The NFC Forum:
Who We Are and Where We Are Going

Christophe Duverne, NFC Forum Chairman
Philips Semiconductors
Today’s Agenda

• Introduction to the NFC Forum
  - Christophe Duverne, NFC Forum Chairman (Philips Semiconductors)

• Near Field Communication technology - coming soon to a device near you!
  - Erik Michielsen, Director RFID and M2M (ABI Research)

• Today’s news from the NFC Forum
  - Gerhard Romen, NFC Forum Marketing Committee Chairman (Nokia)
Near Field Communication (NFC) is a standards-based, short-range (a few centimeters) wireless connectivity technology that enables simple and safe two-way interactions among electronic devices.
New Touch-Based Mobile Services Emerging

Get information by touching smart posters!

Your NFC device is your travel card!

Your NFC device is your ticket!

Get information about your current job or task!

Buy goods from vending machines with your phone!

Your NFC device is your credit card!
Our Mission

The mission of the NFC Forum is to advance the use of Near Field Communication technology by developing specifications, ensuring interoperability among devices and services and educating the market about NFC technology.
Our Members Today

3ALogics
ALPS Electric
American Express
Anadigm, Inc.
ARM
ATMEL
Atos Worldline
Axalto
Bouygues Telecom
Broadcom Corp.
CETECOM
Consorzio Triveneto S.P.A
Dai Nippon Printing
Deutsche Postbank AG
Dexit, Inc.
E-Group Hungary
Electronics Testing Center
ETRI
FH OO Studeinbetriebs GmbH
First Data International
France Telecom
Gemplus
Giesecke & Devrient
Hanchang System Corporation
HTA Lucerne
Infineon Technologies
Ingenico
Innovation Research & Technology
Inside Contactless
Intel
JCB Co., Ltd.
KDDI
LG Electronics
LogicaCMG
Logitech Europe SA
MasterCard International
Melexis
MeT (Mobile Electronic Transactions)
Microsoft
Mobey Forum
MobileLime
mobikom austria
Motorola
National Technical Systems
NEC Corporation
NexgTelecom Co., Ltd
Nokia
Oberthur Card Systems
Ominikey
Panasonic
Payzy
Philips
Plantronics
RATP
Renesas Technology Corp.
RF Micro Devices
Ricoh Company Ltd.
Samsung
SanDisk
Schindler
SFR
Silicide
SK Telecom
SKIDATA AG
Smart Technologies Group
Sony
Sony Ericsson Mobile Communications AB
Sprint
Strategic Engineering Group (SEG)
Swisscom Mobile
Telenor
Texas Instruments
The Open Group
Visa International
ViVOtech
VISA
Vodafone Group PLC
VTT Technical Research Centre
Wells Fargo
Yoonison BV
The vision of the NFC Forum is to enable users to access content and services in an intuitive way, leading to...

- a world of secure universal commerce and connectivity
- in which consumers can access and pay for physical and digital services
- anywhere, at any time, using any device

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Our Goals and Activities

• Develop standards-based specifications that define NFC device architecture and protocols for interoperability

• Encourage use of NFC Forum specifications

• Work to ensure that products claiming NFC capabilities comply with NFC Forum specifications

• Educate consumers and enterprises globally about NFC
Near Field Communication Technology: Coming Soon to a Device Near You!

Erik Michielsen, Director RFID and M2M
ABI Research
• Assumption Drivers
  - Japan: 24% DoCoMo Base Using Wallet Mobile Phone EOY06
  - NFC Bluetooth Chipset Development
  - Contactless Payment Via OTA “Soft Cards”
  - Acceptance Growth (e.g. 55,000 U.S. locations by EOY06)
  - 12+ NFC Trials in ’06 Service Discovery as Data Revenue Driver
NFC and BT: Substantive Simplicity

