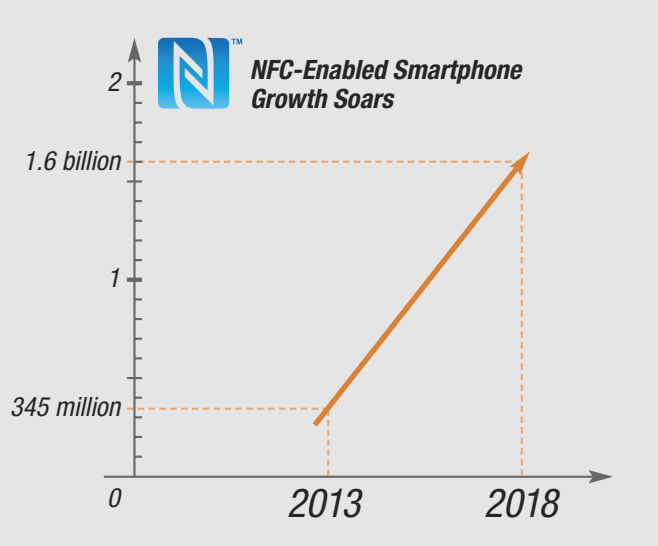
SMARTRAC

Smart and Perfect Together: NFC, Bluetooth, and Wi-Fi Make Mobile Connections and Content Sharing Easy and Convenient

Thought Leadership White Paper

NFC, Wi-Fi®, and Bluetooth®: The Power of Three

After playing a supporting role in smartphones everywhere, NFC technology is ready to take center stage in your customers' lives. This close-range, low-power wireless technology provides instant, seamless connections with Bluetooth devices and Wi-Fi networks, making critical processes faster, easier, and better. Customers can use NFC inlays to facilitate media sharing among smart devices, connect to Bluetooth devices and Wi-Fi networks, acquire vital information about their health and fitness via wearables, and monitor home appliances. NFC stickers and inlays are appearing in home electronics such as TVs, routers, printers, and cameras; are embedded in smart wristbands, watches, and hands-free devices; and are carried for perpetual on-the-go Wi-Fi access. NFC technology is so useful that it's even being placed in refrigerators and washing machines to provide vital information about appliance performance, while streamlining key functions and maintenance.



Sources: ABI Research website. ABI Research and Global Industry Analysts, as reported in NFCWorld.

SMARTRAC® is the largest global RFID and NFC tag and inlay manufacturer. As a principal member of the NFC Forum, SMARTRAC has extensive experience working with all major IC suppliers. We partner with electronics, entertainment, and toy manufacturers and creators to deliver NFC-enabled learning and gaming experiences that blend the physical and virtual worlds.

Totally Connected: The Velocious Family

Let's see how the fictional Velocious family is using NFC, Bluetooth, and Wi-Fi networks to power their lives in the year 2017. Meet parents Gig and Zetta and their four children: teenager Tweet, preteen twins Flash and Dash, and toddler Buzzy.

November 2017: It's an ordinary Saturday morning. After drinking his second cup of coffee, Gig checks the energy consumption of the family's refrigerator, washing machine, and air conditioner with his phone. NFC technology enables the devices to talk together seamlessly. Guess what needs service? Gig uses his smartphone app to schedule maintenance for the refrigerator. Meanwhile, Zetta accesses photos from last night's neighborhood party by touching Gig's digital camera to her tablet. She prints them by tapping the tablet to the home printer, which is on the Wi-Fi network.

Upstairs, Tweet and her friend Bitly are working on homework together. Tweet grants Bitly access to the home's private Wi-Fi network by touching her friend's laptop to an NFC sticker on her desk.

That afternoon, Gig and Zetta divide and conquer to attend the kids' sporting events. Zetta drives the twins to their soccer meet in a neighbor's car, as the family minivan is in the shop. She uses an NFC sticker and the car's audio system to listen an audio book on her smartphone. Meanwhile, Gig sits in the stands at Tweet's swim meet. He shoots video and photos of his daughter and her team on his phablet. He'll transfer them to the big-screen TV later that evening via an NFC-powered controller.

Back home, the family eats dinner and watches Tweet's meet highlights. Gig and Zetta decide to unwind with a workout in the den. Gig steps on the elliptical. He tracks his workout progress with an NFC and Bluetooth powered smart wristband and smartphone app. The app continuously updates his health and fitness data, such as steps taken, calories consumed and burned, and his weight.

Zetta runs on a treadmill beside Gig. She uses her smartphone and high-end headset, powered by Bluetooth and NFC tags, to access her music. She taps the earcup to skip tracks and increase the volume. That's probably a good thing. Flash and Dash are several feet away, using Bluetooth game controllers to play a mobile game, just one of the hundreds they've downloaded to their TV. They're adding their own audio explosions to the game soundtrack.

