Java One 2010

Java ME for Emerging and Developing Countries

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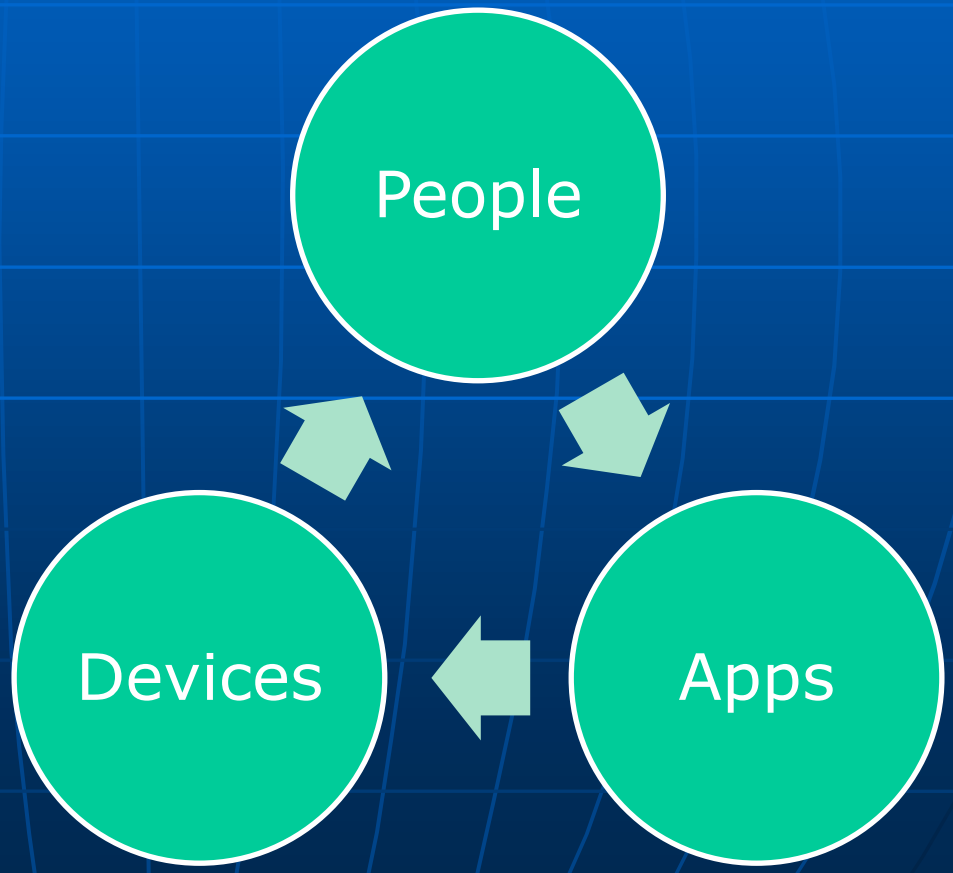
Agenda

- Who am I?
- Why this BOF?
- Audience
- People
- Devices
- Apps



Who am I?

Why this BOF?

- Generate discussion on this topic and see if more venues are necessary to discuss it
- Have the perspective of a more technical community on the topic
  - There is this type of discussions in venues involving NGOS, international organizations, operators and academia
  - Conferences include: ICT4D, M4D, NSDR, HCI4D, AI4D, Mobileactive conference, Mobile Learning, mHealth summit, UN conferences…

Questions

- Who are the users?
- How are users manipulating their phones?
- What devices are used?
- What applications are used?
- Is Java ME the dedicated technology for these markets?
- Are industries / developers seeking to understand these markets?
- Who will develop applications for these markets?
- How to train developers worldwide to target these markets?
- What are the specifics of developing mobile applications for these markets?
- What Java ME applications for these markets?
- What are the difficulties in developing / distributing / maintaining mobile applications for these markets?

Audience

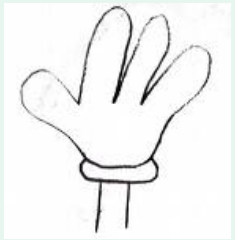
Who are the attendees?

A Unique Medium – More Than a Computer

- Calls and voice commands

Cheaper?

