MOBIQUITOUS Information Systems
(towards « mobiquitous smart places »
with a BOTTOM-UP paradigm)

Pr. Serge Miranda
MBDS Master Degree, University of Nice Sophia Antipolis, France
President DreamIT University Foundation

serge.miranda@unice.fr, @sergeM06 (Twitter), Facebook, Gascon06
on Skype and FlicKR
Contents

- Strategic vision:
  - « We ll BIP and TAG our MOBIQUITOUS CLOUDy future
    … In SMART PLACES of the LOCAL Wide Web»
    …With a BOTTOM-UP paradigm (Innovation, revolutions, ..)

- Some Concrete innovative MOBIQUITY projects in the University of Nice Sophia Antipolis (and DreamIT Foundation)
Be OUT of the box!

« Your Highness ...determined to send me, to the country of India...and furthermore directed that I should not proceed by land to the East as is customary, but by a Westerly route, in which direction we have hitherto no certain evidence that anyone has gone » Christopher COLUMBUS
Digital Future?

« The next big shift in the Internet is mobile: billions of devices are on the Internet, including more than one billion cell phones, and billions of java card devices that can get connected by plugging them into a reader or cell phone, or connecting via a radio reader. The conversations the devices have with each other have swamped human conversations.

... So the main area for development of the Internet is to link these devices at the edge – including those with RFID tags – into conversations, which often do not pass through the main cloud of Internet but pass through the device – it’s a technology shift and a use shift”


John Gage at MBDS (1999)
How was life in 1992?

( MBDS creation !)

- No Public Internet
- No Cell Phones
  - NO SMART PHONES!
Some major mistakes …

☐ Christopher Collombus was WRONG!
  - « The world is FLAT »

☐ Marx was right
  - « To everybody depending on their needs »
  - « You could change YOUR world »

☐ Lamartine was wrong
  - Objects have a soul (and become more and more « intelligent »)

☐ BEN is right
  - Conformism leads to death
Key resource of this millenium (idem LOVE and happiness)?

- **French** – « Le bonheur est une chose merveilleuse: plus tu en donnes plus il t'en reste » (PASCAL)
- **English** - happiness is a marvellous thing: the more you give, the more you are left with
- **Arabe**: السعادة شيء جميل كلما أعطيتها كلما بقيت لك
- **Creole (Haïti)** - Ala yon bèl bagay se kontantman, plis ou bay ladan'l plis ou rete ladan'!
- **Russian** : Счастье – волшебная вещь: чем больше ты его даришь, тем больше тебе остаётся»
- **Spanish** - la felicidad es un artículo maravilloso: cuanto más se da, más le queda a uno
- **Occitan** - la felicitat es una chauxa meravelhosa: mai ne'n donas, mai te'n resta
- **Swedish** - lycka är något underbart: ju mer du har att ge, desto mer har du kvar av den.
- **Italian** - la felicità è qualcosa di meraviglioso: più ne dai e più te ne rimane
- **German** - Glück ist eine wunderbare Sache: je mehr du schenkst, desto mehr hast du
- **Roman** - 'a felicità è quarcosa de meravijoso: più 'a dai e più te ce rimane
- **Hungarian** - a boldogság csodálatos dolog: minél többet adsz belőle, annál több marad neked
- **Brazilian Portuguese** - a felicidade é uma coisa maravilhosa: quanto mais você dá, mais você recebe
- **Latin** - beatitudo res mira est: plus das plus tibi manet
- **Dutch** - het geluk is iets prachtigs: hoe meer je er van weggeeft, des te meer je er van overhoud
- **Esperanto** - felicxo estas io mirinda; ju pli multe da gxi vi donas, des pli multe al vi restas
- **Flemish** - het geluk is iets fantastisch, hoe meer je ervan geeft, hoe meer je krijgt
- **Basque** – zoriona gauza miresgarria da; zenbat eta gehiago eman, orduan eta gehiago daukazu

Copyright Serge Miranda 2007-2008
INFORMATION!

- $1-1 = 2!$
- Abundance
- Positive value of interconnexion!

- «Poverty is denial of access to Information»

Frantz Verella (Haiti)
Internet and Information

- More TRANSISTORS than RICE grains (with a lower cost of production) or ANTS!
- 100 000 New Internet users / a day
  - 800 millions PC’s connected to Internet
- in China : + 500 000 new cell phone users a day
  - 1000 millions of cell phones sold in 2009
- 1 billion of tagged objects (RFID)
  - 1000 billions of tagged objects connected to Internet by 2020 (IPv6)
  - 3 billions Google searches each month

The number of text messages each day is > than the population of the planet

In 2010 in Japan QR CODE scans >> SMS

3000 books published each day

4 exabytes (10**19) of unique NEW information will be generated this year (> in the previous 5000 years)
Chinese: The New Dominant Language of the Internet

In 2010 there is a 11,616,624 million person difference between the number of people online using English, and those using Chinese.

As China grew by more 36 million internet users in the last year, it would (theoretically) take less than three years (at current rates) for Chinese to overtake English.

However, not everyone in China uses Chinese online and so forth, and the number of English speakers is still rising. Given all of that, it seems very fair to say that in five years, Chinese will be the dominant language online.
Internet UBIQUITY, BIP and LWW!

- WEB2.0
- From WORLD-wide Web to ...

LOCAL-Wide Web
Web 2.0 and « USERWARE »

- User-generated content
  - Tribal knowledge
  - Proximity marketing
- From person to « communities »

- MOBILE WEB 2.0 !
  - Twitter (NEXT CNN)
  - Facebook
  - Foursquare

- Then QUORA and mobiquitous serendipity 😊

Man of the year 2006
From « Micro-campaigner 2.0 » to « president 2.0 » ?

