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January 2008

THE WPAN'S NEW YEAR RESOLUTION

THIS ISSUE

BLUETOOTH TAKES AUTOMOTIVE HANDS-FREE TO NEW LEVELS

ENABLING INTUITIVE CONNECTIVITY USING NFC

BLUETOOTH SECURITY – A PRODUCT IMPLEMENTATION PERSPECTIVE

ces beckons – why so quiet?

As we start packing the bags in preparation for leaving for CES, there is a slightly different feel to the run-up to this industry's biggest event (albeit broadstroke rather than wireless-focused).

In years gone by there has been more excitement, more tension and more 'noise' in the weeks preceding CES. Companies spend millions to attend CES, and typically, those companies and their PR agencies are working flat-out at this time to pre-heat the media with teasers as to what they will be doing and showing at CES. It hasn't really felt like that this year.

What does this mean? Is CES starting to feel the same pressure that other shows have felt, whereby the industry is starting to question the value of spending a huge amount of money to see one group of folks, in one town, for a few days? This type of thinking has killed a lot of shows.

Despite the fact that e-media such as Incisor and IncisorTV have a complete answer to such concerns – our products are instant, global and available every hour of every day of the year to anyone, anywhere – we lament the demise of these shows. They are a valuable focal point, and gather lots of people together to have useful conversations.

The chances are that the vast majority of Incisor's readers will not be going to CES, spread around the world as you are. So, the Incisor team will be there for you, and in our next issue we will let you know what was happening at CES, what new products were revealed, and will give our usual overview of market trends and developments – including whether CES appeared to be in expansive mode, or feeling the pinch.

Oh, and our cover date may be January, but this issue goes out in December. So, I would like to wish all Incisor readers and partners a great festive season, and a fantastic 2008!

Thank you all for your support.

Vince Holton
Publisher & editor-in-chief, Incisor

INCISOR SALES TEAM GROWS

The team of people now handling Incisor's sponsorship, advertising and e-marketing has now grown to include Ian Harbar and Mat Ananin, and our team is now headed by Martin Clarke. For all sales enquiries, please email:

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TI sues Chipcon founder

In a surprising turn of events, Texas Instruments (TI) is suing Geir Forre, the founder of low power wireless/ZigBee company Chipcon, the Norwegian business acquired by TI for $200 million in January 2006.

TI's case relates to the poaching of formerly Chipcon, now TI Norway staff. TI alleges that Forre has been trying to recruit Texas Instruments staff in contravention of terms and conditions laid down at the time of the Chipcon acquisition. The restrictions imposed by those terms and conditions end in July 2008, but Forre is alleged to have acted in advance of this.

One key Chipcon exec – Øyvind Janbu - has already been installed at Energy Micros, as chief technology officer. Janbu was also an employee at Chipcon and held several key technical positions within the company, prior to the acquisition.

At its launch, Forre is on record as having said that Energy Micro's plan was to recruit a start-up team of 10 people and be fully operational at the beginning of January 2008. "We are looking for both technical and commercial managers and talented analog and digital IC designers and will recruit people from relevant Norwegian and international semiconductor companies," Forre commented at the time.

Well, it seems that TI has judged that this was another example of apples not falling far from the tree. TI has been quick to act, and issued a statement saying "Texas Instruments has filed a petition for preliminary injunction on Friday 9 November 2007 against Geir Forre in the Oslo Court of Execution and Enforcement.

At this point, TI cannot discuss the details of the case beyond that Mr. Forre has started Energy Micro in the field of MCU business and had prior to leave TI signed a non-compete and non-solicit agreement. Today's petition for preliminary injunction is focusing on prohibition against recruitment by Energy Micro and Geir Forre of any TI Norway and TI employees. Texas Instruments wants to make a point that Geir Forre should not be approaching TI employees before the ending date of the agreement."

Norway is a pretty small company. It probably wasn't a huge assumptive leap to guess that Forre would knock on his mate's doors when he needed to populate his new company. However, it's possible he didn't reckon on TI's willingness to not only ring-fence it's staff, but to use its financial and legal muscle to enforce this.

A preliminary hearing of a case brought in the Oslo court of Execution and Enforcement was due to take place on Monday (Dec. 3) in Oslo.

Ford SYNCs with CSR

Ford calls its latest in-car communications and entertainment system SYNC, and will now integrate CSR's BlueCore4-ROM Bluetooth silicon. This will enable hands free operation of personal media players (PMPs) and hands free operation of Bluetooth enabled mobile phones to make calls and access music. SYNC will be fully integrated into twelve Ford, Lincoln and Mercury models, including the 2008 Focus, Taurus X and Explorer, by the end of the year, and will be available or standard in nearly every Ford, Lincoln and Mercury vehicle by the end of next year. The Focus is a car sold outside the US, so Incisor

checked with CSR as to whether SYNC extends to Ford cars sold in Europe or elsewhere? The answer was that this is currently a US-only initiative.

Ford says that SYNC is a fully integrated communications system that can host nearly any PMP, including the Apple iPod, Microsoft Zune, PlaysForSure players and most USB storage devices. The SYNC uses CSR's technology to act as a hands free car kit for mobile phone calls; it can automatically access names and numbers on a mobile phone's SIM-based address book into the vehicle using the Bluetooth protocol stack software in conjunction with the firmware running on BlueCore4 silicon.

CSR says that its Bluetooth technology is AEC-Q100 qualified and tested to withstand the difficult conditions of the automotive environment. Ford's SYNC utilises CSR's BlueCore4-ROM Plug-n-Go, a single-chip radio and baseband IC for Bluetooth systems which supports EDR.

Rafik Jallad, Vice President of the Automotive Business Unit at CSR, commented, "Legislation restricting the hand held use of mobile phones whilst driving is becoming increasingly commonplace, and using Bluetooth to enable hands free mobile phone operation is now well established as an alternative." Rafik continued, "On top of that, the market for PMPs is growing rapidly and accessing your PMP music is becoming a must have feature in car multi-media systems. These two crucial factors are underlying the massive interest we are seeing from forward thinking car manufacturers like Ford."

(See also 'Bluetooth takes automotive hands-free to new levels' in this issue)

news

Wireless email boosts revenues

New analysis from Frost & Sullivan - European Wireless E-Mail Markets - reveals that this market earned revenues of €1.86 billion in 2007 and estimates this to reach €6.65 billion in 2012.

"The business case justifying the benefits of mobile connectivity is well understood and appreciated," said Frost and Sullivan Industry Analyst, Shomik Banerjee. "Mobile connectivity not only improves flexibility, but also allows faster decision making and increases efficiency by utilising the otherwise wasted time e.g. by travelling. Overall, it improves the effectiveness of the user to the business."

Most European mobile operators have built a wireless e-mail portfolio encompassing third-party solutions such as BlackBerry, Good and Microsoft, as well as their own branded push e-mail services based on white-label products from vendors such as Visto, Seven and Nokia/Intellisync. RIM partners offer the BlackBerry Internet Service modality, which permits subscribers to connect their personal e-mail accounts (for example, on GMail or MSN) to a BlackBerry push e-mail service run by the operators. These offerings are aimed at consumers, small businesses, and "prosumers" – a crossover category between "professional" business users and consumers.

However, limited interoperability in a fragmented value-chain is affecting market development. Furthermore, there has been a growing case for standardization as the technology has matured and moved past the early adopter phase. The efforts made by several stakeholders (P-IMAP) in this regard have yet to yield positive results.

Individual market participants have adopted various means to overcome these challenges. RIM, for instance, offers an end-to-end service. Microsoft, on the other hand, is aiming to make its protocol (ActiveSync) the most widely used. Others offer abstraction through the use of middleware over a client-server model.

Multiple handsets mean greater market potential

Each year In-Stat conducts a Consumer Mobility Survey (CMS). The 2007 survey revealed a noteworthy increase in the number of respondents carrying multiple handsets. In 2006, 17.5% of respondents reported carrying more than one mobile device. In 2007, that number jumped to 25.1%. The 43.4% increase is statistically significant, and may be attributed to the separation of work from personal phone calls. Another explanation for the use of multiple handsets is the consumer desire to use several carriers at different times in order to take advantage of unique calling plans. While not previously prevalent in the United States, this practice is common in other areas of the world.

Career-aged mobile device users aged 30-39 are most likely to use more than one cellular phone—29.4% reported they use multiple handsets. Following in a close second was the age segment 40-49 year olds, 27.9% of whom reported using more than one wireless phone.

Whatever the causes, the use of multiple handsets has not yet been reflected in penetration rates reported by the wireless industry. Multi-line use suggests penetration is actually less than industry figures suggest. For example, in the US, CTIA estimates 81% penetration. In-Stat surveys suggest this number is actually smaller. The implication of lower penetration rates is a greater potential market for the wireless industry to pursue.