- Cameras, accelerometers and sensors for proximity and ambient light

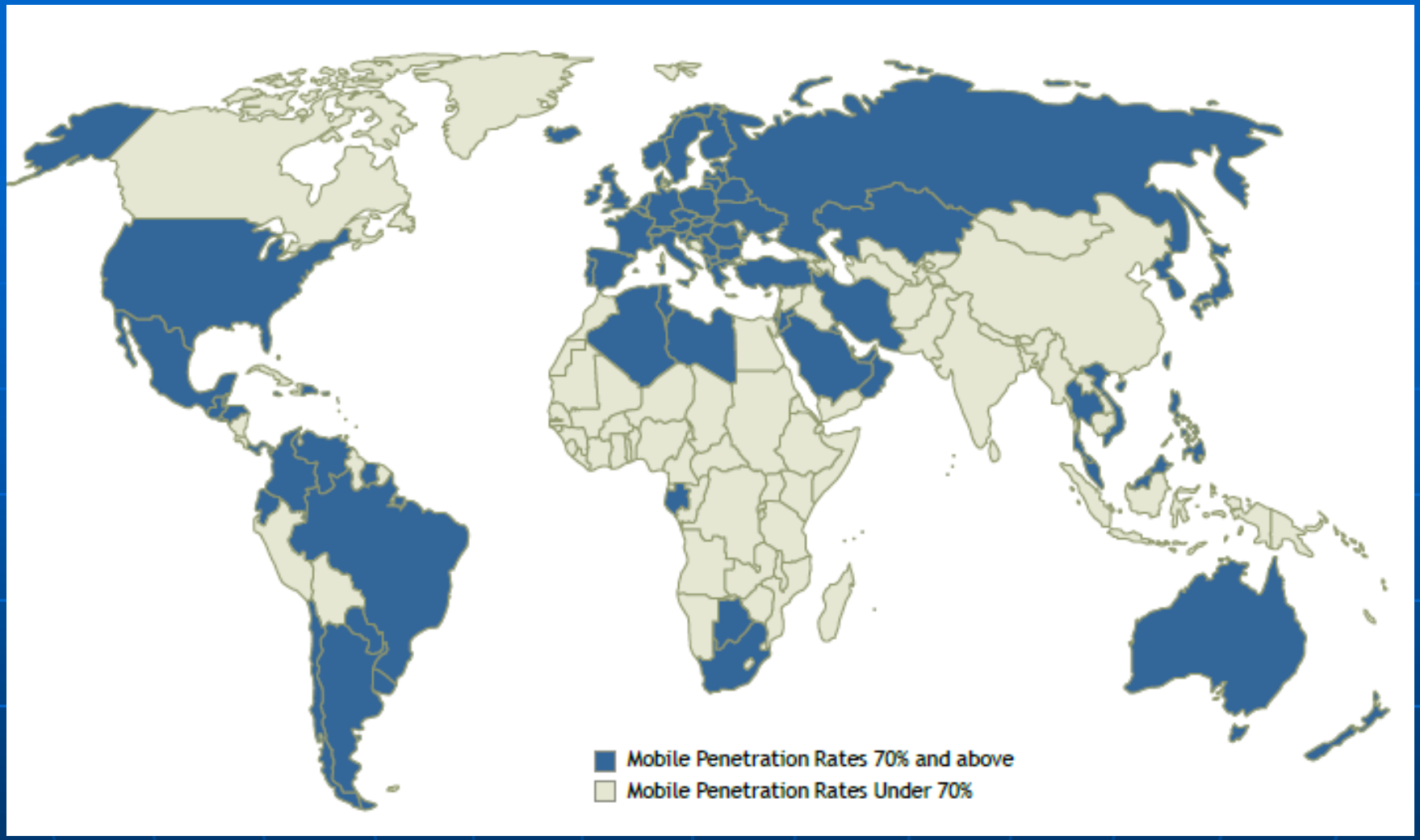


- Touch screen

Bridging the digital divide

- Location by triangulation or GPS

Who are the users?



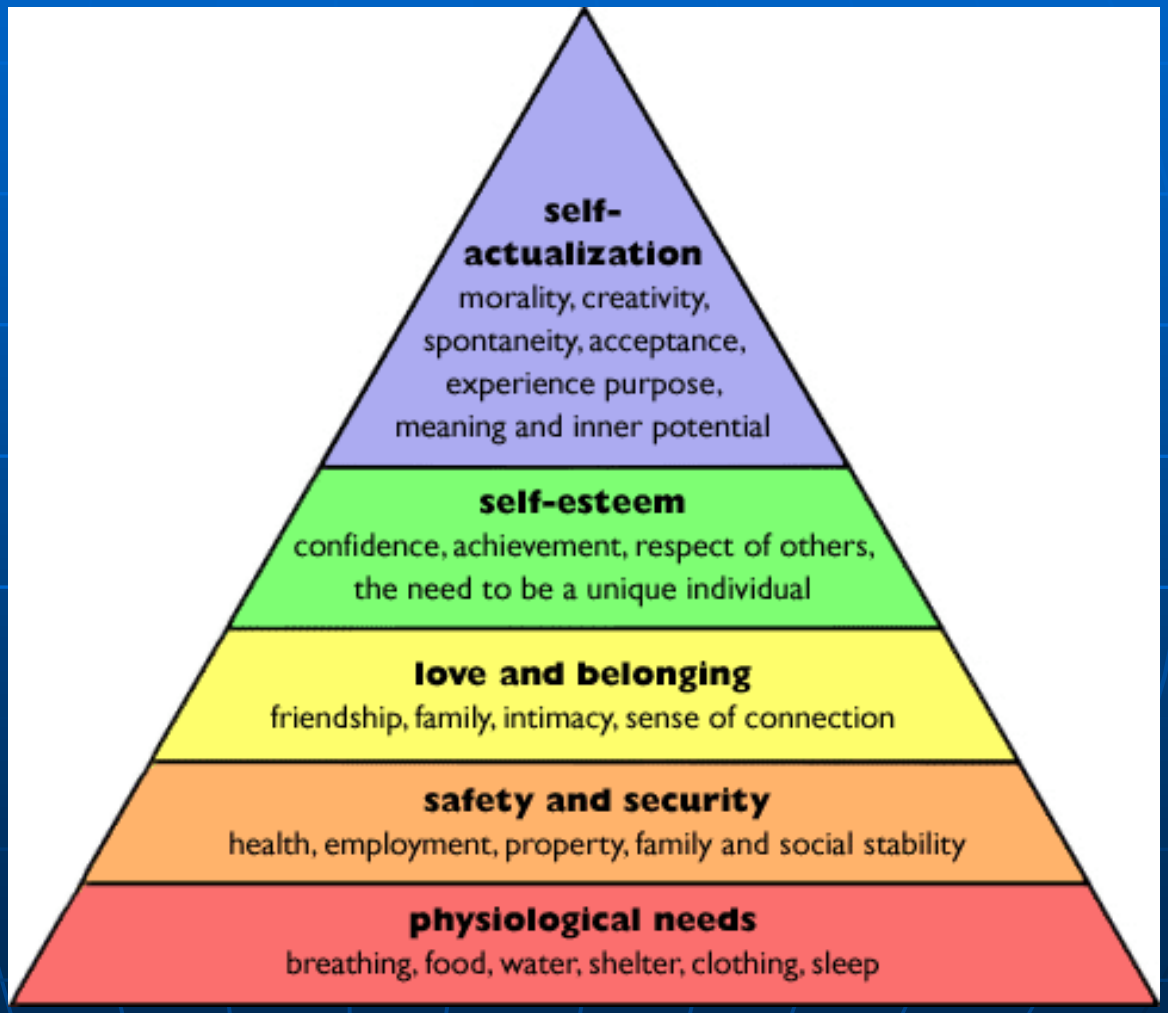
Source: http://www.vitalwaveconsulting.com