Mac Cain (WEB 1.0) vs OBAMA (WEB 2.0) !

http://my.barackobama.com/page/dashboard/private

- FACE BOOK co-founder
- 3.5 millions of « micro-campaigners » (80% < 25 ans)
- >300 M de dollars of « micro-donations »
- report of « micro-actions »
- NO HIERARCHY !

ROOSEVELT (Radio) ➔ KENNEDY (TV) ➔ CLINTON (internet) ➔ OBAMA (Web2.0)
Facebook (> 700 M friends ») ,…Tweeter (>150 M « followers » in 4 years)

Twitter makes me like people I've never met and Facebook makes me hate people I know in real life. 
@shaylamaddox
### US Internet Users Who Are More Likely to Purchase from a Brand After Becoming a Subscriber, Fan or Follower, April 2010

<table>
<thead>
<tr>
<th>% of respondents</th>
<th>Twitter follower</th>
<th>Email subscriber</th>
<th>Facebook fan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>37%</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>Neutral</td>
<td>31%</td>
<td>41%</td>
<td>34%</td>
</tr>
<tr>
<td>Disagree</td>
<td>32%</td>
<td>32%</td>
<td>49%</td>
</tr>
</tbody>
</table>

Source: ExactTarget, "Subscribers, Fans and Followers: The Collaborative Future," provided to eMarketer, Sep 8, 2010

www.eMarketer.com
Towards 1 Billion in Facebook …

The 1000 most-visited sites on the web

<table>
<thead>
<tr>
<th>Rank</th>
<th>Site</th>
<th>Category</th>
<th>Unique Visitors (users)</th>
<th>Reach</th>
<th>Page Views</th>
<th>Has Advertising</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>facebook.com</td>
<td>Social Networks</td>
<td>540,000,000</td>
<td>35.2%</td>
<td>570,000,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>yahoo.com</td>
<td>Web Portals</td>
<td>490,000,000</td>
<td>31.8%</td>
<td>70,000,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>live.com</td>
<td>Search Engines</td>
<td>370,000,000</td>
<td>24.1%</td>
<td>39,000,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>wikipedia.org</td>
<td>Dictionaries &amp; Encyclopedias</td>
<td>310,000,000</td>
<td>20%</td>
<td>7,900,000,000</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>msn.com</td>
<td>Web Portals</td>
<td>280,000,000</td>
<td>18.1%</td>
<td>11,000,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>microsoft.com</td>
<td>Software</td>
<td>230,000,000</td>
<td>14.8%</td>
<td>3,300,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>blogspot.com</td>
<td>Blogging Resources &amp; Services</td>
<td>230,000,000</td>
<td>14.7%</td>
<td>4,400,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>baidu.com</td>
<td>Web Portals</td>
<td>230,000,000</td>
<td>15%</td>
<td>27,000,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>qq.com</td>
<td>Email &amp; Messaging</td>
<td>170,000,000</td>
<td>11.1%</td>
<td>25,000,000,000</td>
<td>Yes</td>
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<tr>
<td>10</td>
<td>mozilla.com</td>
<td>Internet Clients &amp; Browsers</td>
<td>140,000,000</td>
<td>9.2%</td>
<td>2,100,000,000</td>
<td>No</td>
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<tr>
<td>11</td>
<td>sina.com.cn</td>
<td>Web Portals</td>
<td>130,000,000</td>
<td>6.4%</td>
<td>3,600,000,000</td>
<td>Yes</td>
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<tr>
<td>12</td>
<td>wordpress.com</td>
<td>Blogging Resources &amp; Services</td>
<td>120,000,000</td>
<td>7.7%</td>
<td>1,200,000,000</td>
<td>Yes</td>
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<tr>
<td>13</td>
<td>bing.com</td>
<td>Search Engines</td>
<td>110,000,000</td>
<td>7%</td>
<td>2,700,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>adobe.com</td>
<td>Programming</td>
<td>110,000,000</td>
<td>6.9%</td>
<td>1,000,000,000</td>
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<tr>
<td>15</td>
<td>163.com</td>
<td>Web Portals</td>
<td>98,000,000</td>
<td>6.3%</td>
<td>2,700,000,000</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>taobao.com</td>
<td>Shopping</td>
<td>96,000,000</td>
<td>6.3%</td>
<td>10,000,000,000</td>
<td>No</td>
</tr>
</tbody>
</table>
New apps around 2.0 like automatic « DAILY JOURNAL » with twitter !

Thursday, Oct. 14, 2010

The Serge Miranda Daily

as shared by Serge Miranda + 231 followed people on Twitter

El imperio por dentro (Primera parte)

El imperio por dentro (Primera parte)

cubadebate.cu - Me asombra la ignorancia generalizada en torno a problemas vitales para la existencia de la humanidad, en una época en que esta cuenta con fabulosos medios de comunicación que no eran siquiera ima...
MOBILITY!

For the first settlers in Auroville, walking and cycling presented the most practical and accessible forms of transportation. The classic bullock cart was a widely used option for the transportation of heavy goods. There was only one daily bus to Pondicherry. Personal motorized vehicles were a

The combination of a growing population, distances to cover that make walking impracticable, and long hot summers, has helped contribute to the growing use of personal motorized vehicles in Auroville. Our millions use bicycles, but you can also see a lot motorbikes and cars. The occasional bullock cart and small hand-pulled rickshaws are still common sights. They are a

WHERE WE'VE COME FROM

HOW FAR WE'VECOME
Mobility and Cell phones

Graham Bell (1847, 1922)

Martin Cooper (Motorola, 1973)
JULY 2010 : 5 Billion cell phones
(Ericksson)

Source: Nokia

Copyright Serge Miranda 2007-2008
The Cell phone became a real computer ( ...a « smart » phone !) !

