaws. For example, one carrier's PTT service only runs on its proprietary network and is incompatible with widely used cellular technologies like GPRS and CDMA. Only subscribers to this carrier's service can Push-to-Talk with each other, a feature that can limit the utility of PTT services outside of established groups and organizations.

Sonim also notes that the user experience with early PTT services has been somewhat unfriendly. For example, the walkie-talkie style phones can begin squawking without warning, whether it's convenient – or even polite – for the recipient to communicate at that time. Users wanting to convene walkie-talkie meetings must pre-plan their group calling lists, minimizing the benefit of the whole PTT function. Existing services also lack "voice mail" types of capabilities for leaving messages when PTT users are unavailable.

Despite these issues, PTT technology has quickly become a "must-have" service. Providers worldwide are racing to offer IP-based PTT capabilities to their cellular subscribers. Although fast time-to-market is essential, delivering a better PTT service is equally important. Sonim viewed these early shortcomings as a business opportunity and planned to introduce a more user-friendly solution that offered carriers the scalability and performance necessary for providing global PTT services.

New Standard Required

First on the list of technical challenges was interoperability. In order for walkie-talkie style communications to move from a niche service to the global mainstream, standards were needed for compatibility between handsets, carriers and wireless technologies.

Sonim was among several industry leaders that recognized this need. Working with these leaders and the Open Mobile Alliance, Sonim led the effort to develop a global wireless IP-based Push-to-Talk standard that will enable interoperability among carriers and compatibility with all wireless networking specifications.

The resulting Push-to-talk over Cellular (PoC) specification will enable a seamless PTT experience for users around the world, ensuring communications between standards-compliant handsets. Among the improvements to be gained from the PoC specification is speech quality on par with the existing cellular and wired communications experience. PoC-based calls also make more efficient use of spectrum, offering the same quality as circuit switched calling at a fraction of the operator cost.

Development Strategies

Sonim next laid out the plan for developing its Instant Communications Solution, a complete hardware and software system for delivering PTT services via mobile phones. A client/server architecture would offer unlimited scalability, while carrier-grade hardware would ensure reliability, high availability and performance. Standards-based building blocks would simplify future upgrades and make it easier to incorporate components from third-party suppliers. Using the new PoC specification, Sonim's solution would be compatible with all cellular network technologies, including CDMA, GPRS, 3G, and 802.11.

Like most communications solutions, the Sonim ICS would require a specially designed platform and unique application software to deliver the new PTT service. But unlike more established vendors, Sonim did not have the time and resources necessary to engineer this solution from the ground up.

In a typical development cycle, most carrier-grade systems are uniquely designed to serve one purpose. In fact, every component is developed from scratch – from custom-designed ASICs, proprietary middleware, and application-specific databases, to specialty boards and platforms. While powerful, these proprietary solutions require an enormous amount of time, money and labor for both development and ongoing support. Because they have a single purpose, their development and support costs cannot be amortized over time or across multiple customers.

Sonim was well aware that this development model doesn't work well in today's hotly contested telecom segment, where profitability requires fast time-to-market, long time-in-market, scalability to meet future demand, and agility to adapt to changing conditions. If everything has to be customized, it can be especially difficult for new companies to compete among established vendors.

That said, a high-performance, high-availability platform would be integral to the overall solution. But the true "value" of the final product would be delivered via the application-level software, or Sonim's "secret sauce." So Sonim management made a strategic decision to focus the bulk of the company's engineering resources there. Bucking the ground-up development model, the company decided to use "off-the-shelf" components to build its server platform. Sonim believed this strategy could save the company significant development time and money, as well as enable greater design flexibility and scalability down the road.

And they were right. Sonim delivered its solution in half the typical development time, saving all associated costs and labor resources along the way. But what's even more spectacular is that the final product meets all of the requirements of a carrier-grade solution – including interoperability with multiple wireless networking technologies – and delivers the user-friendly feature set demanded for a more sophisticated PTT service.

Force EndurX* CO 21KX Carrier-Grade Platform

The Force EndurX CO 21KX carrier-grade platform is a new concept in embedded systems. It is an integrated hardware-software, application-ready platform. With redundant controllers providing an SNMP remote management interface, high-availability middleware, upgradeable in software with fall-back functionality, the EndurX CO 21KX platform offers a fully redundant architecture to enable "five nines" application availability.

Based on a PICMG 2.16-compliant, NEBS Level 3 design with 19 slots, the system offers dual redundant Intel® architecture-based processor nodes running carrier-grade Linux, configurable up to 19 nodes overall. Redundant Gigabit Ethernet switches and shelf management controllers are standard.