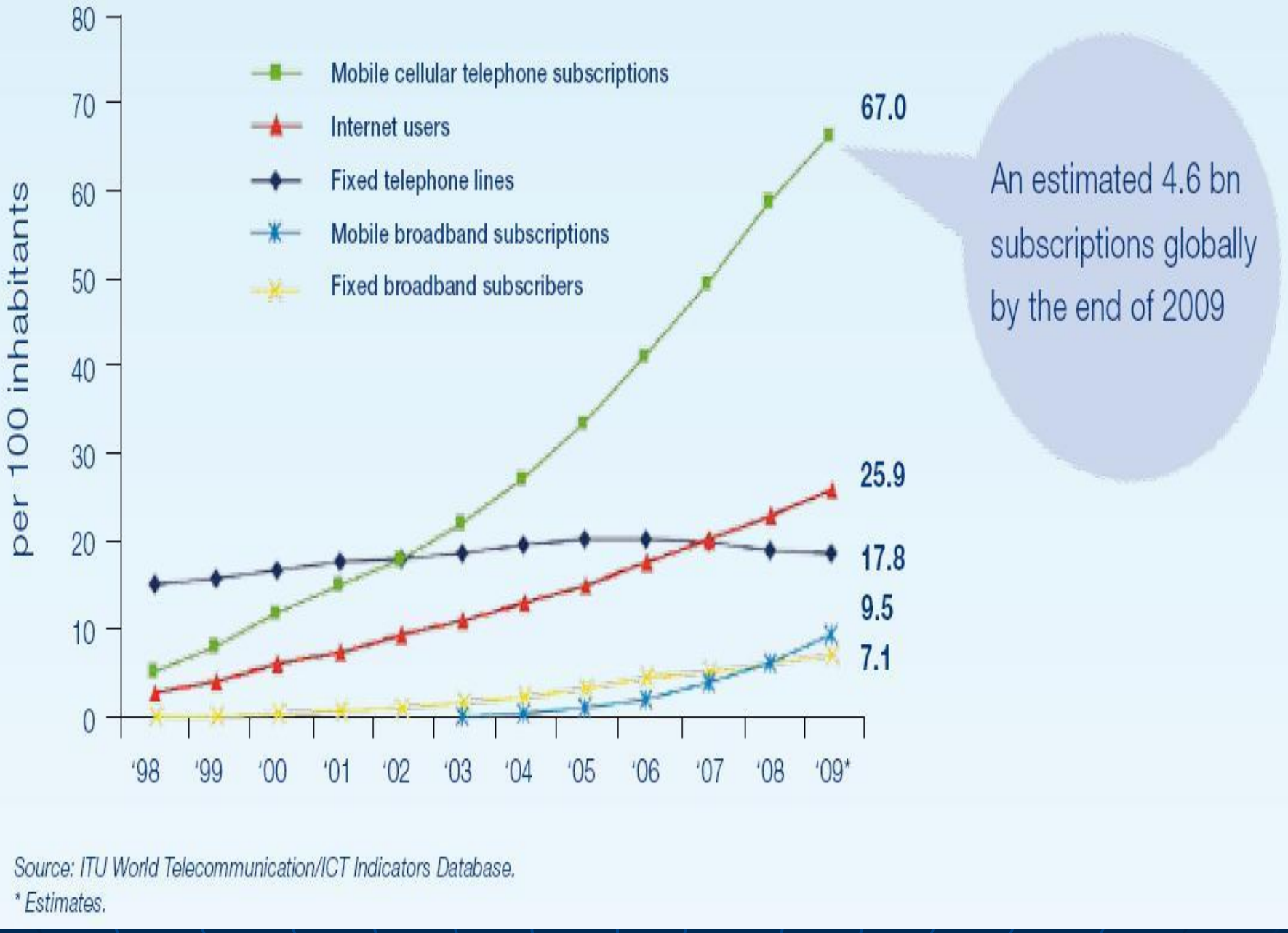
More than 4 billions mobile subscribers
70% of the world's mobile subscriptions are in developing countries, NY Times April 13, 2008

Mobile Phones and the Maslow's Hierarchy of Needs

Who are the users?