Painter in Port au Prince Dec 2010
3.3 Billions of SMART PHONES by 2015
The Smartphone won the battle of the pocket!
Cell Phone tomorrow?

- Universal Remote controller (pic, movies, MP3, TV, key, payment, …)

**Development of Mobile Multimedia**

![Diagram showing traffic changes over time with labels for voice and non-voice (image, data) traffic, indicating 50% and 70-80% in 2005 and 2010 respectively.]
With the cell phone: 4th screen in the history of humanity
(5th with Tablet/Ipad)
> Ex: FILM « BURIED » on the 10th of NOV 2010

http://www.buried-lefilm.com/univers.php

- multi task and multi screen

Concept defined by Marsha Kinder in 1991

– « Transmedia intertextuality works to position consumers as powerful players »

Prof MIT Henry Jenkins (2003, MIT)

Book: « Convergence culture »
Towards mobiquity :
« Digital CONVERGENCE »

« Tip of the Iceberg »

- Wireless revolution (for TELCO’s)
- Internet revolution (in CS)

➔ CONVERGENCE of telecommunications and computing
« MOBIQUITY » ?
Bridge between REAL and DIGITAL worlds

- MOBility
  ➔ Cell Phones
- UbiQUITY
  ➔ Internet

Mobile Internet / MOBIQUITY
is next big wave (I-Phone, Androïd, ..)

Towards Mobiquitous Information Services
« Mobiquity effect » ? (Moore, Morris, Metcalfe, Gilder,...)

- **Moore's law on computer power**: La puissance d’un processeur (nombre de transistors par puces) double tous les 18 mois (100 fois par décennie) (jusqu’à 2030)
  - Le nombre de transistors dans le monde dépasse
    - de 20% le nombre de fourmis,
    - le nombre de grains de riz (avec un coût de production inférieur).

- **Gilder’s law on bandwidth**: La bande passante double chaque année

- **Metcalfe’s law on Network value**: La valeur d’un réseau dépend du carré du nombre de ses nœuds

- **Morris law on storage**: Le nombre de gigabits par pouce carré double tous les ans (d’où la baisse du coût de stockage ; 1 Tera octet pour 0,25 Euros en 2015)

- **OC law on tagged objects**: Le nombre d’objets taggés double tous les ans
1st Equation for mobiquity : E= MC2

- Energetic Resource
- Multimedia
- Computer (Internet)
+ Communication (Wireless)

Ex : iPHONE
2\textsuperscript{nd} Equation for mobiquity : E = MC\textsuperscript{3} !

Ex : iPAD
Mobiquitous FUTURE ?

Nexus S (NFC Google Phone in Dec 2010)
« Creative DELETION » Shumpeter

(Demandez l’heure à un ado, demandez lui de prendre une photo, il …sort son mobile !)

Kodak factory in Harrow (Londres) in 1890
Strategic evolution

From TOOLS to SERVICES to « SMART PLACES » (« LOCAL » Wide Web)

- location/time-based services …
- 5 pre-defined dimensions with NFC phones!
From TOOLS to « (information) SERVICES » :

AVIS >> HERTZ

AVIS : *Added-value information services*

HERTZ : *Heoric Executive Retreat to Zero*

- *Unlimited creativity on SERVICES !*
- *Only chance for EUROPE ?*
  - Software : USA
  - Hardware : ASIA
Convergence thru SERVICES

« A cube is a metaphor for a strong relation » J.Olsson
Convergence thru SERVICES

A cube, built upon three axes, can be used as a metaphor for the relation

If we consider wireless as only an additional channel, we only ”pull” the infrastructure axis

Over time, wireless will lead to new behaviours and needs. This is a trigger to develop new content and AVIS

THINK NEW AVIS of Mobiquity : By exploring the mobiquity potential, CUSTOMER relation expansion
From TOOLS to SERVICES!

« If we can predict the future of the infrastructure we cannot predict the future of services…services cannot be controlled TOP DOWN …Digital divide on services not in technology…from services to SMART PLACES… »

Leonard Kleinrock, June 2008, Brussels
From AVIS to « smart places »

Ex: Car Sharing

With the cell phone to manage complexity
From Tools to Services to 
….SMART PLACES

TOOLS (« Quantity ») \(\rightarrow\) SERVICES (« Quality ») \(\rightarrow\) SMART PLACES (« Authenticity »)

So our mobiquitous future will be … « SMART » !

Smart objects !in Smart Places !

with communicating terminals being SmartPhones !

*Cf IBM in 2011 : … « A smarter PLANET »*
Mobiquitous INFORMATION Services

- Mobiquitous tourism: *From MAXI-MIN to MINI MAX?*
- Mobiquitous Campus
- Mobiquitous health
- Mobiquitous Building
  - MBDS Building in Port of Prince in 2011
  - Mobiquitous library in Grasse in 2015
- Mobiquitous Commerce: *Street and POS marketing*
- Mobiquitous revolution and democracy
- « Mobiquitous VIRTUAL CASH »
- Mobiquitous serendipity …
Beyond Social networks: from « personalized serendipity » to « mobiquitous serendipity »
« Mobiquitous Virtual CASH »
Mobiquitous LETS and barter » !

- Cf LETS (« Local EXCHANGE and Trading Systems ») in the 80’s
  - Michael Liton (1983)
  - Towards Mobiquitous LETS ?

- « PAYMENT ACCOUNTS » outside banks for unbanked (MNO? Google? Apple ?..)
  - CASH becomes VIRTUAL ! No More Fund transfer ?