The Sonim ICS

The highly available, carrier-grade Sonim ICS enables wireless data networks to deliver high-margin voice services using mobile phones, including both walkie-talkie style calling and direct voice messaging. Compatible with GPRS, CDMA, 3G and 802.11 wireless networks, the Sonim ICS will enable interoperability among service providers and handset vendors while offering virtually unlimited scalability via a high-performance client/server architecture.

Sonim's ICS offers features that address some of the user issues of earlier services. With direct voice messaging, the ability to determine user "presence," a multi-party calling feature that allows for the formation of ad-hoc groups, and a polite call-announcement signal, Sonim's PTT technology will make for a much friendlier user experience.

It is a complete, fully redundant system built with application-ready components supplied by members of the Intel Communications Alliance and pre-integrated by Force Computers. Sonim ICS uses Force EndurX* CO 21KX Carrier-Grade, PICMG 2.16-compliant systems with dual redundant Intel® Architecture based nodes.

The application-ready Force EndurX CO 21KX platform is fully redundant with HA architecture designed throughout to enable "five-nines" application availability. Each EndurX platform holds up to 19 service blades that deliver the ICS functionality.

What's more, the EndurX platform is a standard "off-the-shelf" system. It was not customized for Sonim but came ready for the ICS application-layer software. "It's hard to say how much effort was saved going with the Force EndurX platform, but it was substantial," explains Brad Cameron, Vice President of Server Engineering, Sonim Technologies. "Since it's a fully integrated and application-ready system, we didn't need to spend so much effort on development, which helps us get to market a whole lot faster. Plus technical support isn't a huge issue; from a problem-resolution point of view, the system came pre-integrated and fully tested from a single system integrator, Force. It's much better to go with a standards-based, pre-integrated system."

What's Inside?

Force EndurX CO21 KX Platform: Inside the Force EndurX CO 21KX platform are high-performance Intel processors and chipsets, the highly available and scalable database from Solid Information Technology*, the MontaVista Linux* Carrier Grade Edition operating system, and high availability middleware from GoAhead* Software.

The pre-integrated, high-performance, highly available, and redundant capabilities of the Force platform enabled Sonim to distribute the PTT application across multiple blades. This scalable, distributed architecture makes it possible for the ICS to deliver very high-performance and unlimited scalability, even while ensuring continuous availability.

For wireless communications, such "fail-proof" service is an essential ingredient for success. "That's why everything is redundant: the database, the cards, the system, everything," says Cameron.

GoAhead SelfReliant* Middleware: Citing time- and cost-savings in development and integration, Force included GoAhead SelfReliant middleware – instead of proprietary code – to provide the high availability management framework for the platform. GoAhead SelfReliant middleware maintains a system model of all key EndurX CO 21KX hardware components, detects events like failed boards and restarts the appropriate applications. With the tight integration of GoAhead's middleware with Force's EndurX extensions, carriers can customize policy decisions related to system alarms, events and management.

In addition to the hardware availability management, GoAhead SelfReliant conducts millisecond fail over of Sonim's PTT application in the event of a failure, while preserving the "state" of the application. By providing high availability management of the hardware, OS, Solid's database and Sonim's unique application, GoAhead SelfReliant ensures on-demand, uninterrupted service.

MontaVista Linux Carrier Grade Edition:

Force included the MontaVista Linux Carrier Grade Edition operating system for its robust development platform and ability to meet the high availability requirements of carrier-grade applications.

"MontaVista CGE is ideal for the Sonim ICS," says Chris Williams, Force Vice President of Engineering. "It's the premier Carrier-Grade Linux platform, being that it is carefully engineered and a leading standards-compliant platform that ensures freedom and capability for Sonim's demanding application."

Solid Autonomic Data Management Platform:

Integral to the Sonim ICS features and PTT service is the Solid Autonomic Data Management Platform. "Solid delivers the highly sophisticated and scalable data management architecture of the Sonim ICS system," explains Ali Paasimaa, Solution Architect, Solid Information Technology. "In addition to providing the convenience of SQL-based relational data management, Solid practically hides the complexity of carrier-grade data availability from the Sonim development team." All the FCAPS system data and the PTT application data is stored into the Solid database, and is accessed by the applications

through standard ODBC or JDBC interfaces. Solid's CarrierGrade* Option ensures that the required data is continuously available to the application, even in the event of a board or communications failure.