Health, educational and financial needs





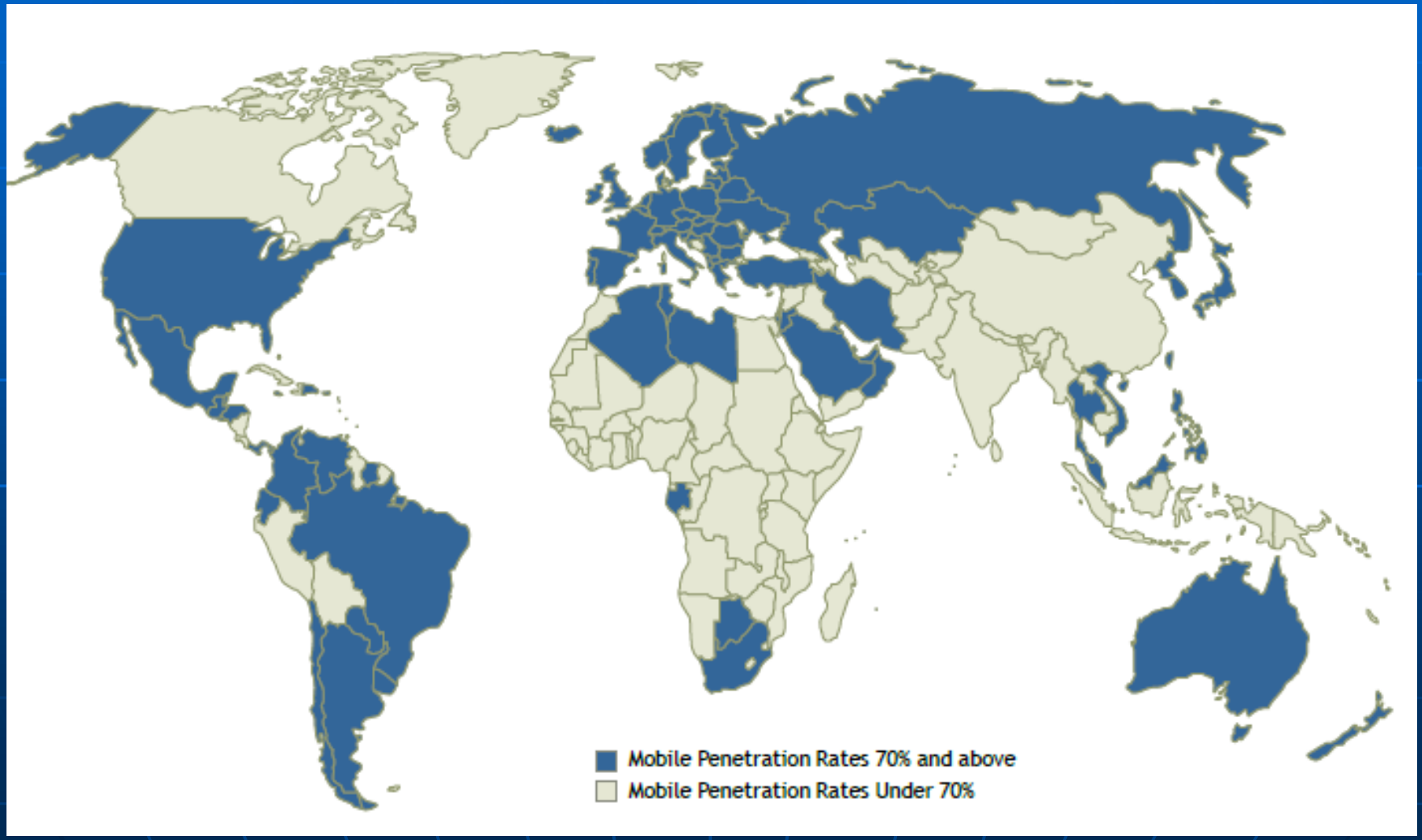
Source: ITU World Telecommunication/ICT Indicators Database.

** Estimates.*

Specifics of the Emerging / Developing Markets

- Prepaid rather than plans
- Several SIM cards
- Buy phone separate from operator (unlocked phones)
- Dramatically different segments
- 300 million fewer female subscribers than male subscribers in low and middle-income countries *[http://www.vitalwaveconsulting.com]*
- Culture specifics
- Spoken languages versus local languages
- Literacy level
- Requirements for training
- The art of “Beeping” *[Donner, Microsoft Research]*
- Users may never have accessed the Internet at all or on a computer
- Users do not have credit cards

Global Markets



Why Java ME?

Lots of Technologies

- SMS
- MMS
- QR codes
- Mobile web sites
- IVR (Interactive Voice Response)
- Bluetooth
- Client applications
- Widgets
- USIM
- UDDI
- Mobile TV

…

Java and Java ME – Some Numbers

- 3 billion mobile phones run Java
  - Feature phones, smart phones and Blackberry phones
- 5 billion Java Cards are in use
- 5 of the top 5 mobile phone manufacturers ship with Java
- 97% of enterprise desktops run Java
- 80 million TV devices run Java
- There are 9 million Java developers worldwide
- Java remains the #1 choice for developers

Source: Blog of Janice Heiss

Powerful

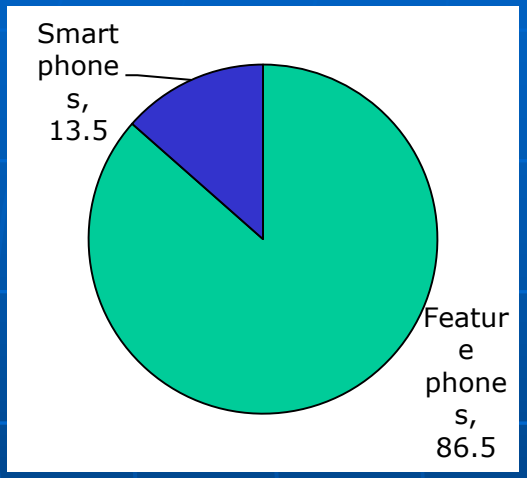
Java ME + SMS Technology

What are the devices?