- Product and service EXCHANGE with Mobiquitous virtual CASH
  - « TIME bank» « Time dollar »,…
  - « PEZE » (« Plan d ECHANGE Zero Ennui ») :
    mobiquitous barter within Campus.
Mobiquity wave:

We ll BIP and TAG the future!
BIP
(Broadband Internet in the Pocket) ?

- 2001 : 3G
- 2002 : RFID (walmart, Dod)
- 2004 : NFC (RFID reader in the cell phone)
- 2002 : WIFI
- 2005 : WIMAX and …INTEL then www.wimaxforum.org
- 2008 : WIMAX « rev E »
- 2010 « 4G »/LTE
TAGS ?

Roger TAGS ?

ёт One TERA (10**12) TAGGED OBJECTS in 2020 ! (with an IPv6 Internet address) !

TAGS ?

- wireless : RFID (NFC,..)
- VISUAL (1D, 2D, ..)
  - 2D TAGS (QR Code, …)
- SOUNDS (Tagattitude,…)
- Virtual (GoogleS, ..)
2D TAGS

Code 1D

Pas de données

+ Contient des données

Code 2D

Contient des données

+ petit, + dense

+ d’information

+ interactifs

Lu par les mobiles
And GOOGLE ? (beginning 2010) ?

+ googleS !

150 000  QR Code stickers for preferred places in …Google !
QR Code (Wikipedia)
Forbidden Add by Calvin Klein in 2010!
Tagged Stamp in Spain in 2010...
Periodic Table of elements …
Offer of the day
(dynamic change of the same QR Code)
Virtual Coupons and tickets

This is your ticket.

Zitsman, Sarah
General Admission

Checked In: 3
9 Tickets Sold

Events

My Ticket
BOOKS : Jules Verne 2010
“QR footnotes”! Around The World In 80 Days

Jules Verne's classic novel gave 19th century readers a taste for adventure and a love of travel. Almost 140 years later, readers still enjoy a good book.

So we've developed a Ubitour version to really add something to your reading experience. Our Ubitour pairs a special version of the book with a way to easily access through your cell phone Internet resources and an online community of readers.

The social interface we provide supports and enhances the book through photos, travel stories, literary musings, on-demand video and audio, interactive maps and historical insights delivered instantaneously to your cell phone.

To make this possible, Ubitour's version of the book includes teeny-sized graphics called 2D codes. These graphics store the information needed to get you where you need to go in cyberspace.

The Ubitour was designed by a Purdue University research team lead by Dr. Sorin Adam Matei.

You can start enjoying the book right away by scanning the codes below. For details, see the introduction.
SO MANY SOLOS, SO LITTLE TIME.

To watch videos of Greg Howe in action, scan this QR tag with your smartphone or visit YouTube.com/PlayLaguna

QR Code and Music

Rochester JAZZ Festival in 2010

Rochester JAZZ Festival in 2010
QR Code and Real Estate ...

Agents & Brokers
Compare value plans & sign up today

Agencies & Brokerages
Learn about branding options & special pricing
QR Code and Tourism

Park Code in Central Park in 2010
New York (January 2011)
Korea
JAPAN : In Dec 2010 : more scanned QR Code than sent SMS !

Human AUDI ad. in 2010 in Japan
Food!
…tagged TUMBS in Japan!
Tag RFID (Radio Frequence ID) ?

RFID from ASK (Sophia Antipolis)
NFC (Near Field Communication) 2004: Nokia, Sony, Philips and www.nfcforum.org

TOUCH’n PLAY paradigm
NFC (Near Field Communication)

- NFC (2004, Philips, Sony, Nokia !! !)
  - The most deployed RFID standard
  - Complementary of Blue tooth in the PAN (Personal Area Network), WIFI, GPRS,…

- « TOUCH « paradigm
  - Touch’ n pay
  - Touch’ n go
  - Touch’n open, Access,
  - ➔ TOUCH’N PLAY

2006 Samsung NFC Phone

Copyright Serge Miranda 2010-2011
The 3 « S » of NFC: Speed, Security, Simplicity
NFC basics

- NFC: Extension of contactless wireless RFID Technology: 13, 56 MHZ
- NFC: Universal standard:
  - ISO 18 092
  - ECMA 340
  - ETSI: TS 102 190 V.1.1.1
- NFC Compatible with ISO 14 443 A and Felica
- NFC Distance: 4 inches/10 cm
- NFC Data rate: up to 424 Kbits:sec
NFC in cell phones:
Communicating objects become « alive »

- LIFE (in biology) = INFORMATION + COMMUNICATION
  (Hair research at L’Oreal, Frédéric II of Prussia!)
- From Internet among « PC » and persons » to Internet « AMONG THINGS » with IPv6
NFC …

- **ABI Research**: From 2009 to 2013: + 200%/year of increase in selling NFC Chips

- NFC Contactless cards and SD cards
  - → NFC Infrastructure (m-payment, transport)

- NFC Cell Phones
  - Sim Centrics (in France) or not

- NFC ADD ON (around the SIM)
  - Oberthur, Techmahindra,..
  - ASK
  - M2T
  - Wireless Technology/Nexperts (for iPhones)

- Bluetooth NFC STICKERS
  - Twinlinx (France) with SE from Sagem in 2010
  - TranZfinity (San Diego)
Three standardized NFC modes

- « Read/Write mode » (active ➔ passive)
- <Idem QR CODE>
- NO SECURITY
- QR CODE alternative
- « Emulation Card » (passive ➔ active)
- « SECURE ELEMENT » (SIM or ?)
- JAVA CARD; Encryption
- « Peer to peer » (active ⇔ active)
NFC potential in Cell Phones

Digital content
URL
Health
Picture
RFID
Video
Song
Comment
Web
SMS
E-Mail
...
SMELL!