In-Stat expects to see an increase in the use of multiple handsets in the future.

Toyota adopts CSR audio streaming technology

Toyota's new G-BOOK mX and G-BOOK mX Pro telematics and navigation devices are to feature CSR's BlueCore5-Multimedia silicon. The G-BOOK allows users to stream audio to their car stereo system wirelessly from mobile phones, MP3 players and personal media devices, and also provides for hands-free use.

In hands-free mode, BlueCore5-Multimedia leverages the integrated digital signal processor (DSP) to offer what CSR claims is best in class echo cancellation. During music playback it uses the integrated CODEC to achieve a signal-to-noise ratio of -95dB. In addition, with a transmit power of +8dBm and reception sensitivity at -90dBm, it increases transmission range and therefore further enhances the quality of reception. BlueCore5-Multimedia also supports most Bluetooth profiles needed for a car application, such as the Bluetooth Audiovisual Remote Control Profile (AVRCP), which allows Toyota the option of including remote control functionality in future generations of G-BOOK.

Rafik Jallad, Vice President of CSR's Automotive Business Unit commented, "BlueCore5-Multimedia has been specifically designed for mono and stereo Bluetooth headset applications and delivers an unprecedented level of voice and music quality. By putting more focus on strong DSP architecture, which integrates more technologies with the Bluetooth radio, we can continue to help our customers to improve their time to market." Jallad continued, "CSR is committed to developing solutions for the automotive market and working with top tier companies such as Toyota further highlights the competency and intelligence of our products."

new products

I-Radio cubed

Internet radio is growing in profile and general user take-up. With the Iona Cube, Cambridge Consultants says it has come up with 'an intuitive new design" for a low-cost, Wi-Fi enabled internet radio. In a departure from the traditional 'push-button' user-interface, the Cube allows the listener to personalise their listening around their favourite radio stations or podcasts.

According to research, the average person listens to between three to four radio stations regularly. The Cube has been designed with this in mind. By turning the Cube onto one of its four available sides, it will change to the desired radio station. A fifth side is dedicated to the speaker and the final remaining side is dedicated to switching the radio to the 'off' position.

The designers wanted to keep simplicity to the maximum, and the Cube can apparently be easily customised to play a listener's top four stations. Accordingly, even the volume button has been removed. Instead, the listener just twists the Cube to the right to increase the volume and twists to the left to decrease it.

Based on the Iona platform technology shown at CES 2007, the Cube uses a Wi-Fi connection to provide a choice of up to 10,000 stations from which listeners can customise the four sides of the radio concept, satisfying both mainstream and exotic tastes. Customisation of the Cube can be achieved via a number of ways, including using a web interface.

Duncan Smith, head of consumer products at Cambridge Consultants, says, "Well designed products are such a joy to use that they turn every consumer into an evangelist. The Cube concept is so easy and fun to use that it is infectious. Consumers won't have to scroll through endless lists of stations to find their favourites, they will just have to flip the radio. It epitomises convenience and is so simple and intuitive that everyone will be able to use it."

Cambridge Consultants will show the Iona Cube Radio at CES 2008.

Wireless hearing device takes CES award

The Epoq hearing device from Oticon has been selected as an International CES Best of Innovations 2008 Design and Engineering Award honoree by the American Consumer Electronics Association (CEA).

Oticon Epoq's wireless technology enables two Epoq hearing instruments to communicate together providing the user with a three-dimensional auditory sound picture. This increased perception of "spaciousness", says Oticon, makes it easier to localize where sounds and voices are coming from and is essential not only to better hearing - especially in surroundings with conversations, such as in crowds or restaurants - but also in providing an important sense of security.

Oticon had already earned an award in 2007 in the CES personal electronics category for the design of the Oticon Delta hearing instrument. "This is the second year that the Consumer Electronics Association's awards program has ranked Oticon's expertise in design and engineering among the world's best in the highly competitive arena of consumer electronics," stated Mariska Alexander, Marketing manager of Oticon UK. "It affirms our belief that Epoq is truly a modern communications device."

Oticon claims that its Epoq wireless system is the smallest in the world, taking up only 1 square millimetre and yet offering 120 k/bit bandwidth. This broadband connectivity (Ed. - 120k/bit – broadband…? Never mind) also enables people with hearing loss to connect to Bluetooth-enabled cell phones and other electronic devices such as MP3 players and computers. With the addition of Epoq's companion device called Streamer, a pair of Epoqs becomes a wireless headset with sound tuned to the wearers hearing ability.

Bluetooth barcode scanner now available with laser

Baracoda is launching a laser version of its RoadRunners barcode scanner.

The RoadRunners Laser has been designed for logistics environments and integrates laser SE 950 Class 2 reading technology that provides increased performance for specific scanning requirements.

In addition, the RoadRunners Laser has a rugged trigger that facilitates intensive scanning operations and can support one million cycles. It is ruggedised too, and can resist being repeatedly dropped onto concrete from a height of up to 2 metres.

The RoadRunners Laser has an enhanced reading capability for scanning of damaged or low quality barcodes. In addition, Baracoda suggests that its Bluetooth Class 1 connection (range up to 100 metres) is ideal in warehouses or other environments requiring a long distance connection. The Roadrunners Laser also has an internal clock for proof of visit and time management needs.

The Roadrunners Laser connects to any mobile device (PC, Tablet PC, Laptop, mobile phone, etc.) via a Plug & Scan connectivity solution from Baracoda. It is also compatible with Windows, Windows Mobile and CE.Net, Palm, Symbian, RIM (BlackBerry).

Baracoda's scanner is available now at an MSRP of €629.

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Bluetooth takes automotive hands-free to new levels

by Rafik Jalad, CSR

SYNC, and some typical devices it supports (Image courtesy of Ford).

An innovative in-car communications and entertainment system, SYNC, will soon start shipping in a wide range of Ford, Lincoln and Mercury vehicles. Developed jointly by Ford and Microsoft, the system takes Bluetooth automobile applications to a new level, by adding wireless streaming of music from a user's cellphone, or other compatible device such as a PMP, into a vehicle's infotainment system.

Hands-free telephony will additionally be enhanced via voice-activated dialling using a mobile's standard phonebook data, which can be automatically downloaded. Another neat feature is the ability to handover seamlessly from making a call directly into the phone, to a hands-free Bluetooth connection when entering the car, simply by pressing a button on the steering wheel.

CSR's BlueCore4-ROM Plug-n-Go Bluetooth compatible device, has been chosen for the application. In this pioneering system, which is sure to have an influential impact on the penetration of Bluetooth in automotive applications. The potential scale of the wireless network required the Bluetooth system to support multiple devices — such as a mobile phone and MP3 player — and exploits CSR's firmware support for scatternet implementations.

SYNC is likely to have a lot of influence because of its open and flexible nature, and the way it caters (and improves support) for both established and evolving applications. The system's advanced voice-activated Bluetooth telephony elevates hands free capability to a logical, highly ergonomic level for example, making wireless communications easy and safe. This is likely to appeal greatly to the many professional users who rely on voice communications when travelling. Built-in echo and noise cancellation, and the BlueCore4 ROM Plug-n-Go device's support for eSCO, ensures users of call quality.

An additional ability to play digital media in cars will probably appeal more to younger audiences. Here again, the SYNC system provides a USB port for connecting today's storage devices, but also builds in A2DP support for streaming stereo from a mobile phone with player capability — providing almost universal support. The wireless capability is likely to gain a lot more prominence as MP3 players and PMPs increasingly adopt Bluetooth capability for wireless stereo headphones and other functions.

Ford and Microsoft's reference design is built on a software platform that is upgradeable and designed to support new features — including new Bluetooth capability — by upgrading the software. This will make field upgrades such as adding support for both Sink and Source A2DP feasible (to support, say, streaming DVD audio to wireless headphones in the back seat), and give the electronic subsystem the same kind of longevity as the vehicle itself.

The device used on this platform, CSR's BlueCore4-ROM Plug-n-Go device packaged in 10 x 10 mm BGA, is qualified to qualified to AEC-Q100, and operates over a -40 to +85 degrees C temperature range.

Rafik Jalad is Vice President of CSR's Automotive Business Unit.

The WPAN's New Year Resolution

by Dean Anthony Gratton

I shall not make false claims about bandwidth or range...

I shall not create 'draft' specifications...

I shall not pretend to get along with other technologies to their face and then take every opportunity I can to stab them in the back when they aren't looking...

I shall not allow commercial considerations to force changes to my spec...

I shall not... Etc, etc.