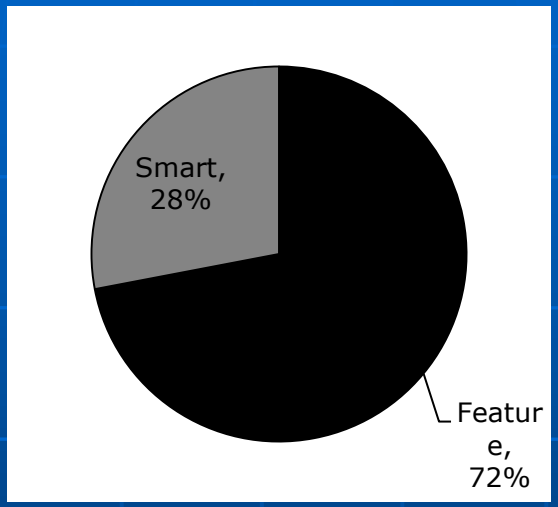
Devices

- A wide variety of feature devices by the main vendors
  - E.g., Nokia, Samsung, LG, Motorala, Sony Ericsson
- A wide variety of smartphones
  - E.g., Blackberry, Android phones, iPhone
- A wide variety of operating systems
  - E.g., Blackberry, Palm OS, Windows CE/Mobile, Symbian, Android
- A wide variety of development environments
  - E.g., Java ME, BREW, Google Android
- A wide variety of programming languages
  - Java, Python, Flash Lite, Objective C, C, C++, JavaScript, Qt, HTML and CSS for Widgets

Global / US Handset Sales



Global (1Q 2009)



US (1Q 2009)

Blackberry
First smartphone in North America
Second smartphone globally
Source: JavaOne 2010

http://www.mobilemarketer.com

Worldwide Mobile Terminal Sales to End Users in 1Q10 (Thousands of Units)

Company	1Q10 Units	1Q10 Market Share (%)	1Q09 Units	1Q09 Market Share (%)
Nokia	110,105.6	35.0	97,398.2	36.2
Samsung	64,897.1	20.6	51,385.4	19.1
LG	27,190.1	8.6	26,546.9	9.9
RIM	10,552.5	3.4	7,233.5	2.7
Sony Ericsson	9,865.6	3.1	14,470.3	5.4
Motorola	9,574.5	3.0	16,587.3	6.2
Apple	8,359.7	2.7	3,938.8	1.5
ZTE	5,375.4	1.7	3,369.6	1.3
G-Five	4,345.0	1.4		
Huawei	3,970.0	1.3	3,217.9	1.2
Others	60,418.1	19.2	44,972.2	16.5
Total	**314,653.50**	**100.0**	**269,120.10**	**100.0**

Source: Gartner (May 2010)

Nokia New Handsets

- Nokia C1 [3rd Quarter 2010]
  - Standby battery time of up to six weeks
  - 2 SIM cards, only one active at a time
  - Flashlight
  - FM Radio
  - 500 phone number phonebook / 250 text messages
  - 30 euros
- Nokia C2 [4th Quarter 2010]
  - 2 SIM cards with dual standby capability
  - 1 hot-swappable SIM card
  - Micro-SD cards of up to 32GB
  - Access to Ovi Life Tools and Ovi mail
  - FM Radio
  - Music player
  - 45 euros

China in the Handset Market

Innovations in the African Context

Yobalema

3G sim card

$5
(Senegal)

Senegal

Ghana

Nigeria

$20
$1.5 / day or $30 / month for unlimited calls and Internet
(Senegal)

$100
$1 / hour $5 / day
(Senegal)

Source: http://expressotelecom.com

What are the applications?

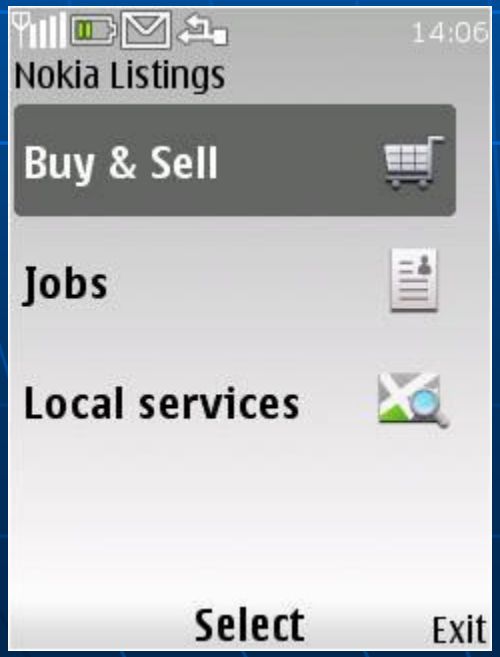
Mobile Innovations

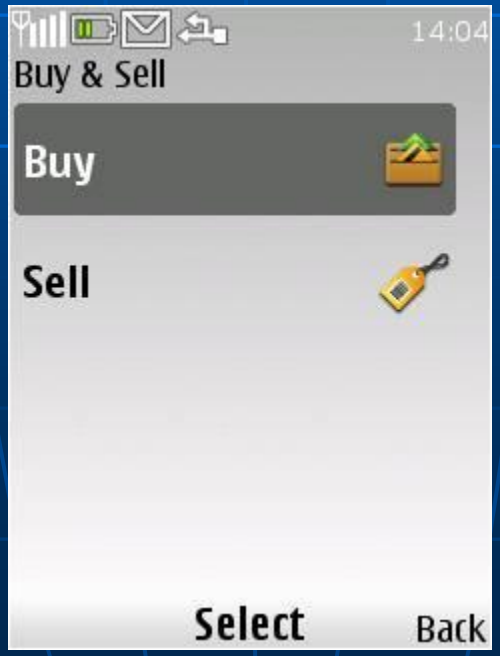
- Pioneering initiatives
  - mHealth
  - mFinance
  - mAgriculture
  - mCommerce
  - mGovernance
  - mActivism
  - mEducation
  - mIdentity
  - mEntertainment
  - …

Client App

Listings

- Listings is Nokia version of craigslist for the developing world
  - Works on basic mobile phones (Series 40) without GPRS connections
  - Geo-coded listings