NFC 3G Phone

Gets Information by TOUCHING

Generates information

Web 2.0

SERVICES
Marketing
Digital safe
Meetings
Post card
Digital family
Blogs
MOBILE 2.0 : Twitter,
Facebook
NFC APPLICATIONS ? (NFC Forum)

☐ Short term
  - **M-payment** (USA, and …emerging countries..)
  - **M-transport** (Europe, Oyster/London, Navigo/paris,..)

☐ Mid/long Term
  - Intelligent Posters, Customized-Information TAGS
  - M-ticketing and couponing
  - M-marketing (POS, ..)
  - M_Social networking
  - NFC-based APP STORE
1) WHO ? (Authentification. Profile)

2) WHERE and 3) WHEN ?

(Here and now! Ici et Maintenant !)

4) WHERABOUT ?

(GOAL ?)

5) WHAT ?

(Triggered NFC services; NFC App Store, mobile 2.0/Blogging)
NFC eco-system: value chain players

Source GSMA
And Smartphones became NFC in 2010

Iphone V5 in 2011

Nexus S GOOGLE in Dec 2010
NFC Smartphone NFC from Nokia : C7 (January 2011 )
Bluetooth Cell phones rendered NFC with an active sticker

Ex MIMAX sticker from Twinlix (France) and Think’nGo
Next-Stop MOBIQUITY: SURFACE COMPUTING
AUGMENTED (& reduced) REALITY

....
Walls ...start talking ...
« Userware »

La musique adoucit les murs (Rue Croulebarbe, 14 Avril 2008)
Surface Computing

- Microsoft, Sony
- Intelligent Vibrations, Intuilib (France)
Augmented reality
« Real strolling in virtual space/time » : Strolling in Nice in 1860 !
AR Video (real estate and tourism) with Wikitude in June 2010 in Nice
2. Mobiquitous architectures (« infostructure »)
Mobiquitous Infostructure evolution

« To make visible what is invisible and make invisible what is visible »
John GAGE, SUN, (March 2001, Monte Carlo)
« Computing is no longer a discrete activity bound to a desktop: pervasive computing is fast becoming a part of everyday life » Dr Jung-Kook Hong (IBM)

Mainframe Computing (’70)  Personal Computing (’80)

Client-server Computing (’90) « 2-tier »

Internet computing (2000): « 3-tier »

From « 3-tier Infostructure »

- **Presentation tier**
- **Business logic tier**
- **Data Access tier**

Other logical tiers

Component approach (tight coupling)
- (CORBA, RMI) vs (COM, DCOM)

Web service approach (loose coupling)
- SOAP, UDDI, WSDL

MiddleWare services

Application Server(S)

Data server

• JDBC, SQL/J ...
  • Vs
  • ADO.Net, ADO, ODBC ...

Data source

Mobile Server

déploiement sur 1 ou n serveurs

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...to 5-tier Architecture (2010)

- 5 aggregative layers
  - (1960-90) Data base Servers (foundation)
  - (1990) Application servers (Web services XML)
  - (2000) Mobile servers (PDA, Cell Phone…)
  - (2010) EDGES servers (RFID, NFC, captors,..)
  - (2015) Interaction servers (Context-aware,..)
OTA and TSM

- OTA (Over the Air)
- TSM (Trusted Service manager)
OTA (« Over The Air ») platform

- Remote download of applications, content, services, tickets, coupons are then possible in a secured OTA way.

- OTA platforms should be interoperable which is not yet the case with three major existing approaches:
  - SIM-Centric (MNO controlled),
  - SynchML (Open Mobile Alliance standard)
  - J2ME/HTTP (like in NFC stickers and Global Platform).
« SPLIT TSM »
(Global Platform Feb 2011)

- TSM for MNO
- TSM for Service providers (banks,..)

- Example : FIRST project
Mobiquitous innovative projects in ...
« MBDS » and « DreamIT » Context

Foundation of the University of Nice on ICT and MOBIQUITY (multidiciplinary) since 2009

Innovation LAB and Master degree in CS since 1992

www.mbds-fr.org
www.youtube.com/mbdsimagine (POC videos)
MBDS in Morocco (1998) : Rabat and Casablanca
MBDS in Haïti (1998)
MBDS in the University of Astrakhan, Russia (2007)
MBDS in Tunisia (2010)

MBDS in Madagascar (Stand By since 2005)

Astrakhan, RUSSIA, 2006
NICE an « NFC city » in May 2010

« VIP » demo to the mayor of Nice and Minister of Industry who announced Nice an NFC CITY (May 2009) due to « MBDS Innovation lab. »
Tags in NICE Bus Tops (May 2010)
4 Key business areas in DreamIT Foundation

- **Environment and sustainable economy**
  - Veolia, Malongo in Haïti,
  - ECO-LE project in Haïti (after earthquake)

- **TRAVEL and Turism**
  - Amadeus,..VIP, MOSTRA, Digital City (GRASSE)

- **HEALTHCARE**
  - Covea Tech with RoboDOMO (MMA, MAAF, GMF,..)
  - Multi-sense Memory Suitcase (Alzheimer prevention)

- **Virtualization**
  - Credit Agricole…CAMPUS NOVA, NICE FUTURE CAMPUS (NFC)
4 MBDS innovative POC and pilot projects

- « MBDS2.0 » : tag (QR Code, NFC) management platform for **mobiquitous tourism** with augmented reality and Social networking (Open Source in 2011)
  - Nice, Grasse, Menton, Sophia in France
  - Sidi Bou Said (Tunisia), Digital Kremlin in Astrakhan (Russia), Medina in Casablanca ?, Santo Domingo