For highly available and efficient data access, Solid's integrated data flow autonomously coordinates the movement of data inside the chassis and to the EMS, Sonim's management system. Changes in the FCAPS system data reactively flow from the elements all the way up to the management level, enabling the EMS to display a centralized real-time view over the managed objects based on its local data. Central configuration and provisioning of the system is handled in the same manner, reactively disseminating changes made on the EMS level down to the elements. The Solid data management platform ensures that data flows automatically to its point of use.

Embedded Intel Architecture: Force and Sonim chose embedded Intel architecture for its standards-based high performance, as well as its system-ready compatibility with other third-party components.

Solid* Autonomic Data Management Platform

Comprised of a suite of products that combines traditional data management concepts with innovative self-management technologies, the Solid Autonomic Data Management Platform addresses the data management issues of complex, highly available and distributed, next-generation communications applications.

At the core of the Solid Autonomic Data Management Platform is Solid EmbeddedEngine*, a compact, full-featured SQL relational database manager. EmbeddedEngine transactional data store guarantees data integrity, even when data is shared across multiple applications.

Solid BoostEngine* extends EmbeddedEngine to combine both disk-access optimized and in-memory-access optimized data management, allowing developers the flexibility to choose data location table by table, either to disk for low-cost storage, or to memory for the highest performance.

The Solid CarrierGrade* Option is the high availability component of the Solid platform. In the event of a board or communication failure, Solid CarrierGrade protects the continuity of application service by enabling applications to fail over to a hot standby copy of the database in a few tens of milliseconds.

The Solid SmartFlow* Option adds an integrated, patented bi-directional data distribution technology to guarantee data consistency across a loosely connected system of database-enabled applications. Any node in such a distributed system can be protected using hot standby.

Citing Intel's high-performance, embedded roadmap, both Force and Sonim believe future upgrades and platform enhancements will be much simpler. "Force's EndurX CO 21KX was designed to address the requirements that next-generation communications applications demand," said Force's Williams. "By using Intel Architecture-based processors in this system, Force satisfies customer needs for high performance in network infrastructure elements." The EndurX CO 21KX features the Intel® Pentium® M processor and Intel E7501 chipset.

And then there's the whole "off-the-shelf" strategy Sonim wanted to use to build the system architecture. Access to all of the necessary components – pre-integrated, optimized for high availability – was essential to meeting Sonim's aggressive development timeline. "We would not have been able to meet our design goals without Intel and their developer community," says Sonim's Cameron.

The Alliance – Key to Success

In the highly competitive wireless telecom segment, getting to market quickly is a matter of survival. To that end, choosing to build the ICS system with 'off-the-shelf' components "was an important design decision," explains Joakim Wiklund, Sonim's Chief

Technology Officer. But "choosing Intel processors and the Intel Communications Alliance was equally important, probably cutting our time-to-market in half. We knew we wanted to minimize our development work on the system architecture, which is why we chose to use ready-made, reliable components in the first place. But we had no idea just how much time and energy this strategy would save us. It turned out to be a competitive advantage."

Members of the Alliance have long-established work groups that collaborate on product roadmaps, technology standards and industry trends, enabling the Alliance to jump ahead of any individual company. "The advantage gained by leveraging all of those established working relationships is huge," continues Wiklund. "We knew we could deliver our carrier-grade system, and it would work together with all the other parts. Our developers have worked with the Alliance members before, which means it all comes together so much more quickly."

As a leading integrator of application-ready platforms for the communications segment, Force shares the Alliance's vision on the transition to standards-based modular platforms. "With standards-based building blocks from the Intel Communications Alliance community and our

MontaVista* Linux* Carrier Grade Edition

MontaVista Linux Carrier Grade Edition (CGE) is the premier Carrier Grade Linux system software platform based on the OSDL CGL Specification. CGE is an advanced Linux-based development platform engineered specifically for the robust and highly available requirements of carrier-class applications. CGE is being used today in packet-based and wireless infrastructure solutions provided by the world's leading communications infrastructure equipment providers.

CGE was designed for edge and core telecommunications including applications for the converging IP and voice networks such as soft switches, SGSN (Serving GPRS Support Node) and GGSN (Gateway GPRS Support Node) and Voice over IP (VoIP) gateways, and many other applications. It enhances standard Linux with additional real-time, high availability, serviceability, hardware management, and high reliability features, and it is ideal for deployment in any carrier-grade class environment.