SMS

Health

RapidSMS

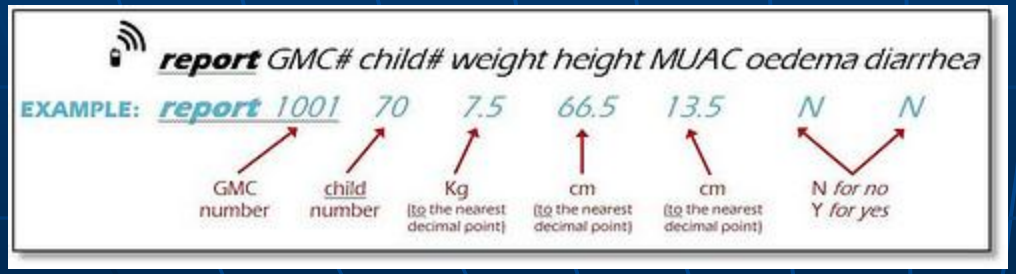
Source: http://rapidsms.org

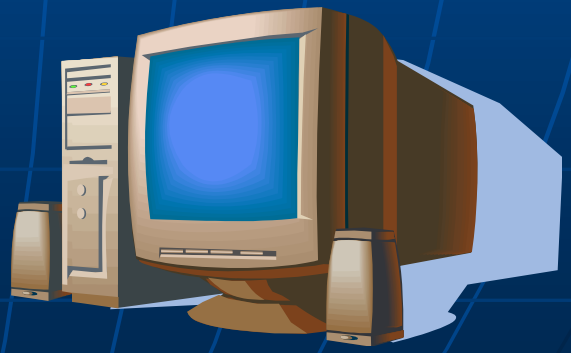
Data Collection

- Malnutrition surveillance

Integrated Nutrition & Food Security Surveillance Data Collection

Child #	Sex	Age	Weight	Height	% Weight for Height	MUAC	Oedema	Diarrhoea
70	M	24	7.5	66.5		13.5	N	N
28	F	13	6.7	66.4		12.1	N	N
42	F	42	8.6	68.8		13.8	Y	N





SMS

Education

RapidSMS

Jokko Initiative
Mobile Technology Amplifying Social Change

Source:
http://rapidsms.org

- Sending SMS as a tool for literacy and numeracy

Tostan
Community-led Development

http://tostan.org

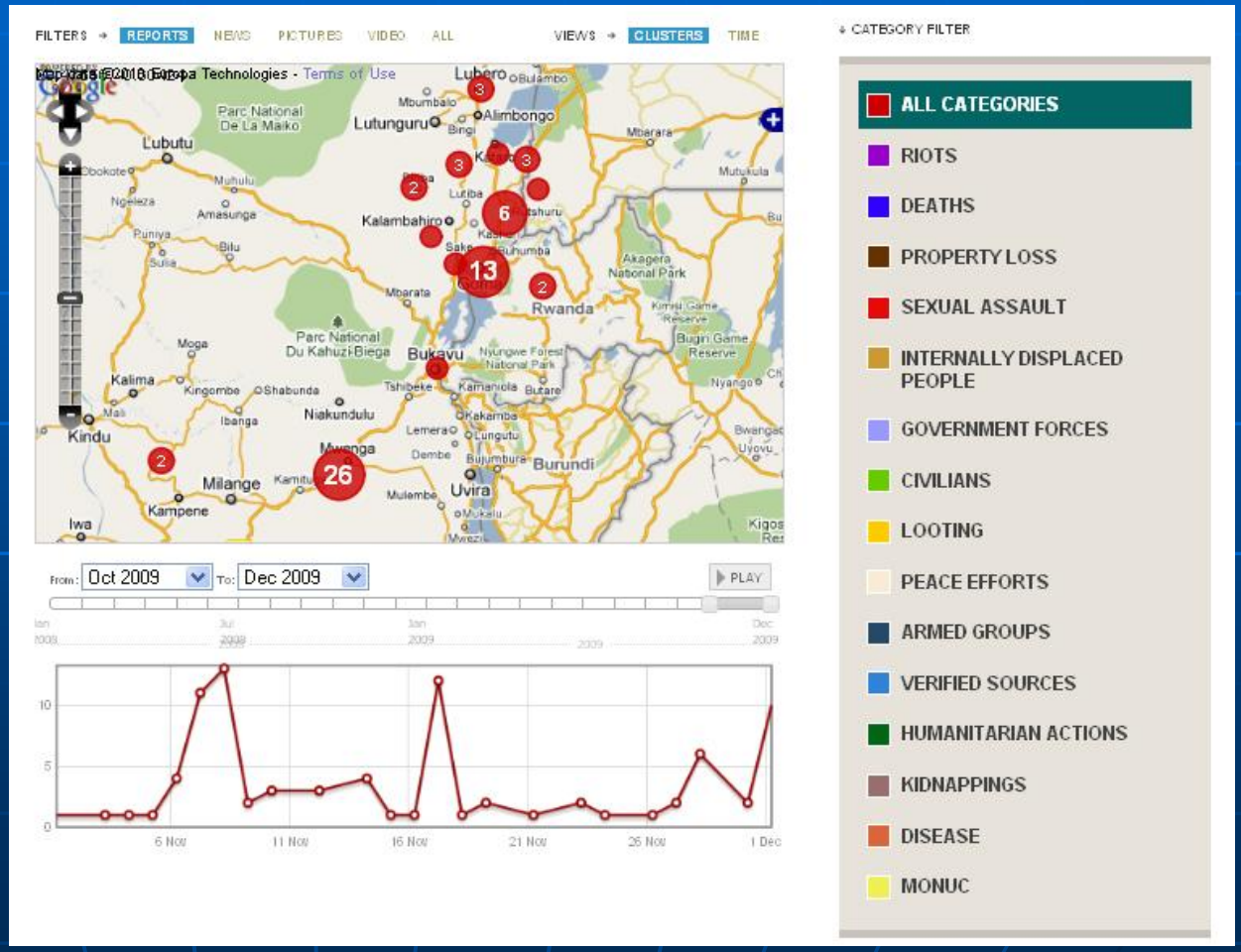
Crowdsourcing Crisis Information

- Ushahidi – *http://ushahidi.org*

SMS

Emails

Web



Republic Democratic of Congo

How to distribute these applications?