- « ROBODOMO » project for **isolated elderly people** (2006-2011)

- « FIRST » : m-payment project in India (Haïti, Morocco ?) with TATA and Gemalto **for emerging countries** (2011-2013)

- « NICE FUTURE CAMPUS » in Nice University for **students** (launched on Feb 18th 2011 with 200 students)
MBDS2.0 platform: a GUIDE in the pocket

Mobiquitous services for m-ecotourism and culture

TASSOU ‘s present 2008

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MBDS2.0 Open -Source tagging and blogging platform

Социальная сеть «Вальрозв 2.0»

- Place blogging
- Interfaces with Facebook, Twitter, Youtube…by TOUCHING
- VENTOSE Cafe (digital cafe of the future)
- Augmented reality with Google(Android) and Apple (I-phone)
« Invisible paths » in Valrose Campus (Sept 19th 2009)

Bassin au cygne...

Статуя лошади...

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Tags in Valrose Campus (June 2010)

Pour la cible NFC téléchargez l'application gratuite MBDS 2.0 en touchant le cible.

For the NFC target, upload the free application MBDS 2.0 by touching it.

Pour le code 2D téléchargez au préalable une application gratuite comme i-nigma.

For the 2D Code, first upload a free application like i-nigma on your smartphone.
Cultural invisible path

Dominique Laredo
As a GUIDE
UNS
Biodiversity invisible path
(Pr. Jean De Vaugelas)

JUDEA tree
(love tree)
Jean De Vaugelas
As a GUIDE
UNS

Biodiversity path
QR Code and NFC tags on Valrose Campus with MBDS2.0 (Nice)
MIDLET version of MBDS2.0
Gogol a passé à Nice l’hiver de 1843-44
Il travaillait sur le 2ème tome des « Ames Mortes ».
C’était un début d’une nouvelle étape dans sa vie et dans son art.

Rue Paradis où Gogol vivait dans la maison de ses amis Wielgorsky – il disait que cette période était un “paradis”

Rue de France où Gogol passait pour aller voir Mme Smirnova-Rosset – il se trouvait l’Hôtel “Etranger” (1854)

Croix de Marbre érigée en 1568 et pas changée depuis.
Gogol s’y promenait avec Mme Smirnova-Rosset et la famille de Wielgorsky

Place Masséna à côté de l’Hôtel “Etranger” (2009)

Informations et photos de Tamara Prikhodko, de la maison des Russes de l’Emigration

Information и фотографии: Тамара Приходько, Дом Русского Зарубежья

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MBDS 2.0 deployment in …

- MENTON 2010
- VALROSE Campus (June 2010)
- GRASSE (Nov 2010)
- Astrakhan (Russia)
- SIDI BOU SAID (Tunisia), Santo Domingo
- Santiago de Compostela (Spain)
- Alexandria (Egypt)
Menton area with MBDS2.0 platform in June 2010
Grasse city on November 2010 (1st Waalled QR code in France) !...

With JP Leleux Mayor and senator
GRASSE in Nov. 2010 ...

L’Innovation autrement

Jean-Pierre LELEUX
Sénateur des Alpes-Maritimes
Maire de Grasse
Président de la communauté d’agglomération Pôle Azur Provence

Le Conseil Municipal de la Ville de Grasse

Serge MIRANDA
Professeur d’informatique à l’Université de Nice Sophia-Antipolis (UNS)
Président de la Fondation partenariale DreamIT sur les nouvelles technologies

Vous invitent à assister à l’inauguration
du chemin du patrimoine tagué (QR Code et NFC*)
du centre historique de Grasse

Le samedi 20 novembre à 10h30
Salle du Conseil Municipal – Hôtel de Ville de Grasse

Interview de Jean-Pierre LELEUX
Pour lire ce QR Code, téléchargez gratuitement l’application i-nigma

NFC : Near Field communication. Le téléphone mobile au standard NFC du futur contenant un lecteur RFID (Radio Frequency Identification) permet en touchant un objet tagué N d’obtenir une information multimedia dans ces « chemins invisibles ». Un Smartphone équipé d’un lecteur (gratuit) de QR CODE (Code barre en 2D) permet d’obtenir la même information en photographiant le tag.
BUZZ : « INNOVER AUTREMENT »
<Just INNOVATE differently>

Buzz Marketing GRASSE (20 Nov 2010)
Grasse

Festival TransMéditerranée : pleins feux sur l’Amérique latine

FESTIVAL Deux invités exceptionnels cette année pour la vingt-troisième édition : la députée argentine Victoria Donda et l’ingénieur équatorien Victor Hugo Álvaro.

à Grasse INNOVONS autrement

QR CODE
20th of Nov 2010 in Grasse
Tagged Invisible historical path in Grasse
Tagged poster in Grasse

Présentation d’un panneau

Logo propre à la démarche NTIC à Grasse

Textes: 2 x 300 caractères en français et anglais

2 photos de l’intérieur du monument

Tags :
- NFC : à toucher
- Flashcode: à photographier

Logos : Ville, CAPAP, Musée de France, Université ...
Pic Nice Matin (Nov 2010)
Augmented reality in Grasse: « Strolling in 1900 with Charles Negre »
AR in Grasse (Transport)

Transports de Grasse

Voici donc les trois principaux points qui vont vous permettre de rejoindre n'importe lequel de ces monuments.

La galerie d'images quant à elle vous permettra de consulter les horaires du bus que vous souhaitez prendre pour rejoindre ce dernier.