As a result of providing a leading role in the Open Systems Development Labs (OSDL) Carrier Grade Linux (CGL) working group focused on specifying the operating system platform required for these demanding environments, MontaVista Linux CGE is the premier CGL platform in the industry, both in terms of contribution of ideas and source code, and of delivery of compliant versions of its CGE operating system distribution.

expertise in third-party integration, Force is able to quickly deliver cutting-edge platforms to innovators like Sonim, enabling them to deliver the industry's first standards-based Push-To-Talk application," said Williams.

"Sonim made a wise decision to go with Intel," agrees Solid's Paasimaa. "Intel has a rational vision of where the industry needs to go: toward modular, off-the-shelf components. The integration of Solid's highly available database with Intel processor-based platforms makes it that much easier and faster for the industry to transition from proprietary architectures to standards-based computing platforms."

"MontaVista Linux Carrier Grade Edition adds momentum to the emergence of Intel-based carrier-grade solutions," said Bob Monkman, Senior Product Marketing Manager, MontaVista Software. "Telecommunications OEMs, such as Sonim, need fast and cost-effective access to high-performance, highly available platforms. The combination of modular Intel building blocks, MontaVista Linux Carrier Grade Edition and the ecosystem of quality companies that are members of the Intel Communications Alliance will give our mutual customers the levels of flexibility and time-to-market they require."

Sonim engineers believe it makes no sense to develop all of the functionality on your own when there are reliable components readily available. Yet competitive PTT solutions are very proprietary, with everything from the processing hardware to the application software being custom made for the individual solution.

Sonim's decision to go with pre-integrated, off-the-shelf components freed company engineers from time-consuming platform development and allowed them to focus on the development of the application layer. This strategy helps Sonim innovate even while cutting costs and speeding time-to-market.

As GoAhead explains: "While some telecom vendors continue to develop proprietary HA middleware, this approach can be extremely time-consuming and resource-intensive. What's more, it also introduces needless schedule and stability risk into the project," says Asif Naseem, Chief Technology Officer, GoAhead Software. "Sonim was able to concentrate their resources on building a very high quality Push-to-Talk application by adopting field-proven commercial components in a pre-integrated platform."

GoAhead SelfReliant* Middleware

The GoAhead SelfReliant product line of platform-independent middleware delivers high availability systems management and messaging services to developers of carrier-grade embedded systems. SelfReliant is deployed in commercial networks worldwide ensuring 99.999% or higher levels of availability.

The middleware's modular architecture offers project teams the ability to pick and choose among four products, depending on system requirements, including: Basic Availability Management (SR-BAM) – HA software that makes applications highly available in less than 30 minutes without programming; Distributed Messaging (SR-DM) – high performance distributed messaging for intra- and inter-node communications (up to 64 nodes); Embedded Systems Management (SR-ESM) – a set of systems management building blocks; and SelfReliant Advanced Suite (SR-AS) – a complete, integrated suite of platform-independent middleware combining high availability, distributed messaging and embedded systems management to deliver the highest levels of availability (up to 64 nodes).

The Suite provides the full set of SelfReliant API libraries for management of devices down to the hardware and operating system levels and is the only middleware to support the new Service Availability Forum's Hardware Interface (HPI) specification.

This choice not only allowed them to finish their project more quickly and with less risk, but also allowed them to create a low-cost solution. We believe this will be the standard development strategy in the future."

The Intel Communications Alliance pulls together all these proven components and literally hands them to developers in a pre-integrated standards-based package. Says Paasimaa; "Taking advantage of the strength of the Alliance is a smart move. In addition to significant cost- and timesavings for the initial development, utilizing standards-based general-purpose elements results in a very flexible system. It's quick and painless for the service developer to customize their value offering, add new services and scale solutions to swiftly respond to the changing needs of the market place."

Stay Tuned

The whole movement toward modular communications platforms is just beginning. But Intel believes it's a strategy whose time has come. With industry leaders and newcomers alike embracing the idea, using "off-the-shelf" components for the development of complex systems will quickly become the new model for innovation.

The real value of the strategy, of course, will be proven with the successful launch of Sonim's ICS solution at top tier service providers later this spring. Deployment is currently in process, and services are expected to begin in mid-2004.



A community of communications and embedded developers and solution providers

For more information about Sonim Technologies and Intel Communications Alliance member companies, please visit:

www.sonimtech.com

www.forcecomputers.com

www.solidtech.com

www.mvista.com

www.goahead.com

For more information about the Intel Communications Alliance, please visit:

www.intel.com/design/network/ica/index.htm

For more information about embedded Intel architecture, please visit:

<http://developer.intel.com/design/intarch/>


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