Mobile Stores

App Store	Android Market	Ovi Store	Blackberry App World
July 2008	March 2009	May 2009	November 2009

- GetJar, GooJet, Opera Widgets, Orange's Application shop, Vodaphone apps, T-mobile Applications, Sony Ericsson eStore…

- Free and paid apps
- Not all phones are supported
- Not open in all countries for developers and users

- Model not adapted to reach potential users in the developing world

Who should develop these applications?

Developers in the emerging and developing countries

Existing Programmes

- Pace University
  - MobileSenegal, 2007-
    - http://www.mobilesenegal.com
  - Global Software Development (GSD), 2005-
    - Collaboration between developers in the US and developing countries (India, Thailand, Cambodia, Senegal)
  - http://atlantis.seidenberg.pace.edu/wiki/gsd2010
- Mobile-empowered entrepreneurs in Africa, 2010
  - Web Foundation and Vodafone Group
  - Train entrepreneurs to leverage mobile and Web technologies relevant to developing countries
  - Creation of mobile training labs
  - Focus on Ghana
  - http://www.webfoundation.org/projects/mobile-entrepreneurs/

Existing Programmes

- African Regional Mobile Application Labs, 2010
  - infoDev (World Bank) and Nokia
  - Increase the competiveness of innovative companies working in mobile content and application
  - Focus on Kenya and South Africa
  - http://www.infodev.org/en/Article.559.html
- MIT courses "Designing Technologies for the Next Billion Mobile Users" and "Mobile Innovation for Global Challenges", 2008-
  - Collaboration with NGOs
  - http://nextlab.mit.edu/
  - http://tinyurl.com/39yxpuq

Existing Programmes

- EPROM (Entrepreneurial Programming and Research on Mobiles), 2006-
  - Focus on Kenya and Ethiopia
  - http://www.media.mit.edu/ventures/EPROM/index.html
- CodedInCountry, 2008-
  - Strengthen the capacity to develop software in low-income countries
  - “FairTrade” label for software projects
  - http://groups.google.com/group/coded-in-country-launch

MobileSenegal

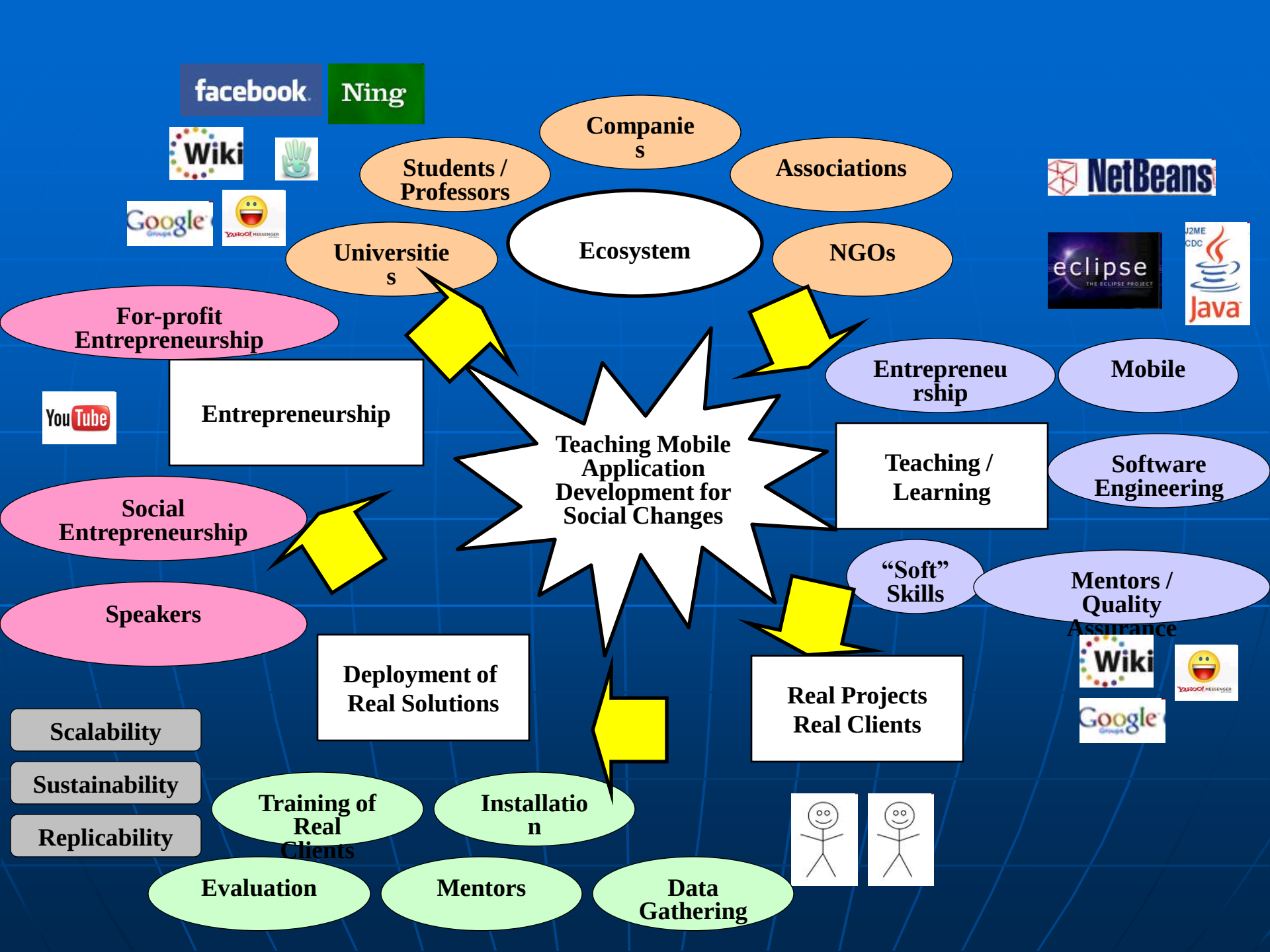
- Teach students the skills to engineer mobile solutions
- Educate students on the potential and procedures for creating tech startups (based on mobile technology)
- Develop mobile solutions for Senegal