Liste des monuments avec les lignes qu'il faudra prendre et l'arrêt où descendre :

- Le lavoir Basse Foux - Théâtre : Terminus Gare Routière (Lignes 1, 2, 3, 4, 21).
- Place aux Aires : Arrêt Thuron MIP (Lignes 1, 2, 3, 4, 21 sens Gare Routière).
- Vieille Porte - Porte Neuve : Arrêt La Roque (Lignes 1, 2, 3, 4, 21 provenance Gare Routière).
ART NOVA project (2007)

TASSOU’s totem made with tagged « old » cell phones (Sept 2006)
Art Nova project (2007)
Example with BEN (www.ben-vautier.com)

Mobile 2.0 : Bozza/BLOG at
bozza.blogdns.com
Discussion avec BEN le 12 Juin 2010 : « l’ART est un dialogue entre deux EGOs (et deux imaginaires toujours reliés par un artefact) que le téléphone mobile du futur ne pourra qu’amplifier »
AAL and NFC

Environment and sustainable economy

TRAVEL and Tourism

HEALTHCARE

Covea Tech with RoboDOMO
(MMA, MAAF, GMF,..)

Multi-sense Memory Suitcase
(Alzheimer prevention)

Virtualization
ROBODOMO project

Professeur Serge Miranda

V1 (2006) with Robula 40

V2 (2008) with Robulab 10

V3 (2010)
Location-based home system for an « Intelligent » Robot (SRI partnership)

Location schema based upon captors

DHS watch

Fall Captor in P#2

Presence captor

Go to P#2

Location schema discovered by the robot

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Implementation Status of mobiquitous services portfolio for RoboDOMO

**Customized services**

- Medecine checking
- Health monitoring
- Fall alerts
- Video messaging
- Infotainment (widgets)
- Visioconferencing

**Family and environment**

- Robot/Camera control thru 3G phone
- Robot/Camera control thru Web Interface
- Location-based service at home
- Door opening for emergency
- Patient monitoring (Google Health interface)
- Voice Recognition, Administrative support (virtual CESU with NFC)
- (karto merging)
Sept 2010 : Public demo in Paris at Covea Tech conference
Memory Multisense NFC Suitcase for Alzheimer in 2010
(Innovation AWARD from Groupama in Sept 2010)
VIRTUALIZATION and NFC

- Environment and sustainable economy
- TRAVEL and Turism
- HEALTHCARE
- Virtualization

Credit Agricole…CAMPUS NOVA, NICE FUTURE CAMPUS (NFC)
Launching the Pilot project with 200 Students on February 18th 2011
EXTELIA as CO-leader with MBDS/DreamIT Foundation

Orange R&D, Cassis, BMS, Twinlinnx, ASK

Grant from Minister of Industry (2 Million Euros)

- 2/18 2011 for pilot deployment (50 students) in Valrose
« CAMPUS Nova » project With Credit Agricole, Nokia, IBM :
Virtualization of the student ID card in an NFC Phone (2008)

- Room access
- Cash exchange (P2P)
- Micro-payments
- Student restaurant
- Library
- Dorm access

Credit/debit Card
Student ID Card
Ticket RU
Room access card
Transport card
Coupons

Troc intramuros (le « PEZE »)
Portfolio of NFC services in a SIM card

- NFC Add On
- NFC SIM centric cell phone
- NFC sticker

Project background: NFC Container (Pole TES), CAMPUS NOVA (MBDS avec CA), VIP (MBDS), TICKET TAP (MBDS), VENTOSE Café (MBDS) & BluLink (Pole SCS)

« Student ID card becomes virtual in the cell phone with a portfolio of Mobiquitous innovative services »
NFC targets on Campus
Nice Future Campus
VIP project

(Interactive shop Window)
TOUCH ME project (couponing)
(WIMA award in 2007)

VS.

Present  Future

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ImaJEANS

- with Rica Lewis, AIRTAG
- Street marketing/ POS marketing
Mostra project with Amadeus (2006)

- NFC Awards in 2007 at WIMA in Monaco (www.wima.mc)
LISA  Car Sharing Project in Nice?

- Electric Renault TWIZY vehicles (2 seats) in Nice with end-to-end transport services (bikes, tram, buses)

- NFC Renault car < cf MBDS Project in 2006>
  - Identification
  - Opening/Engine start
  - Multimedia customization
  - Cell phone transfer

Twizy Z.E
4 Key business areas in DreamIT Foundation

- Environment and sustainable economy
- TRAVEL and Tourism
- HEALTHCARE
- Virtualization

Veolia, Malongo in Haïti,..
ECO-LE project in Haïti (after earthquake)
FIRST project
(India, Haïti, Morocco) a banker in the pocket

Financial
Inclusion based upon
Rural mobiquitous Services
Technology platform
« FIRST » NFC mobiquitous SERVICES

• Use CASES logic
  – CASH IN and OUT on « PAYMENT accounts »
  – M-transfer with « VIRTUAL MOBIQUITOUS CASH »
  – « The NFC Smartphone is the banker »
  – NFC FIRST Application loaded by touching NFC tagged posters

• APPLICATION development using our « NFC CONTAINER » approach for better efficiency
Financial Inclusion (FI) open platform

- **Fi global account**
- **Fi agent account**

**FIRST System overview**

1. Unbanked persons enrollment
2. FI card
3. NFC passive sticker
4. Fi agent with an NFC smartphone
5. CASH IN and OUT on « generic accounts »
6. M-Microcredit (cf Chadek project in Haiti, KIVA.ORG like)
7. M-transfert

**GUI**

- Pin
- Banking information

**MNOs**

- Banks/MNO enrollment

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FIRST building Blocks with Dual (Split) TSM

Financial inclusion open platform (FIP)