A new year beckons: the start of new promises and the declaration of our resolutions. What to improve upon and what to discard. What to make amends over and what to finally bury the hatchet upon. It's all in our heads when the clock strikes midnight and we strive to make our pledges a reality as the New Year takes its precedence. But, what if we could hear the resolutions of the technologies that occupy the Wireless Personal Area Networking (WPAN) space? If they had an opportunity to declare their promises for the New Year, what would they be? Many of us have defined our own personal goals for 2008 and with this in mind it's important to let WPAN have its say. After all, each wireless technology has its own personality; one which is not defined by the developer alone but more often is defined by the experience of the consumer.   In this article we take a condensed perspective of the technologies that make up the WPAN space and consider what we might expect from them over the next twelve months.

The WPAN family is occupied by a number of short-range wireless technologies that can uniquely be differentiated by the type of applications they support, along with traits such as data rates and radio range. Individually, they are characterized by consumers' experiences where we can easily envisage a customer branding a technology with some artistic flair like the drawing of moustaches, glasses and thicker eyebrows on a poster. Economic forecasters and the like predict a downturn in the market next year and a number of large players have already indicated a slump in profits, for example Freescale and Broadcom (November, 2007, Incisor.tv). Surely, the camaraderie of the WPAN family will not easily be defeated by such hitherto predictions; after all, they have already 'roller-coasted' through a pessimistic ride and have suffered several beatings from some hard-line judges that would easily put Simon Cowell to shame. The members of the WPAN family remain steadfast despite their critics and have demonstrated a wealth of features and capabilities that continue to surprise and amaze us. The family members namely, Bluetooth, Wi-Fi, Ultra Wideband and Near Field Communications (NFC) have created and established themselves as technologies that encapsulate a generation of personal-area networking. We characterise a WPAN family member as a technology that would typically be used in proximity to your laptop or desktop where the WPAN connection is further extended to the wide-area network through the Internet (Wi-Fi) or 3G technologies.

Bluetooth: "In 2008, I will look to deliver on my relationships with High-Speed Bluetooth (UWB) and Ultra Low Power (ULP) Bluetooth (previously known as Wibree)."

Bluetooth wireless technology is celebrating over ten years with a '10-Years Member Party' bash at the CES (Las Vegas) event – undoubtedly a deserved congratulatory pat on the back for a technology that has had an onerous journey. Nonetheless, Bluetooth was probably the first wireless technology to really define the notion of personal-area networking – a notion that has embraced other family members over recent years. Moreover, Infrared was never a technology that was awarded such a status – wireless connectivity became productive as a result of Bluetooth. Nowadays, Bluetooth technology is synonymous with mobile phones, in-car hands-free kits, stereo headsets and a lot more, which is something of a triumph despite the initial hype and PR fiasco. The Bluetooth Special Interest Group (SIG) has continued to evolve and move forward with interoperability techniques to overcome interference with other WPAN technologies, as well as, increasing its data rates to offer a wider range of applications. Additionally, the SIG has also introduced several iconic images that enable consumers to easily identify functionality and, in turn, simplify the consumers' experience of Bluetooth applications. It has established partnerships with other technology groups to further enhance and promote Bluetooth as 'the' wireless technology. High-Speed Bluetooth will be delivered through the integration of UWB technology into its specification in addition to accommodating

ULP, where Bluetooth hopes to offer ultra-low-power products; for example sport, health and fitness. In 2008, we should begin to witness the emergence of High-Speed and ultra-low-power products extending Bluetooth's application range further.

Wi-Fi: "This year I promise to continue to make Wi-Fi simpler and to pursue 802.11n ratification and certification?"

Wi-Fi encompasses 802.11a/b/g technology, which has enveloped a generation of consumers that can now innately connect to the wider-area network (office or Internet). Wi-Fi offers true Ethernet cable replacement technology, as it is now widely adopted by all sorts of industries to include entertainment, pleasure and business. The technology suffered initial concerns regarding its security and was rapped for its overcomplicated setup and configuration. Nevertheless, the Wi-Fi Alliance has triumphed and responded well to criticism with the introduction of WPA2 (802.11i) and Wi-Fi Protected Setup (WPS). The whole process will surely improve when NFC becomes more ubiquitous. Like Bluetooth, Wi-Fi's prevalence is paramount and with an increasing number of mobile devices supporting Wi-Fi connectivity, it has become clear to the Alliance that low-power, battery-saving techniques are increasingly significant. The Wi-Fi Multimedia (WMM) Power Save uses several techniques during data transmission that help reduce battery life. In a need to remain proactive in an industry that continually advances, the Wi-Fi Alliance has permitted Draft-N certification – perhaps as a taste of what is to come, but more importantly to remain in constant consumer focus. In the latter part of 2008, the Wi-Fi Alliance is expected to ratify the full 802.11n specification along with its certification in early 2009. What we will witness in 2008 is the delivery of improved quality of service and distended bandwidth offering greater support for a number of demanding video/audio-enabled applications.

Ultra Wideband: "I have already delivered on my previous resolutions and I will continue to deliver exciting UWB-enabled products in 2008."

In Incisor's December 2007 issue we featured a story about the WiMedia Alliance's steady approach as it takes Ultra Wideband to market. The WiMedia Alliance was accused of being late to market, but arguably the Alliance's approach with the introduction of the technology was to really ensure that its introduction to market was 'right' the first time. It's understandable that an Alliance, having the privilege to experience and witness other Alliances' experiences, may want to tread carefully in ensuring that Ultra Wideband's delivery to market is going to do exactly what it says on the box! Nonetheless, the WiMedia Alliance has been quite busy in its certification of silicon and upcoming products – all these products will naturally be

demanding of bandwidth and this is something clearly that Ultra Wideband is capable of delivering. It seems 2008 will see an influx of UWB-enabled products, but more interestingly it's the delivery of Wireless USB that will be the most exciting; albeit very early products are already in circulation.

Near Field Communications: "This year I promise to lead the wireless personal-area networking space and ensure that consumers' experience the best in wireless technology."

It might be an odd inclusion for NFC to be considered a WPAN technology, but it's no stretch of the imagination to realise that NFC will critically enable and simplify the range of technologies already within WPAN space. NFC is an inclusive component of the personal-area networking space offering its own unique applications, as well, as an intuitive enabler of others (see also '**Enabling Intuitive Connectivity using NFC**' in this issue). We will witness key applications, such as payment, ticketing and smart posters all supported through the mobile phone. In 2008, NFC has the potential of simplifying wireless technology whilst supporting the philosophy that wireless technology is easy to use.

Most of us no longer wrestle with the notion of wireless technology whilst others continue to tussle with some of the terminology and the expectation. Indeed, as innovators and developers we are conscious of a moving target – a target that is often defined by the consumer and their experiences. Nonetheless, we remain undefeated, as we continue to architect products to ultimately satisfy the group of consumers who are eager to resolve their differences with a generation of products that clearly simplifies our way-of-working. Moreover, we continue to develop new techniques enabling secure, simplified setup and configuration, as we refuse to become complacent in a knowledge that a group of consumers have yet to be reached. We repeatedly look at new innovative ways to overcome any shortcomings and in doing so we secure the longevity of wireless technology. We may occasionally hear the clichéd statement that the technology has revolutionised all of our lives and often a tear can be seen tricking down our cheek. Although more realistically, wireless has certainly changed how we work and how we look at connecting one device to another. It has afforded us freedom, in terms of mobility and connectivity in the home, work and away. It's a much more modest statement lacking vanity and theatrical pomp, but certainly it remains a well-balanced statement that can easily be measured.

The WPAN family members have endured the premise of fame and fortune and it is with no doubt that despite the prospective economic gloom wireless will continue to surprise us. The forecast for 2008: it will still feel good to be wireless.

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Bluetooth security – A product implementation perspective

By Girish Managoli, MindTree Consulting

Imagine this: you have just bought a swanky new car with a Bluetooth Car Kit and as you are learning to experience the new gadget, something bizarre happens -- your serene drive is suddenly interrupted by a ghastly voice emanating from your car speakers. Baffling? Not if you know about "Car Whisperer".

Security has been an important matter for the Bluetooth Special Interest Group (SIG). Though Bluetooth is inherently secure and the specifications provide all the necessary nuts and bolts for an implementer to put together a secure Bluetooth product, a chain is only as strong as its weakest link. A Bluetooth product is secure only if the implementer uses all the security features effectively. Incorrect implementation can make a Bluetooth device unsafe and render a user skeptic about its security.

The initial section of this article outlines the security features of individual Bluetooth components, and the subsequent section drills-down into the application component explaining the various types of Bluetooth security breaches and recommended solutions to thwart them from the product application.