- **Bluetooth Simple Pairing**
  - Integrate connectivity bundle (NFC, BT, Wi-Fi, GPS, FM Radio) and drive functionality (e.g. headsets, data sharing)
  - Challenge-NFC Secure Element
  - Bluetooth-NFC systems arrive on the market 4Q06/1Q07

- **Bluetooth SIG Interest Up**
  - Bluetooth handset penetration surpasses 70% by 2010
  - Share 30+ use case experience with NFC Forum groups to guarantee interoperability
  - NFC enhances BT relevance

![NFC Bluetooth-Enabled Phones by Phone Type, World Market, Moderate Forecast, 2006-2011 (Source: ABI Research)](image-url)
“At a time when television and radio advertising generate less effective responses and the market continues to fragment, NFC offers a way to connect consumers where it matters most — with their peers — while offering anytime point-of-sale opportunities on the move via the cellular handset and, progressively, consumer electronics devices.”

- ABI Research, December 2005
Balancing Near and Far Field Agendas

• Today’s Challenges
  - Modes, Formats, Security, Emulation, Carrier Buy-In
  - Backward Compatibility in reader environments where NFC plays passive role (payment, ticketing, transit)
  - Architecture, mode switching, profile definition, Secure Element flexibility learned from Bluetooth and applied to NFC Content Discovery and device pairing
  - Phone Availability

• Tomorrow’s Challenges
  - Device Switching Challenges (e.g., Banking Soft Cards)
  - NFC Enabled Consumer Electronics
  - Advertiser and Agency Education on Content Discovery
  - Compelling Application Availability
NFC Forum Technology Architecture
And Our First Specifications

Gerhard Romen, NFC Forum Marketing Committee Chairman
Nokia
RF Layer ISO 18092 + ISO 14443 Type A, Type B + FeliCa
The NFC Forum specified an initial set of mandatory tag formats based on ISO 14443 Type A and 14443 Type B standards, and Sony’s FeliCa
- ISO 14443 is a four-part international standard for contactless smart cards operating at 13.56 MHz in close proximity with a reader antenna
- Compatible tags are available initially from Innovision, Philips, Sony and other vendors
A Billion NFC-Ready Tags Are Already Deployed

NFC-Ready Tags (Units Thru 2005)

NFC-Ready Tags (% Share Thru 2005)

- 14443 Type A: 8.4%
- 14443 Type B: 5.0%
- FeliCa: 72.4%
- Others: 14.2%
## Four Mandated NFC Forum Tag Formats

<table>
<thead>
<tr>
<th></th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
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<tbody>
<tr>
<td><strong>RF Interface</strong></td>
<td>ISO 14443 A-2</td>
<td>ISO 14443 A-2</td>
<td>FeliCa (ISO 18092, passive communication mode at 212 kbits/second)</td>
<td>ISO 14443-2</td>
</tr>
<tr>
<td><strong>Initialization</strong></td>
<td>ISO 14443 A-3</td>
<td>ISO 14443 A-3</td>
<td>FeliCa (ISO 18092, passive communication mode at 212 kbit/s/second)</td>
<td>ISO 14443-3</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>106 kbits/second</td>
<td>106 kbits/second</td>
<td>212 kbits/second</td>
<td>106-424 kbits/second</td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>Specific Command set</td>
<td>Specific Command Set</td>
<td>FeliCa protocol</td>
<td>ISO 14443-4, ISO 7816-4 commands</td>
</tr>
<tr>
<td><strong>Memory Size</strong></td>
<td>Up to 1 KB</td>
<td>Up to 2 KB</td>
<td>Up to 1 MB</td>
<td>Up to 64KB</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Use cases</strong></td>
<td>Tags with small memory for single application</td>
<td>Flexible tags with larger memory offering multi-application capabilities</td>
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**NFC Forum Technology Architecture**

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<th>Application</th>
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**RF Layer ISO 18092 + ISO 14443 Type A, Type B + FeliCa**
### NFC Forum Technology Architecture