Across the hall, Buzzy plays a simple online English learning game with a soft plush, NFC-tagged toy, Bluetooth headset, and hard-cased NFC tablet. Tweet dons a headset and then joins in, singing songs with her little sister.

One day. One family. And the technology that ties it all together. It's easy to be a Velocious in a high-speed world when NFC technology powers not only your devices – but also the activities you're involved with.

Fast Facts

- *Global internet and device growth, paired with faster broadband speeds, will make it easier than ever to consume mobile video, games, and apps.*
- *There will be 10 million hotspots by 2017, enabling consumers to use their devices on the go with less interruption.*
- *Of the 500 mobile gamers worldwide, 175 million are paying players who spend more than $9 billion annually on games.*

Sources: Cisco, as reported by BusinessInsider. NewZoo.

66% of all money spent on smartphones and tablets was allocated to games.

Source: NewZoo.

On the Go: Work and Play Blend Together with NFC, Bluetooth, and Wi-Fi

Does this scenario look like your life? Is this your customer's life? If it isn't, it will be – and sooner than you think. As an electronics brand, you know that your customers are using an ever-growing array of devices at work and home. Like the Velocious family of six, they've cut the cord on both internet and phone connections, opting to go totally wireless. They possess a record number of mobile devices and home electronics, using them to make life and work tasks easier, help their children learn, provide endless entertainment, and keep everyone connected. Photos, video, games: It's fun to share when NFC, Bluetooth, and Wi-Fi are all talking together. And everything's super-fast, which is important to consumers who expect instant access and seamless connectivity. After all, who wants to enter passwords – or worse yet, painstakingly reset forgotten codes – when you can simply tap devices together to connect them and get on with the business of work and play?

NFC-powered smartphones are the driver for this new world of constant, pervasive connectivity. By linking Bluetooth devices and Wi-Fi networks, they create a bridge between the physical and virtual worlds and provide real value that consumers instantly recognize. That's why consumers will adopt NFC-enabled devices, from wearables, to game controllers and TV remotes, to remotely controlled and plush toys, to smart electronics and devices.

By 2017, the average internet user will control an average of five internet-enabled devices, 1.9 of which will be mobile. In that year, wireless and mobile internet traffic will outpace wired traffic, video will constitute 74% of all internet traffic, and online games and TV will eat up most of users' home bandwidth. In the race for users' technology walletshare, it's game on!

Source: Cisco, as reported by BusinessInsider.

The Great Enabler: NFC Connects

As we've seen from the Velocious family, consumers everywhere are harnessing the power of NFC technology to:

Enable rapid, seamless pairing: Simply tap NFC and Bluetooth enabled devices together to connect them. There is no manual setup and no interference from other nearby internet-enabled devices. The connection is almost instantaneous, and NFC tags can quickly turn over their signal to Bluetooth devices to enable longer wireless connections of 30 to 100 feet, depending on the device power.

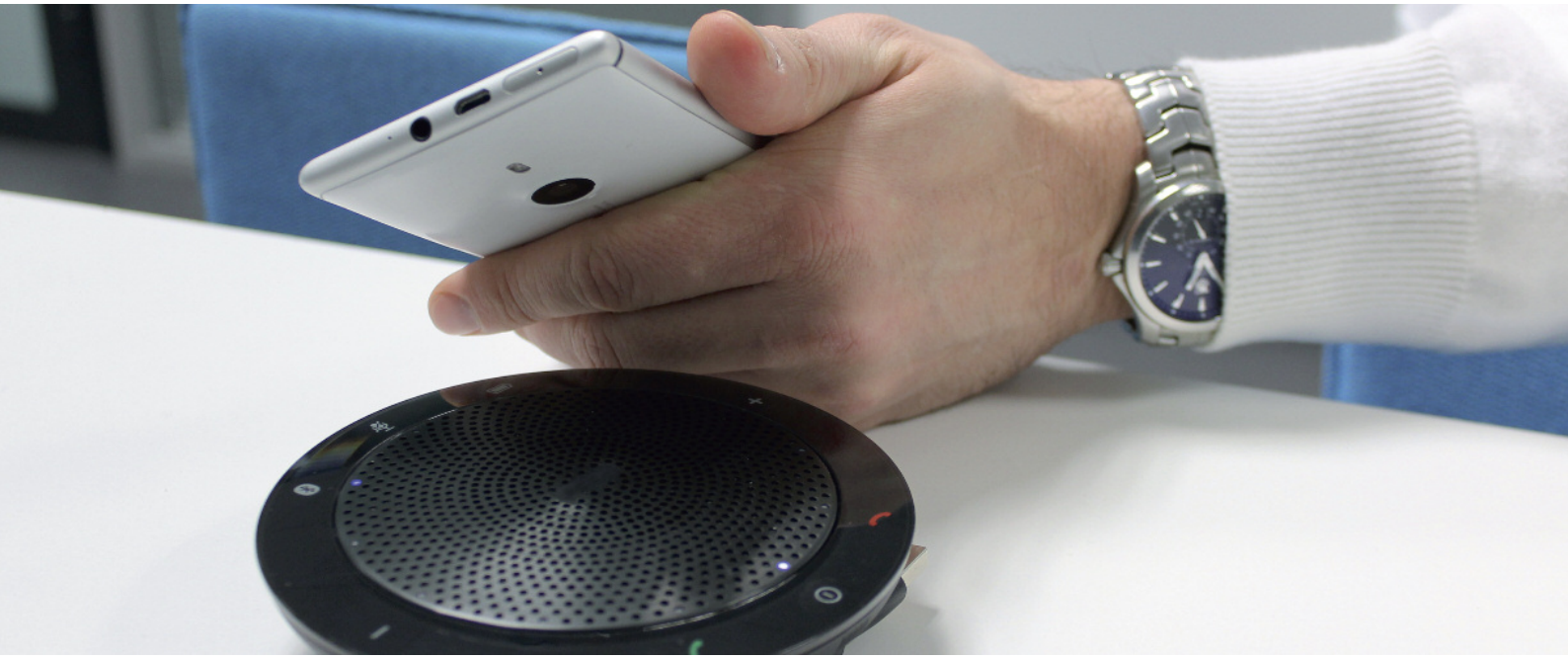
Access Wi-Fi networks in public and private locations: Instantly access a Wi-Fi network by tapping your laptop, tablet, or smartphone to an NFC sticker or the router itself, if the tag is embedded inside. Users can carry and share the routers on their devices with friends or access trusted networks easily. Retailers and vendors benefit, since they know the Wi-Fi service is localized to their location and can't be bootlegged by offsite users.