Security of individual modules

Typically, Bluetooth components in a product are integrated rather than implemented from scratch. The host-based solution (also referred as two-chip solution), is common in many products, as shown in the Figure below:

Figure 1: Host Stack Architecture. To build a completely secure product, the individual components integrated must conform to appropriate security requirements. The following table provides information about the security features & responsibilities of individual components:

Component	Security Responsibilities
LMP, Baseband	• Supports all security related PDUs and sequences
Upper Layer Stack and Profile	• Supports security modes 2 and 3 and selection of security mode • Supports setting page scan modes • Supports variable length PINs • Supports a well-designed Security Manager with interfaces to set devices as trusted /untrusted • Supports enabling/disabling encrypted links
Application	• Appropriate selection of security features based on product requirements • Implementation of product use cases in a secure manner • Provides balanced user experience, without compromising on security

Secure usage of the product is the responsibility of the user, however, a good implementation should aid in preventing the user from unintentionally using the product in an insecure manner (for example, features like suitable display of warnings/tones when the user is about to do something potentially unsafe.) Let us examine how the product application can be implemented in a secure manner through a product example.

Security considerations in a product application:

We will consider the example of a Hands-free Car Kit (HFCK); the security attacks it may be prone to; and how these can be prevented in the implementation. HFCKs support features such as call handling and music streaming. The profiles typically required to realize these features are:

• HF (Hands-free Profile)/HS (Headset Profile)
• OPP (Object Push Profile) and/or PBAP (Phonebook Access Profile)
• A2DP (Advanced Audio Distribution Profile) and AVRCP (Audio Video Remote Control Profile)

Some of the security attacks HFCKs may face are:
(i)   Eavesdropping or "Car Whisperer"
(ii) "Bluejacking"
(iii) Stealing phonebook data

Let us consider, that we are dealing with a

sophisticated hacker, who has an air sniffer, PC-based tools, a directional antenna to increase the range, and can also follow around the car at high speeds!

The minimum information that the hacker needs is to "know" the device to be hacked is the BD_ADDR of HFCK. One of the scenarios for the hacker to find the BD_ADDR is when the HFCK is in a discoverable mode. All that the hacker needs to do is to execute an inquiry to find the target device. From the device names, the hacker can guess the target device rather easily. Keeping a device in discoverable mode at all times has been one of the mistakes committed by the early implementations. Fortunately, the new implementations take care to switch on the discoverable mode only when required. For a product like HFCK, the following guidelines would apply:

• HFCK must not be discoverable on startup
• HFCK must be put into discoverable mode ("pairable" mode as it may be referred to on UI) by the user to pair with other phone for the first time
• Pairing must be performed in secure environments since the data captured during the pairing procedure can potentially be used to compute the link key. The user must be alerted through a suitable warning on screen and audio beeps that pairing must be attempted only in safe environment, such as the user's home/garage
• After the pairing is successful, HFCK must come out of discoverable mode and become connectable, so that only a "known" device can connect
• A timeout period can be implemented, which means that if the pairing is not successful within the given time duration, the HFCK automatically comes out of discoverable mode. User must put HFCK into pairable mode again for it to be paired
• Number of retries for pairing option can also be provided

Let us consider another extreme case of a Bluetooth security breach. In spite of taking care of the above guidelines, the

hacker has managed to get hold of HFCK's BD_ADDR in some manner (let us say, the hacker's device had once been legitimately paired with HFCK, but it is no longer on HFCK's trusted/paired device list). Let us look at how to safeguard against the various types of attacks in such a case.

(i) Eavesdropping / "Car Whisperer"

The scenario depicted at the beginning of the article is the "Car Whisperer" hack.

Can someone get unauthorized access to the car speakers?

Yes. Only if the hacker is aware of:

- BD_ADDR of HFCK
- PIN used by HFCK

Possibility 1: The hacker's device had been paired with HFCK sometime in the past, but it is no longer on HFCK's trusted/paired device list, but the hacker is still aware of both the BD_ADDR and the PIN.

Solution:
- Do not use a fixed PIN. Generate a random PIN (which is displayed to the user) for every pairing session, or allow the user to enter their own PIN (through voice recognition, for instance)

Possibility 2: The hacker is aware of BD_ADDR, but not the PIN. Since many implementations use a "standard" PIN such as 0000 or 1234, the hacker can guess it easily. Usually all products of similar make use the same PIN; the hacker only needs to know the make of his target HFCK!

Solutions:
- Do not use a standard PIN. Generate a random PIN for every pairing session or allow the user to enter their own PIN
- Find a way to mass produce products using a different, unique PIN for each device. The unique PIN can be printed on the product package
- Allow only a single connected device at a time. If the user's device is already connected to HFCK, it would not be possible for the hacker to connect his device too

Can someone eavesdrop on the call conducted on the HFCK?

Yes. If the hacker:
- Has an air sniffer
- Is aware of the BD_ADDR of HFCK

When the hacker is aware of the BD_ADDR, he can simply use an air sniffer to capture all packets on air, to and from the HFCK, and can retrieve back the audio data from SCO packets (a simplistic view, but possible for a knowledgeable hacker with appropriate tools).

A good way to avoid this is to mandate encryption. All communication between the HFCK and mobile phone would be encrypted. The hacker, who captures the encrypted packets, needs an encryption key to decrypt the captured data. One of the inputs to generate the encryption key is the link key used between the HFCK and the mobile phone. Using the packets captured during the authentication procedure while connection is established, it is very difficult (though not impossible) to compute the link key. Using a non-standard PIN raises the complexity level to compute the link key.

(ii) Bluejacking:

Would we be seeing the famed "Bluejacking" [http://en.wikipedia.org/wiki/Bluejacking] now on HFCKs? This attack involves sending an unwanted message, masqueraded as a contact file, through use of OPP. HFCKs support OPP to receive phonebook contacts from the mobile phone, which are stored locally for the user to dial-out calls directly from the HFCK while driving, without having to reach for the mobile phone. The effect of Bluejacking is more of a nuisance, than a serious security lapse.

Let us assume that the hacker has somehow acquired the BD_ADDR of the HFCK. The hacker can then simply use a PC-based tool to send a contact over OPP to the HFCK's BD_ADDR. This problem can be prevented using one of these options:

- By using Security Mode 3 or Security Mode 2 with authentication mandated for OPP Service. In either of these cases, authentication is done for each contact push. This requires the sender of the contact to enter the PIN the first time and for subsequent times the link key authentication is done as depicted in Figure 3. This option takes more time and may not have a positive impact on the user's experience
- Another option is to give a thought about application use case i.e., the user would only push a contact from their mobile phone, which would also be used for Hands Free (HF). Thus, the mobile should already have been paired for using HF. Hence, the application would need to allow contact push from only a device paired for HF and simply reject OPP connections for all other devices

(iii) Stealing Phonebook data:

HFCKs have a locally stored phonebook downloaded from the user's mobile phone. Can a hacker access this sensitive information? Let us assume that the hacker has somehow obtained HFCK's BD_ADDR and can simply issue an OPP PULL

request. The following considerations can help an implementer avoid this issue:

- Is the Phonebook PULL functionality required to be supported by HFCK? If it is not really required, can we simply reject all such PULL requests?
- If this feature is required (let us say, the user has lost the data on the mobile phone and wants to retrieve the data available on the HFCK back to the phone), can it be made a user-initiated PUSH instead of PULL?

To summarize, HFCK can be guarded against security attacks by following some rules during product implementation:

- HFCK should be put into discoverable mode only through user action when required
- Instead of "Standard" PINs, randomly generated PINs (dissimilar for each pairing session) should be used. Consider options such as a user-specified PIN or a unique PIN for each device of the same make
- The product use cases can, many times, give insights for a secure implementation

For our discussion, we have considered Car Kit as an example. The guidelines provided are also applicable for other product types (laptops, headsets, mobile phones) as well.

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uwb/w-usb news

Pulse-Link UWB chipset outperforms other technologies

San Diego based UWB company Pulse-Link tells us that its recently released CWave UWB chipset has been validated in independent testing to have the world's highest data rate available for wireless networking. A test of UWB products, conducted by octoScope, showed CWave's 1.35 Gbps over-the-air signalling rate delivering 890 Mbps application layer throughput. Pulse-Link says that Cwave's performance was 15 to 20 times greater than all other wireless UWB products measured in the test, the best of which peaked at around 50 Mbps at close range.

A full report on the independent UWB test results has been published, and the arrestingly-named Fanny Mlinarsky, President of octoScope commented: "Pulse-Link's CWave technology has delivered on the promise of UWB – HD video distribution."

Results of wireless range were also reported in the octoScope testing: "The CWave throughput held at around 500 Mbps at up to 8 feet of wireless range. CWave sustained throughput of 115 Mbps up to 40 feet, at which point we ran out of space in the test facility." The CWave chipset also measured sustained TCP/IP throughputs of 500Mbps across 450 feet of coaxial cable.