1. Users enrollment interfaces
2. Card issuance and personalization module
3. MNO interfaces (OTA TSM)
4. Banking interfaces (Bank TSM)
5. Web interfaces
6. FI Core Services
   - CASH IN and CASH OUT on generic accounts
   - M-Microcredit
   - M-transfer
7. Mobile transactions interfaces
8. Unbanked person
9. FIP mobile enablers

Remote user

MNOs
Banks
Card Issuance NFC stickers Issuance
Certification Authority

Key Management

OTA transactions
Banking transactions
FIWEB transactions
FIMobile transactions
FIRST salient ICT innovative features

- **NFC ecosystem**
  - **NFC smartphone** for last banked person, the FI agent (MNO prepaid-card reseller,..) attached to a rural village and managing the global « village account »
  - NFC cheap passive stickers for unbanked persons (having a virtual payment account on the « village account ») for authentification

- **Dual TSM (« SPLIT TSM ») global NFC symmetric architecture**
  - Balance between banks and MNO’s having their own TSM and TSM interoperability
FIRST Project

• A very PRAGMATIC bottom-up INNOVATIVE standardized approach with short-term pilot projects in India (in 2011, Haiti and Morocco in 2012)

• Starting with the bottom-billion of the pyramid!
  • ➔ New Business models
  • ➔ New …Banking Theory with Virtual mobiquitous cash
A very simple pragmatic idea:

« We Propose a high-level card API for mobile service developers stemming from DB approach to ease NFC app. development »
Typical Mobile Internet application Development

- **APP developer**
- **SERVICE PROVIDER**
- **APP server**
- **Mobile Network Operator**
  - portal
  - Network access
- **Customer**

**Mature development tools**

**GUI** (application mobile)
NFC Development: A Complex Ecosystem

Service Provider

Trusted service Manager

Mobile Network Operator

Customer

NFC Application developers

Application

SIM CARD

GUI

Development kit

APP Server

Unified interfaces?

Mature Development Tools

Socilogical and business studies

Technical Infrastructure

Services

• portal
• Network access
• SIM access

Acceptation point

Generic API for data management

NFC SIM Centric (SE)
Before Complete DEV by the service provider

Use of CONTAINER GENERIC CARDLET

- Use of a CUSTOMIZED CARDLET based on the generic container
- GENERIC API approach (NFC CONTAINER UNS Proposal)

CONTAINER NFC API code for data mgmt
SERVICE PROVIDER (SP)
Application KEY of the SP
Specific API of the SP
Generic API
Optimized reduced coding for NFC App developer

... short index = GetIdxToDO(tag);
if (index == (short) DO_NOT_FOUND) {
    //----- DO not found -> create a new one
    short index2free = GetIdxToFreeSpace();
    short freesize = (short) (SIZE_MEMORY - index2free); // calculate size of free space
    short DOsize = (short) (lc+LEN_TAG+LEN_LEN); // calculate size of the new DO
    if (DOsize <= freesize) {
        // it is enough space for a new DO
        memory[index2free] = (byte) tag; // set DO tag
        memory[(short) (index2free+LEN_TAG)] = (byte) lc; // set DO length
        // copy the DO atomic into the memory
        Util.arrayCopy(cmd_apdu, (short)((ISO7816.OFFSET_CDATA) & 0x00FF), memory, (short) (index2free+LEN_TAG+LEN_LEN), lc);

VERSUS

void insertRecord(byte[] record, short recordOffset, short recordLength)

// Adds a record in the current structure.
Cf LETS (‘Local EXCHANGE and Trading Systems ») in the 80’s
- Michael Liton (1983)
- Towards Mobiquitous LETS ?

« PAYMENT ACCOUNT » (MNO? Google? Apple ?..)
- CASH becomes VIRTUAL ! No More Fund transfer ?

Product and service EXCHANGE with VIRTUAL CASH
- « Bank of TIME »
- « PEZE » (« Plan d ECHANGE Zero Ennui ») : mobiquitous barter within Campus.
TAP’nFLOUSS project (MBDS Morocco, 2009)

- NFC Cash dispenser/ATM (Omnidata, NCR)
- NFC Phone
  - NFC ADD ON (M2T)
  - NFC stickers (Twinlinx)
- 75% of the population owns a cell phone with only 25% bankable
  - M-transfer on 50% of the population!
- Demo and Mediterranean M-payment summit on June 2011 in Casablanca
Casa Karibe Nova Project in Haïti: Tracking coffee for fair trade with MALONGO (Alcatel Lucent, Comcel,..)

- NFC/RFID and 2D TAGS (Semapedia in 2006 then Flashcode in 2008) for end users
- NFC demo in May 2006 in Paris and formal agreement (MOU) in May 2007 in Port of Prince (Haiti) with WIMAX pilot project launched in March 2008 in rural area of Haïti (Cap Rouge)
Frantz Verella (Minister of Telecommunications) on March the 29TH in Cap Rouge (Haiti): « Poverty is a denial of access to INFORMATION »
MBDS building in the Univ of Haiti

MBDS building before and after the earthquake of January 2010 in The University of Haiti (Port of Prince)
Haiti in March 2011 towards the 1st « Mobiquitous building in America » to be inaugurated on April 2011
MBDS Students receiving their NFC cell Phones on March 2011
Questions ?

« If you are crazy, it is possible. Remain open to creativity and innovation » John Gage, 28 Oct 99  MBDS  Sophia

« Stay hungry, stay foolish » Steve Jobs, Stanford, 2007

Charles Babbage en 1812 :

« Propose to any english man any principle or any new instrument however admirable and you ’ll observe he will spend his energy to demonstrate it could ’nt work. Propose it to an american, he will congratulate you and spend his energy to find new applications »