Switch on devices: The latest generation of NFC tags can even switch on Bluetooth devices and Wi-Fi networks by harvesting their power, making it that much easier to access media and content. NFC inlays can be placed close to the device surface, apart from other circuit board electronics, saving more space for them.

Transfer content: Tap NFC-enabled devices together to share content with a friend or use NFC-powered remote controllers to move media to a TV for group consumption.

Authenticate products: With their unique ID numbers, NFC tags provide the same product identification capabilities as other RFID tags, while pulling double duty as Bluetooth and Wi-Fi access enablers. Manufacturers can use NFC tags to authenticate goods, reducing counterfeiting and increasing consumer confidence in their product purchases.

Provide instructions: Instead of printing costly user manuals, electronics and games manufacturers can use the same NFC tags they're offering for Bluetooth and Wi-Fi pairing to link users to graphic instructions and videos on their corporate website.



Just Tap It

So how can you bring the "tap it" technology to your consumers?

1. Simply encode the media access control (MAC) address, or unique identifier, of the desired Bluetooth enabled device or Wi-Fi router into a passive NFC Forum, ISO 14443-compatible NFC tag or inlay.
2. Embed or attach the coded NFC tag or inlay into or on your devices.
3. Instruct consumers to tap devices to pair or connect them via the N-Mark, a touchpoint symbol which also demonstrates that manufacturers comply with the NFC Forum's specifications and device requirements. NFC technology operates at close range: one to four centimeters, so tapping is the most logical way to activate its capabilities.

Let's Get Strategic

If you've caught a vision for how NFC technology can help you grow your electronics, games, and toy businesses, it's time to move – fast.

The industry is constantly changing, and first movers will have the greatest advantage for capturing consumers' attention and a large percentage of the walletshare allocated to electronics and online entertainment.

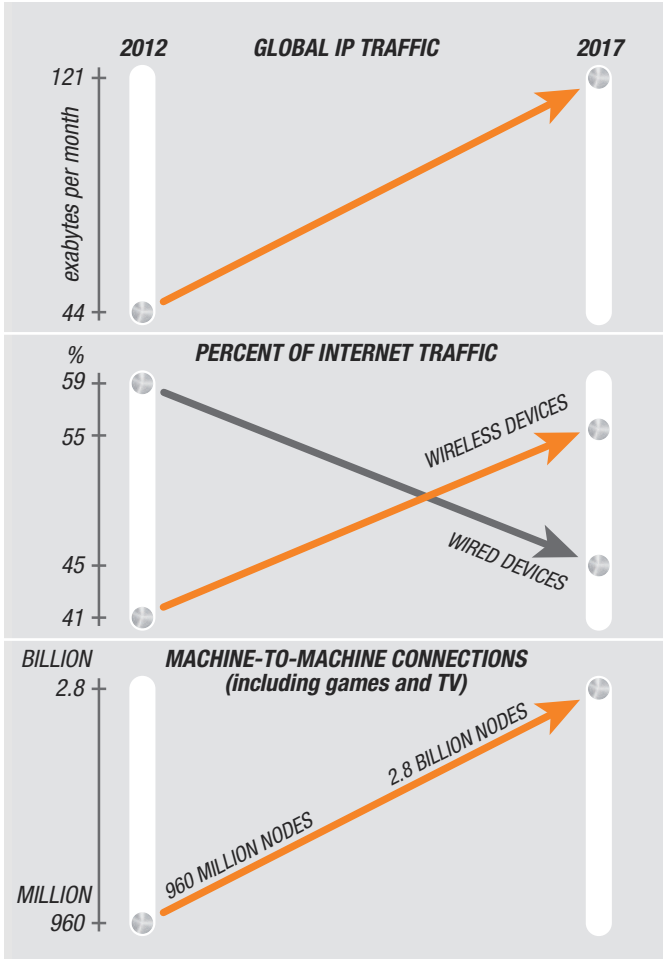
We suggest that you:

1. Think deeply about how you can leverage and package NFC capabilities together with Bluetooth devices and Wi-Fi networks in your electronic products, gadgets, and games.
2. Create an NFC strategy to guide your R&D, product development, and marketing efforts.
3. Identify high-value areas for pilot projects.
4. Evaluate your findings and expand your NFC efforts to an entire product line.

Need help getting started? Contact SMARTRAC TECHNOLOGY GROUP experts to learn more about our NFC product portfolio and solutions. We're happy to partner with you on developing your NFC strategy – or launching a high-value pilot program.

Take 5: It's Go, Go Growth Time for Internet and Device Usage

It's boom time for global internet and wireless device usage. From 2012 to 2017, we will witness an explosion of online media consumption, sharing and gaming as consumers acquire more devices and revel in the internet of everything – and everywhere.



Way To Go Global

- *3.6 billion internet users*
- *19 billion connections*
- *10 million Wi-Fi hotspots*

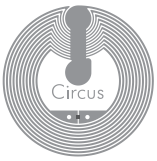
And it's just 2017!

Sources: All figures courtesy of Cisco, as reported in BusinessInsider.

How the Technology of Tomorrow Is Powering Today

We've given you a vision of the near future: 2017. But how are companies using NFC technology today to enhance Bluetooth and Wi-Fi connectivity and gaming experiences?

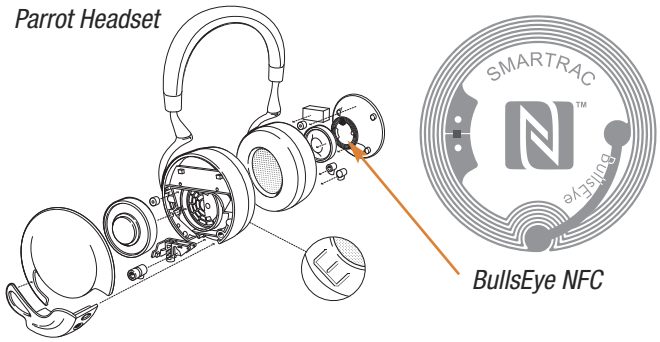
Calm Island is using NFC tags and Bluetooth to power Badanamu interactive learning experiences for children ages two to eight. NFC tags allow small, soft toys to communicate electronically with mobile devices, serving as fun study companions as the children read online storybooks or participate in multi-player learning games. Children select a toy, scan it against the NFC-driven devices, and don Bluetooth enabled headsets to learn English language skills through interactive character- and narrative-driven stories. The toy serves as a unique identifier for that particular learning experience, allowing teachers to record their progress and parents to monitor their children's results on the online Badanamu.com portal. Equally importantly, the location-driven NFC tags create an electronic "garden wall" ensuring that online play and activity is reserved for only the children in that physical environment.



Circus NFC

Calm Island / Badanamu

Parrot Headset



BullsEye NFC

Parrot has created Parrot Zik headsets for music lovers that provide exceptional acoustics and seamless pairing with smartphones and speakers via NFC and Bluetooth. Users can pair the headphones to their smartphones by touching the two devices. They can then control volume, change tracks, or take a call by swiping or tapping the right ear cup.

About SMARTRAC

SMARTRAC® is the leading developer, manufacturer, and supplier of RFID and NFC transponders, tags, and inlays. The company produces both ready-made and customized solutions used in access control, animal identification, automated fare collection, border control, RFID-based car immobilizers, contactless payment cards, electronic product identification, industry, libraries and media management, laundry, logistics, mobile and smart media, public transport, retail, and many more. SMARTRAC has its registered headquarters in Amsterdam, The Netherlands. The company maintains a global research and development, production, and sales network. For more information, visit www.smartrac-group.com and follow us on Twitter: www.twitter.com/SMARTRAC_NV.

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