"We can truly say that we currently have the fastest commercially available wireless networking chipset on the planet," states John Santhoff, Pulse-Link Founder and CTO. "The peak measured application layer throughput of 890Mbps represents an unprecedented breakthrough in wireless communications, not just UWB."

... and Pulse-Link launches CWave UWB Wireless HDMI home theater Solution

Concurrent with the performance announcement above, Pulse-Link told Incisor that its CWave Wireless HDMI production ready reference designs are now available for CE

device manufacturers. These enable real-time high definition audio and video distribution throughout the home.

The CWave UWB Wireless HDMI transmit and receive units are small form factor, production ready reference designs. Pulse-Link claims that CWave HDMI products offer real-time visually lossless wired and wireless streaming of high quality audio and video content between entertainment source devices and HDTV displays. Video data is encoded using the JPEG2000 video codec, the same codec used by movie theaters for "Digital Cinema".

Alereon introduces Wireless USB private label deal

UWB company Alereon has introduced a Private Label Program (PLP) for its AL5000 Worldwide Ultra Wideband Chipset.

The PLP provides complete designs, including all the documentation and software necessary to develop a worldwide Certified Wireless USB product including vendor customization and branding. Additionally, all of Alereon's PLP products are pre-certified from the FCC, WiMedia Alliance and USB-IF. Alereon claims that the program enables transfer of certifications to realize production-ready products in as little as four weeks.

"This new private label program is the fastest way for aftermarket vendors to get Certified Wireless USB products to market," said Eric Broockman, CEO of Alereon. "With our proven, worldwide-capable technology, Alereon can support customer differentiation through different levels of engagement, such as using our exact boards and plastics or by modifying the design for specific customer requirements."

The initial aftermarket products included in the program consist of Alereon's AL5608 Half-MiniCard, the AL5604 Wireless USB Adapter, the AL5605 Wireless USB ExpressCard/34, the AL5620 Wireless USB Video Adapter and the AL5612 Wireless USB Hub.

All of the PLP products are based on Alereon's AL5000 Wireless USB chipset, which integrates all of the RF circuitry, including synthesizer VCO/PLL, anti-alias filters, LNAs, PAs, baluns and transmit/receive (T/R) switches, the Media Access Controller (MAC) and Baseband Processor (BBP).

The AL5000 covers the entire WiMedia spectrum from 3.1 GHz to 10.6 GHz, including Bandgroup 6, which is the only Bandgroup recognized to meet regulatory requirements worldwide.

CSR joins WiMedia Alliance Board

CSR tells Incisor that Kristine Overlaur has been appointed to the board of the WiMedia Alliance, which is responsible for bringing UWB (Ultra Wideband) Bluetooth to the mass market.

UWB is 100 times faster than regular Bluetooth over short distances, and as such, the market opportunity is expected to be significant in data rich applications such as mobile video content sharing. Whilst preserving the low power aspects of Bluetooth and fitting into the existing Bluetooth ecosystem, UWB Bluetooth will be featured in mobile devices in 2008.

CSR is known to be developing UWB technology for worldwide use in mobile phones and other battery powered portable devices, and is expected to make single chip silicon available in the second half of 2008, with volume ramping in 2009.

Kristine Overlaur, Senior Standards Architect, CSR, commented, "CSR will be making significant contributions to the WiMedia board of directors and continued contributions in order to ensure the rapid progression of the UWB market globally. As experts in designing and manufacturing highly integrated, low power CMOS radios, CSR is perfectly placed to meet the demands of the UWB market."

Overlaur joins senior executives on the WiMedia Alliance board from companies including Nokia, Samsung and Sony.

uwb/w-usb news

Real-time video over Wi-Fi demo at WRC Wales Rally GB

ProVision Communication's technology was used to enable real-time multicast video streaming over Wi-Fi of the action on the first day of the 2007 World Rally Championship (WRC) Wales Rally GB on Friday 30 November.

Spectators in the hospitality area at the Walters Arena were able to watch and select a choice of video channels showing the action at different parts of the rally course, using Wi-Fi -enabled PDAs and smartphones equipped with ProVision's software decoder running on Windows Mobile 5 and Mobile 6 respectively.

Two video cameras were located around the rally track, remotely from the stadium, and another was positioned inside one of the rally cars. The video feeds, powered by ProVision's H.264 technology, allowed spectators at the venue to have personal access via the hand-held terminals to a choice of real-time audio and video streams across the stages from both the trackside and the in-car cameras.

ProVision's H.264 video encoding and decoding modules (codecs) formed a key part of the demonstration staged at the WRC Wales Rally GB by VISUALISE, a UK government sponsored project. Each ProVision module comprised a DSP-based H.264 module for the real time encoding and wireless transmission of video from a camera, and the software-based decoder platform that allows it to be received on a PC, PDA or smartphone. The encoded video signal was transmitted and received through an integrated IEEE 802.11b/g modem that incorporates antenna diversity.

On the handheld terminal a customised graphical user interface (GUI) allowed the spectator to select the video or information channel they required from a menu.

A number of communications technologies – 3G, 802.11b/g Wi-Fi, satellite and Ethernet – were used in combination to deliver the video signals to the spectators, with the ProVision units providing the enabling links both for the Wi-Fi unicast from each camera to the servers at the media control centre and for the multicast over Wi-Fi from the servers to the handheld terminals.

ProVision describes the main strengths of its technology as packet loss resilience, optimised strategies for UDP/IP packet encapsulation, and methods for flow/buffer control and error feedback.

Wi-Fi to ship 300 million chipsets in 2007, but Bluetooth remains well ahead

Wi-Fi chipset sales are poised to reach 300 million units this year, according to new data released today by the Wi-Fi Alliance and In-Stat. Growth has been driven, the two parties say, by ongoing strength in the PC networking market and new growth in consumer electronics and handsets. The 300 million number represents a 41% growth rate from 2006, in which 213 million chipsets were shipped.

In-Stat further predicts that by 2011, about 700 million devices will ship with Wi-Fi on board, and that by that time, Wi-Fi-enabled consumer electronics and phones will begin to exceed notebook computers in the total number of shipments.

In-Stat observed that inclusion of Wi-Fi in consumer electronics has become more widespread this year, with the 802.11g standard wirelessly connecting some of the most popular consumer gadgets, including phones, MP3 music players, and gaming devices. It was also

felt that the June 2007 introduction of certification for products based upon 802.11n draft 2.0 helped boost sales of new higher-throughput products to 9% of the total shipments.

These numbers look good, but, by way of perspective, an October 2007 report from IMS Research predicted that 800 million Bluetooth chips would ship in 2007, with 500 million going into the cellular handset market alone. IMS is a contracted supplier of market data to the Bluetooth SIG these days, so its numbers ought to be reliable. Beyond that, the SIG's own forecast is that 2 billion Bluetooth chips will be shipped annually by 2010 – three times Wi-Fi's number and a year earlier.

Certification of 802.11n draft 2.0 boosts Wi-Fi certified products

More than 4,000 products have now achieved Wi-Fi certification since March 2000, and the Wi-Fi Alliance (WFA) believes that recent growth in certifications is thanks in part to Wi-Fi Certified 802.11n draft 2.0, launched in June 2007. According to the WFA, growth in the diversity of Wi-Fi-enabled product types, as well as next-generation 802.11n draft 2.0 products, have led to the certification of more than 1,000 Wi-Fi products over the last 15 months.

Since the launch of the draft 2.0 program in June of this year, the WFA has certified more than 150 products for 802.11n draft 2.0, nearly three times the number certified for 802.11a/b/g in the first three months of their respective testing programs.

Many observers, including Incisor, have questioned the practice of supporting a draft specification. Vendors in the Wi-Fi equipment market, however, seem untroubled by concerns over interoperability and future-proofing.

Wi-Fi in handsets – bright future or dismal prospects?

IMS Research believes that the industry hype and level of discussion surrounding fixed-mobile convergence (FMC) would lead most casual industry observers to believe that in the near future all handsets will feature Wi-Fi capabilities, and that everyone will use their cellular handsets to make voice over IP (VoIP) calls in the home and the office.

However, the reality is that, at the start of 2006, there were globally only around ten handset models featuring built-in Wi-Fi chipsets, says IMS. The count has risen to approximately 25 handset models in 2007, driven by operators of both mobile and fixed networks launching fixed-mobile services and special home-zone tariffs. However, each operator still only provides a very limited choice of handsets with each service typically only supported by up to five different models. Additionally, many consumers who purchase Wi-Fi equipped handsets never use the functionality. Some of the new services that were announced in the second half of 2007 have started to address this issue and are planned to provide a greater choice for the subscriber, which should increase the attraction of FMC offerings.