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- RF Layer ISO 18092 + ISO 14443 Type A, Type B + FeliCa
NFC Applications

Data transfer between devices

Connect Electronic Devices
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NFC Applications

Connect Electronic Devices

Access Digital Content
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<td>Application</td>
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NFC Applications

Data transfer between devices

Access info on-the-move

Battery-less tags

Mobile Payment & Transaction

Secure applications in combination with Smart Card Technology

Connect Electronic Devices

Access Digital Content

Make Contactless Transactions
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<td>RTD (Record Type Definition) &amp; NDEF (Data Exchange Format)</td>
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The first two NFC Forum specifications will provide common formats for data sharing between NFC-enabled devices and between devices and tags

- **NFC Data Exchange Format (NDEF)**
  - Specifies a common data format for NFC Forum devices and NFC Forum tags
- **NFC Record Type Definition (RTD)**
  - Specifies standard record types used in messages between NFC Forum devices and between NFC Forum devices and tags
  - Both scheduled for release in Q3

**Next NFC Forum specifications define specific RTDs**

- **Smart Poster RTD**
  - For posters incorporating tags containing text, audio or other data
- **Text RTD**
  - For records containing plain text
- **Uniform Resource Identifier (URI) RTD**
  - For records that refer to an Internet resource
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<td><strong>LLCP</strong></td>
<td><strong>RTD</strong> &amp; <strong>NDEF</strong></td>
</tr>
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<td></td>
<td>(Logical Link Control Protocol)</td>
<td>(Record Type Definition) &amp; (Data Exchange Format)</td>
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What’s Next?

• Logical Link Control Protocol (LLCP)
  - Defines the protocol to manage the logical link between NFC Forum devices (based on ISO 18092 / NFCIP-1)

• Card Emulation
  - Defines how NFC Forum devices can function as contactless smart cards
Today’s News Recap

• NFC Forum publishes its technology architecture

• The NFC Forum specified an initial set of mandatory tag formats based on ISO 14443 Type A and 14443 Type B standards, and Sony’s FeliCa

• NFC Forum announces first five pending specifications
  - NFC Data Exchange Format (NDEF)
    Specifies common data format for NFC Forum devices and NFC Forum tags
  - NFC Record Type Definition (RTD)
    Specifies standard record types used in messages between NFC Forum devices and between NFC Forum devices and tags
    • Smart Poster RTD
      For posters incorporating tags containing text, audio or other data
    • Text RTD
      For records containing plain text
    • Uniform Resource Identifier (URI) RTD
      For records that refer to an Internet resource
Questions
# NFC Is Fast, Private and Easy

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<th>NFC</th>
<th>RFID</th>
<th>IrDa</th>
<th>Bluetooth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set-up time</strong></td>
<td>&lt;0.1ms</td>
<td>&lt;0.1ms</td>
<td>~0.5s</td>
<td>~6 sec</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>Up to 10cm</td>
<td>Up to 3m</td>
<td>Up to 5m</td>
<td>Up to 30m</td>
</tr>
<tr>
<td><strong>Usability</strong></td>
<td>Human centric, Easy, intuitive, fast</td>
<td>Item centric Easy</td>
<td>Data centric Easy</td>
<td>Data centric Medium</td>
</tr>
<tr>
<td><strong>Selectivity</strong></td>
<td>High, given, security</td>
<td>Partly given</td>
<td>Line of sight</td>
<td>Who are you?</td>
</tr>
<tr>
<td><strong>Use cases</strong></td>
<td>Pay, get access, share, initiate service, easy set up</td>
<td>Item tracking</td>
<td>Control &amp; exchange data</td>
<td>Network for data exchange, headset</td>
</tr>
<tr>
<td><strong>Consumer experience</strong></td>
<td>Touch, wave, simply connect</td>
<td>Get information</td>
<td>Easy</td>
<td>Configuration needed</td>
</tr>
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