The other barriers to take-up of FMC services, directly affecting the demand for WLAN-enabled handsets, are the network and standards requirements that operators have to address. Many operators are still unsettled by the lack of commitment to a standard, be it UMA, SIP-based or another mobile VoIP solution. This uncertainty, plus the inherent desire to protect their existing service revenues from potentially disruptive third-party offerings such as Skype and Vonage, is delaying demand for Wi-Fi equipped handsets. Also, femtocells are starting to emerge as a viable marketplace solution, offering operators an option for an FMC solution that goes directly from cellular to broadband without the need for Wi-Fi as a bridge.

According to Bill Morelli, Mobile Technologies analyst at IMS, these barriers are having an impact on market growth. "From very few shipments in 2006 (1.6% of the global total), shipments of Wi-Fi equipped handsets are forecast to reach nearly one in five of annual shipments by 2012" states Morelli. "While this is respectable growth, it is far more moderate than what many ardent FMC supporters are projecting."   This is

primarily due to FMC services (both voice and data) being targeted at high-usage enterprise and leading-edge consumer customers. Operators are not predicted to want to provide such handsets to low-spending users, the ones most likely to seek third-party mobile VoIP applications in an attempt to avoid the cost of cellular calls. At present, Wi-Fi equipped handset shipments are expected to be limited to high-end feature-rich phones and smartphones, and will be priced out of the reach of the majority of users. Further, the Wi-Fi equipped handset market will be limited to subscribers with access to Wi-Fi access points for voice and data services.

IMS commented that while this looks like a fairly gloomy set of predictions, there is light on the horizon. The successful launch of several commercial UMA-based services, such as T-Mobile's HotSpot @ Home and the Unik service from Orange, have shown operators that there is revenue potential in Wi-Fi. Additionally, high profile partnerships such as Apple's arrangement with Starbucks to provide free music to iPhone users over Wi-Fi are driving stronger consumer interest.   Operators are also leveraging their existing network of Wi-Fi hotspots to attract cellular customers, for example, the UK O2's iPhone contract includes unlimited access to The Cloud's 7,500 hotspots.

These factors are expected to drive wider support and product variety from chipset manufacturers, handset vendors and operators from now. Apple and Nokia's decision to include Wi-Fi in their flagship products, the iPhone and N95 respectively, highlights the positioning of WLAN as a key differentiating technology, and is helping to raise consumer awareness. Increased competition between service providers is expected, as they seek to gain new subscribers and reduce churn; many operators in mature markets are expected to continue in attempts to acquire broadband providers. Improved chipset availability and choice will also help to drive the market, with companies developing single- and dual-chip solutions, specifically targeting this market. In addition, the handset OEMs will see an opportunity to market converged devices to subscribers in an attempt to differentiate their products, and to tap into the growing popularity of mobile VoIP and data access.

Enabling intuitive connectivity using NFC

by Dean Anthony Gratton

Near Field Communications (NFC) has appeared in footnote news for a number of months now in Incisor (notably, October 2007 and December 2007) and various other publications.   It has also appeared in a commercial context where we have seen NFC integrated within a number of mobile phones on a trial basis for the London Underground (see page 18 - O2 announces O2 Wallet and NFC trial) and on a larger scale with several rollouts across Europe and the US. However, in a recent surge of press releases and various announcements, NFC is anticipated to become integrated as a standard technology into mobile phones and a host of other products.

In a marketing white paper ("The Keys to Truly Interoperable Communications," nfc-forum.org) a Frost & Sullivan study purports that "One third of all mobile phones will be NFC-equipped in a span of three to five years," March 2007. Remarkably, a variant of the technology has already established itself and has been widely used in Japan (FeliCa), Hong Kong (Octopus) and in London with its Oyster offering for some time now. But why the sudden push into daylight? Gradually we have been witnessing a stable portrayal of NFC-enabled application growth, all toned with modest features and capabilities. With its innate ability to enable connectivity with proximity or through the merest touch, NFC

will surely evolve into an intuitive and transparent mechanism that switches on other short-range wireless technologies as well as hosting a number of genius applications. For a while, NFC has gone unnoticed only making guest appearances in footnote news. But, fundamentally it has a paradoxical ability to disguise itself within most modest devices retaining an omnipresent yet invisible guise that can potentially unleash what can only be described as a supernatural ability to allow consumers to truly experience wireless connectivity at its best.

Big names, widespread support

Historically, Sony (www.sony.com) and Philips (www.philips.com) jointly developed NFC. It was initially derived from their contact-less or smartcard technology, namely FeliCa and Mifare which were respectively developed by Sony and Philips. The NFC standard was approved in late 2003 where it offered compatibility and interoperation for future NFC-enabled products. The specific RF requirements during read/write operations of NFC devices are mandated by the ISO/IEC (International Organization for Standardization / International Electrotechnical Commission), ETSI (European Telecommunications Standards Institute) and the ECMA (European association for standardizing information and communication systems)

technical committees. An initial number of sponsors formed, namely Nokia, Sony and Philips who launched the NFC Forum (nfc-forum.org) in March 2004, but the list of members have increased considerably (now over 135 active members) and the recent news (December 2007, Incisor) that NTTDoCoMo has joined the NFC Forum as a sponsor member further demonstrates its growth in popularity.

The technology utilises the Industrial, Scientific and Medical (ISM) unlicensed band 13.56KHz operating within a distance of between 5cm to 10cm. It offers data rates of 106Kbit/s, 212Kbit/s and 424Kbit/s and uses an inductive-coupling technique (the transfer of energy) using an electromagnetic field which, in turn, through induction, is able to stimulate current in the passive (or target) device. An NFC-enabled device may operate in one of two modes depending on the application context. In a typical passive operation a mobile phone will contain the NFC-enabled silicon, which is capable of read/write operations whereas the other device will simply contain an NFC-tag. For example, a smart poster will contain an NFC-tag, which remains passive until a consumer 'touches' the poster with the mobile phone. The passive NFC-tag will essentially power-up (now becoming active) enabling the phone to read its data. In an active mode operation, both devices may be NFC-enabled and have their own power sources. For example, an NFC-enabled mobile phone along with an NFC-enabled payment system would actively communicate. Incidentally, NFC and RFID are often used synonymously, but fundamentally they both have similar topologies with active and passive operational modes. The technologies have some subtle differences primarily surrounding the usability, technology and its range, but most important remain compatible.

No need for noise

We have established that NFC has been around for many years and hasn't really sought notoriety when compared with other short-range wireless technologies. Like Ultra Wideband (Incisor.tv, December 2007), it seems that the NFC Forum has taken a steady approach with the development of the technology and the associated announcements remain void of any

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outlandish marketing hype and PR. However, the NFC's quiet temperament is perhaps supported by the technology already successfully working in several contexts. It is often said, "You have to watch that one; always keep an eye on the quiet one." Rest assured, NFC is unlikely to have the same predisposition as TV's Dexter (Showtime.com) a serial killer who must relinquish a primal need to kill others, albeit through the slaughter of other serial killers that have escaped the judicial system (it all makes sense!). But hopefully more of the 'shy boy' in the classroom that keeps his head down; focuses on the lesson and returns his homework on time. Moreover, this personable and charismatic young man on reaching the cusp of adulthood naturally excels in his business initiatives and consequently establishes himself as a successful entrepreneur – akin to a very young Richard Branson.

With the upcoming International CES 2008 event (Las Vegas), NFC will undoubtedly have a difficult time remaining unnoticed, but why should it? This young man has now established his confidence within an often sceptical market and with his peers where he can modestly introduce himself as a technology that will not only simplify connectivity for other wireless technologies, such as Bluetooth, Wi-Fi and Ultra Wideband, but will support a number of new unique applications such as smart posters (advertising), payment through mobile phones, ticketing at car parks and cinemas all offering consumers such convenience. It is evident that NFC isn't a competitor to Bluetooth, Wi-Fi or Ultra Wideband. It's a natural leader offering guidance and support with other short-range wireless technologies and is also capable of delivering several unique applications that sets it apart from any other technology. It remains ambitious whilst retaining modesty regarding its capabilities and wireless acumen.

With a notion of touch and proximity consumers can embrace and appreciate a useable technique for simply establishing and securing a wireless connection with ease. The NFC Forum supports this philosophy as it has created an NFC Target Mark, which will help consumers identify products that are NFC-enabled. Moreover, it should reinforce the usability context where hopefully consumers will learn that they just have to bring the two devices together to establish a connection. In some instances, this pivotal ability, to 'know' how to connect, is lacking in many wireless products and, as we have discussed, can cause some confusion. The future success of short-range wireless technologies could be further enhanced with NFC as an intuitive enabler of other wireless technologies; it fundamentally demystifies the often complicated setup process and its configuration when connecting one device to another. In fact, the Wi-Fi Alliance has proposed NFC as part of the Wi-Fi Protected Setup (WPS) specification, along with PIN and pushbutton procedures. The Wi-Fi Alliance had to address issues concerning consumers who were returning Wi-Fi access points to the supplier after receiving several complaints over setup and configuration. With the introduction of the Wi-Fi Protected Setup specification the Alliance can now finally begin to offer simpler setup and configuration procedures for a large number of non-technical consumers. The Bluetooth SIG will also integrate NFC into its specification offering simpler pairing and connectivity schemes for a host of Bluetooth-enabled products as well as speeding up the connection time between both devices. Likewise, the Wireless USB group have incorporated the technology "touch-and-go" into their v1.1 specification (nfc-forum.org).

Is it safe?

As for security: NFC enables connectivity through proximity or touch and remains inherently secure, which is supported by the operating radio range and the fact that the majority of transactions are usually short. Additionally, when enabling a Bluetooth or Wi-Fi connection, naturally the software protocols and architecture of these technologies can further create a secure and encrypted connection once established. But let's not forget the initial contact and in particular serving applications, such as mobile payments and ticketing – here consumers would naturally have concerns regarding the nature of the sensitive data. NFC uses two coding schemes, namely Miller or Manchester. The coding scheme used is selected depending on the data transfer rate during the initial exchange, but typically the initial transaction between the two devices remains quite short. It is expected that an eavesdropper would have to be in similar proximity to the user (of the device). Perhaps, you should ask yourself: "if someone was that close to you – you would certainly notice?" Furthermore, there's also a degree of probability that needs to be added to this equation: someone somewhere has to be in the right place at the right time in order to successfully capture and reverse engineer the protocol and other miscellaneous data that is exchanged during the initial contact. An eavesdropper would need the appropriate equipment, along with a reliable RF signal – in general it's perceived to be somewhat of a moving target. Moreover, why not offer the consumer a simplified authentication prompt at the user interface for some applications: "Do you want to connect to this device: Yes or No?" And, if after a pre-defined timeout period where the consumer hasn't responded, then the proposed connection can terminate. It is clear that there is no PIN exchange; no accidentally leaving your device open to discovery and most of all avoiding manufacturers' default settings. NFC really does put the consumer back in charge.

Wireless technology doesn't have to be complicated.

Near Field Communications can infuse a consumer generation, not only the early adopters, but a large consumer-base that so desperately wants the convenience and simplicity afforded to it by wireless. Let's keep NFC simple.

O2 announces O2 Wallet and NFC trial

As mentioned in our main NFC feature above, UK cellular operator O2 has launched the UK's first large scale pilot of NFC (Near Field Communications) technology on mobile phones. The trial of the O2 Wallet paves the way for the mass market use of mobile phones to pay for purchases, access events or even be used as Oyster cards for travel on London's public transport systems, simply by touching the phone to a reader.

"Research shows that people are more likely to return home if they leave their phone behind than their wallet or keys," said Cath Keers, Customer Director, O2 UK.

"So why not have your wallet on your phone? We believe that NFC technology is going to fundamentally change the way people use their mobile phones."

The trial, which will involve over 500 people invited from the O2 customer base, takes place across selected sites   ➜

Snippets

throughout London and begins on 28th November 2007 running for six months until the end of May 2008.

The NFC trial is looking to enable a wide range of secure uses including cashless payments, public transport, event ticketing, and smart posters. In order to make this as comprehensive a pilot as possible, O2 has brought together a broad range of partners, including Transport for London, TranSys, Barclaycard, Visa Europe, Nokia and AEG.

Each trialist will be given a Nokia 6131 NFC handset installed with the O2 Wallet. Just like a normal wallet, this will hold various everyday cards, including Oyster and Barclaycard, but in virtual form and with NFC functionality. Trialists will be able to test a wide range of different services in London, such as making purchases in retail outlets and travelling on London's public transport system. All participants will be asked to provide feedback on the services featured in the O2 Wallet evaluating its ease of use, security and overall usefulness.

A range of services

Accessed from the phone's main menu, the O2 Wallet shows all the NFC services available on the handset in addition to information about each service and customer support.

All 500 trialists will have Oyster on their phone enabling them to use their handset to pay for travel on the Tube, buses and trams across the Capital. They will also be able to top up their Oyster by touching their handset on Oyster ticket machines in tube stations or at Oyster ticket stops. If a trialist's phone rings, they can still answer the call and continue to make a transaction. A call or text message will not interfere with the NFC service.

Trialists will also be able to touch the NFC-enabled handset on selected smart posters at the launch and at other locations over the course of the trial. The smart posters contain embedded tags which serve as shortcuts for services enabled through the handset. Once the user taps the poster with the handset, they will automatically dial a number, send a text message or be sent a shortcut to a mobile internet site with more information about the subject on the poster e.g. an event taking place or downloading content.

Mobile payments

The trial will also examine mobile payments using the Barclaycard payment application in the O2 Wallet. A subset of trialists will be able to use the growing number of 'contactless' payment readers at retailers in and around London to

purchase goods for GBP 10 or under. They will simply need to tap their phones on the secure reader and transactions will be completed in a matter of seconds.

In the initial phase of the trial, Barclaycard will credit each phone with GBP 200 worth of non-reloadable funds which trialists can use and spend as they see fit at any participating retailer. As well as making payments, they will also be able to use the phones to check available funds and to locate retailers close to them that accept 'contactless' payments, including Books Etc, Chop'd, Coffee Republic, EAT, Krispy Kreme, Threshers and YO! Sushi.

The partners are keen to extend the payment functionality delivered to trialists as part of the O2 Wallet and are actively discussing the opportunities to develop the trial service further in 2008. Possible developments include PIN capability, over GBP 10 purchases and reloadable / credit funds capability.

AEG Europe, which operates The O2 (the music, sport and entertainment venue in London formerly known as the Millenium Dome), will also be looking into how the NFC handset can be used to enhance the customer experience at The O2. All trialists will be able to use their NFC handsets to gain entry into the blueroom at The O2 - the exclusive bar for O2 customers and guests in the venue. The experience will be managed by O2 Angels whose own NFC handsets will display the name of the trialists enabling a personalised greeting into the blueroom.

Cath Keers added: "This trial is going to provide insights which will prove crucial to getting the customer experience right as we bring NFC on mobile to market. But the trial is just the start of this journey. For this to work we will need the whole ecosystem to come together which means mobile operators, banks and retailers all working together to fulfill a shared vision. If we get this right we can place the UK at the forefront of technology innovation."

This is a broad and fairly large-scale NFC trial. It will be interesting to see how it pans out (no pun intended). Incisor will follow up further into the trial.

picoChip scoops up three awards

picoChip has won the Design Application of the Year, Fabless Semiconductor Company of the Year and Company of the Year Awards at the Elektra European Electronics Industry Awards 2007. picoChip was the only company to take home three awards.

There were joint winners of the Company of the Year Award with component distributor Anglia Components joining wireless semiconductor supplier picoChip Designs on the winner's rostrum. picoChip won the Design Application of the Year Award its femtocell reference design.

IEEE members select new president

John Vig, consultant, System Planning Corporation; Colts Neck, New Jersey, USA, has been selected as 2008 IEEE president-elect. Pending acceptance of the Teller's Committee report by the IEEE Board of Directors, Vig will begin serving as IEEE president on 1 Jan. 2009. He will succeed 2008 IEEE President Lewis Terman, IBM Research Emeritus.

At the time of writing, all results were unofficial until the IEEE Board of Directors had accepted the report of the Teller's Committee during the November meeting series.

Global mobile penetration hits 50 per cent

Figures released by industry analysts Informa Telecoms & Media at the end of November revealed that worldwide mobile subscriptions had hit 3.3 billion - equivalent to 50 per cent of the global population - just over 26 years since the first cellular network was launched.

"The mobile industry has constantly outperformed even the most optimistic forecasts for subscriber growth," said Mark Newman, chief research officer at Informa Telecoms & Media. "For children growing up today the issue is not whether they will get a mobile phone, it's a question of when."

Samsung now # 2 global handset maker

Samsung has replaced Motorola as the second largest global mobile-handset maker, according to newly released third-quarter data from Gartner. Samsung's market share was 14.5% while Motorola ended the third quarter with 13.1%. At the head of the pile, Nokia increased its share to 38.1%.

nfc / rfid news

NFC Forum Global Competition

The NFC Forum has announced a call for entries for 'Touching the Future', an NFC Forum Global Competition. In the competition, developers in a commercial track vie for the honour of having their solutions named "The Best NFC Service of the Year 2008," while a research track recognizes "The Most Innovative NFC Research Project of the Year 2008."

Focusing on the theme "Innovation at Your Fingertips," entries will be judged on their innovation, commercial potential and usability, as well as quality of design and implementation. The competition's Organizing Committee is now accepting submissions; all final proposals must be received by February 15, 2008. Twenty finalists will be judged on April 29, 2008 at the NFC Developers Summit, held in Monaco during the WIMA event. The

winners will be selected by a jury composed of professionals and experts from sponsoring companies.

"One of the most exciting things about NFC technology is how organizations are applying it to the broadest range of applications in new and imaginative ways," said Christophe Duverne, chairman of the NFC Forum. "This competition recognizes the top innovators in the world while supporting networking in the NFC community to exchange ideas and create new business models."

Commercial Track submissions require a business case and prototype; entries will be evaluated on how successfully and innovatively their solutions meet the needs of key vertical market segments. Research Track submissions require a prototype and will be judged on creativity and innovativeness.

NFC Evaluation Kit now available

Stollmann is inviting developers to explore the possibilities of contactless chip cards, RFID tags and Near Field Communication with its NFCStack+Eva evaluation kit. This features a user interface, USB reader, NFC tags and complies with the most recent NFC Forum standards.

The scope of the PC software includes the reader/writer stack, NDEF and RTD analysis and the user interface for control and visualization of near field communications. Developers can follow the data traffic routed via the NFC stack API that forms the basis for the development of NFC software. Stollmann believes that the NFCStack+Eva evaluation kit is therefore particularly suitable for testing NFC components and for taking the first steps in the worlds of NFC and NFC application development.

Snippets

New board member for CSR

Chris Ladas, Senior Vice President Operations will join the CSR board on 1 January 2008. Ladas has led CSR's manufacturing and testing operations since May 2000. According to CSR, he has been instrumental in establishing CSR's supply chain partnership with TSMC, a world leader in wafer foundry operations and ASE, the largest assembly and test subcontractor in the industry.

Joep van Beurden, CEO said " Chris has helped build important strategic relationships with our key fabrication and test partners. His guidance and wider semiconductor industry experience will be a valuable addition to the Board, particularly as our product portfolio continues to broaden."

NXP Semiconductors to acquire GloNav

NXP Semiconductors is to acquire GloNav Inc., a US-based fabless semiconductor company developing single-chip solutions for global positioning systems (GPS) and other satellite navigation systems.
NXP will purchase the company for US$85 million in cash plus up to US$25 million in cash contingent upon GloNav reaching certain revenue and product development milestones over the next two years. NXP predicts that by 2010, approximately 40 percent (some 560 million) of mobile phones will be equipped with the GPS feature.

Wi-Fi / Wireless LAN

New white paper explores Voice over Wi-Fi benefits

The Wi-Fi Alliance has released a white paper, "Delivering the Best Experience with Voice over Wi-Fi Programs," which details the requirements of the voice application on Wi-Fi devices and previews its Voice-Personal certification program, planned for launch in the first half of 2008. Growth in the widespread use of voice over Wi-Fi in the consumer market is expected to accelerate over the next few years.

Analysis
Science education needed – fast!

By Manek Dubash

I suggested recently that part of the reason why technology proves such a problem for so many was due in part at least to a lack of scientific education. I received a flood of responses suggesting that we struck a rich vein of frustration on this issue. Well, one individual was keen enough to agree...

However, in suggesting that the problem is confined to the upper reaches of the British class system, we may have done the rest of the UK's educational system a disservice. It's clear that the problem of a lack of scientific education is just as widespread among the rest of the population.

The latest row over Wi-Fi, prompted by an unbalanced edition of the BBC's once-great Panorama current affairs documentary, is evidence enough.

The BBC's editorial complaints unit recently ruled against Panorama's bosses, and criticised the way that the editorial team constructed a documentary about wireless networking in schools.

Only one scientist supported the idea that Wi-Fi was, on the balance of evidence currently available to us, probably OK, and his arguments were questioned. Fair enough so far, but the other side of the argument was buttressed by three scientists, none of whose arguments were questioned.

This, according to the BBC's complaints unit, "gave a misleading impression of the state of scientific opinion on the issue". Quite so.

But in the meantime, the letters pages of local papers are humming with anxious parents worrying about Wi-Fi in schools, and the writers backing their arguments using circumstantial, unscientifically produced evidence that so-and-so felt dizzy when the system was switched on.

Yet in focusing on one result, people miss the point that Wi-Fi can hardly constitute a major danger when the rest of the world and all available evidence point to the risk, if any, being miniscule.

Meanwhile, no-one on the Panorama team is likely to lose their job for misleading the nation, while dozens of other news staff are being shown the door in the latest round of cuts.

It's a pity they're not all being put to work producing scientific literacy programmes in the guise of celeb-led reality TV.

zigbee/802.15.4 news

ZigBee addresses energy demand management

Ember has teamed up with Itron, a technology provider to the global energy and water industries, to help electricity utilities reduce peak load demand and home owners conserve energy by using ZigBee-enabled wireless technology.

Itron has integrated Ember's ZigBee technology into its OpenWay Advanced Metering Infrastructure (AMI) platform. Specifically, Itron's Centron smart meters are embedded with Ember's ZigBee chips and software to provide a two-way communication pathway to the home for energy load control and demand response. The two companies believe that the technology will enable homeowners to make more informed decisions about their energy usage and promotes energy conservation.

OpenWay Centron smart meters serve as a gateway for Home Area Networks (HANs) of wireless devices such as ZigBee thermostats, load control devices, in-home displays, and smart appliances. Itron's smart meters also support time-of-use pricing, load profile data and other advanced features required for "Smart Grid" initiatives, such as California's Title 24 regulations aimed at modernizing the electric grid to reduce peak demand. These features include full two-way communication between the home and utility, a load-limiting remote disconnect and reconnect switch, positive power outage detection and restoration notification, voltage monitoring, theft detection, and the ability to reprogram the meter remotely.

OpenWay Centron smart meters use Ember's chip and EmberZNet PRO networking software platform to communicate with ZigBee-enabled devices in a home. The Ember system interfaces the HAN with load control devices, enabling utilities to manage a household's energy consumption during peak load demands, among its other applications. The bi-directional meter also continuously measures and displays active energy delivered to the home, letting consumers see where, when and how energy is being consumed.

"Studies show that demand response programs can reduce peak electricity demand by five percent over the next five years, saving consumers more than $3 billion in annual electricity costs," said Dennis Natale, Ember's director of sales for the America's.

Jennic launches JenNet stack

Jennic has introduced JenNet, a free proprietary wireless networking stack for its range of 32 bit single chip wireless microcontrollers. Based on the IEEE 802.15.4 standard, it is scalable from just a few nodes to large networks of up to 1,000 nodes, and addresses a range of applications, including street lighting systems with long strings of nodes, and large building management systems.

A range of network topologies are possible, including star, tree or linear formations that can accommodate long strings of nodes. Jennic added that, since it is based on the established IEEE 802.15.4 standard at 2.5GHz, it can co-exist with Wi-Fi and Bluetooth.

JenNet provides users with an application development path through its two programming interfaces, Jenie and AT-Jenie. These are provided together with products that facilitate all stages of the development cycle, from initial design support with evaluation kits, through modules, to chips.

AT-Jenie provides a serial command interface to the network, enabling existing products to add wireless network capability by using the chips or modules as a wireless co-processor alongside a PC or existing host processor. Jenie is a simplified 'C' programmer's interface, providing access to the whole of the network stack and enabling users to develop fully customized 'C' applications using Jennic's standard software development kit.

events

DATE	EVENT	LOCATION	NOTES	LINK
Jan 7 - 10 2008	2008 International CES	Las Vegas, USA	-	http://www.cesweb.org/
Jan 27 - 30 2008	ISPO Winter	Munich, Germany	Bluetooth SIG participates in Wearable Technology sector	http://www.ispo-winter.com/
Feb 11 - 14 2008	3GSM World Congress	Barcelona, Spain	-	http://www.mobileworldcongress.com/
Feb 11 - 15 2008	Bluetooth SIG UnPlugFest 29	Las Vegas, Nevada, USA	-	www.bluetooth.org
March 31 2008	Pheonix, Arizona, USA	Bluetooth SIG All Hands meeting	-	www.bluetooth.org
April 1 - 3 2008	CTIA Wireless 2008	Las Vegas Convention Centre, Las Vegas, Nevada, USA	-	www.ctiawireless.com
May 13 - 15 2008	EURO ID 2008	EXPO XXI, Cologne, Germany	Application options for RFID and barcode systems	http://www.euro-id-messe.de

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