MobileSenegal

- Boot camps in mobile application development at Thies
- Courses in mobile application development in different universities in Senegal
- National competition for the development of mobile applications
- Training for faculty
- Application for children, artisans and universities
  - KomKom – accounting for artisans – Nokia judge choice prize

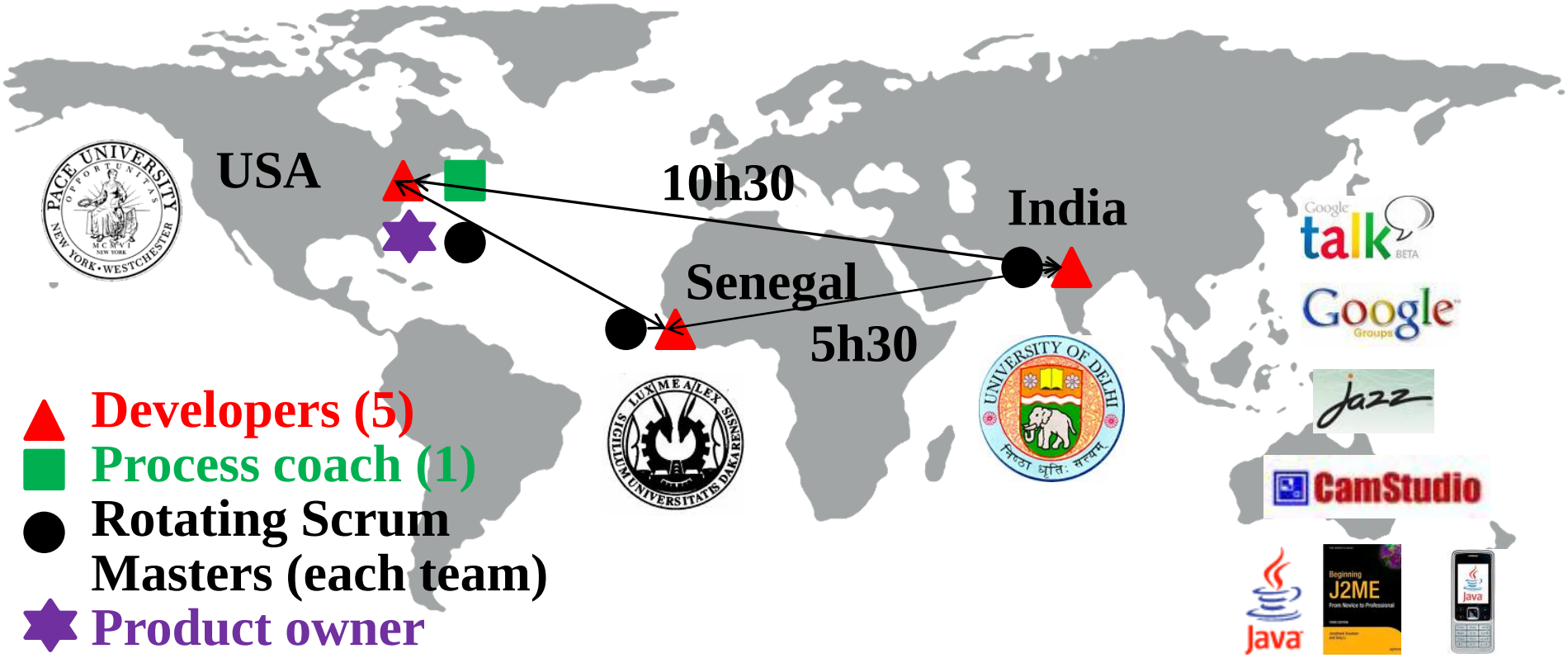
NOKIA
Connecting People

Calling All Innovators.com


facebook
Ning
Wiki
Google
Companies
Students / Professors
Associations
Ecosystem
Universities
NGOs
NetBeans
eclipse
J2ME CDC
Java
For-profit Entrepreneurship
Entrepreneurship
YouTube
Entrepreneurship
Mobile
Teaching Mobile Application Development for Social Changes
Teaching / Learning
Software Engineering
Social Entrepreneurship
"Soft" Skills
Mentors / Quality Assurance
Speakers
Deployment of Real Solutions
Real Projects Real Clients
Wiki
Google
Scalability
Sustainability
Replicability
Training of Real Clients
Installation
Evaluation
Mentors
Data Gathering

Distributed Developers | *End-to-Eng Tooling* | *Scrum* | *Mobile* | *Agile Methodologies*

GSD 2009



Software Development Project

- **TargetFirstGrade – Product owner: Dr. Scharff**
  - Mobile application to assess the learning of pupils in first grade (5-6 year old) in topics such as Mathematics, Reading, Writing and Geography
  - Delivery of exercises in these topics in the form of open-ended and multiple choice questions
  - Automated computation of the scores
  - SMS of the scores to the teachers and parents

Distributed developers

Quality

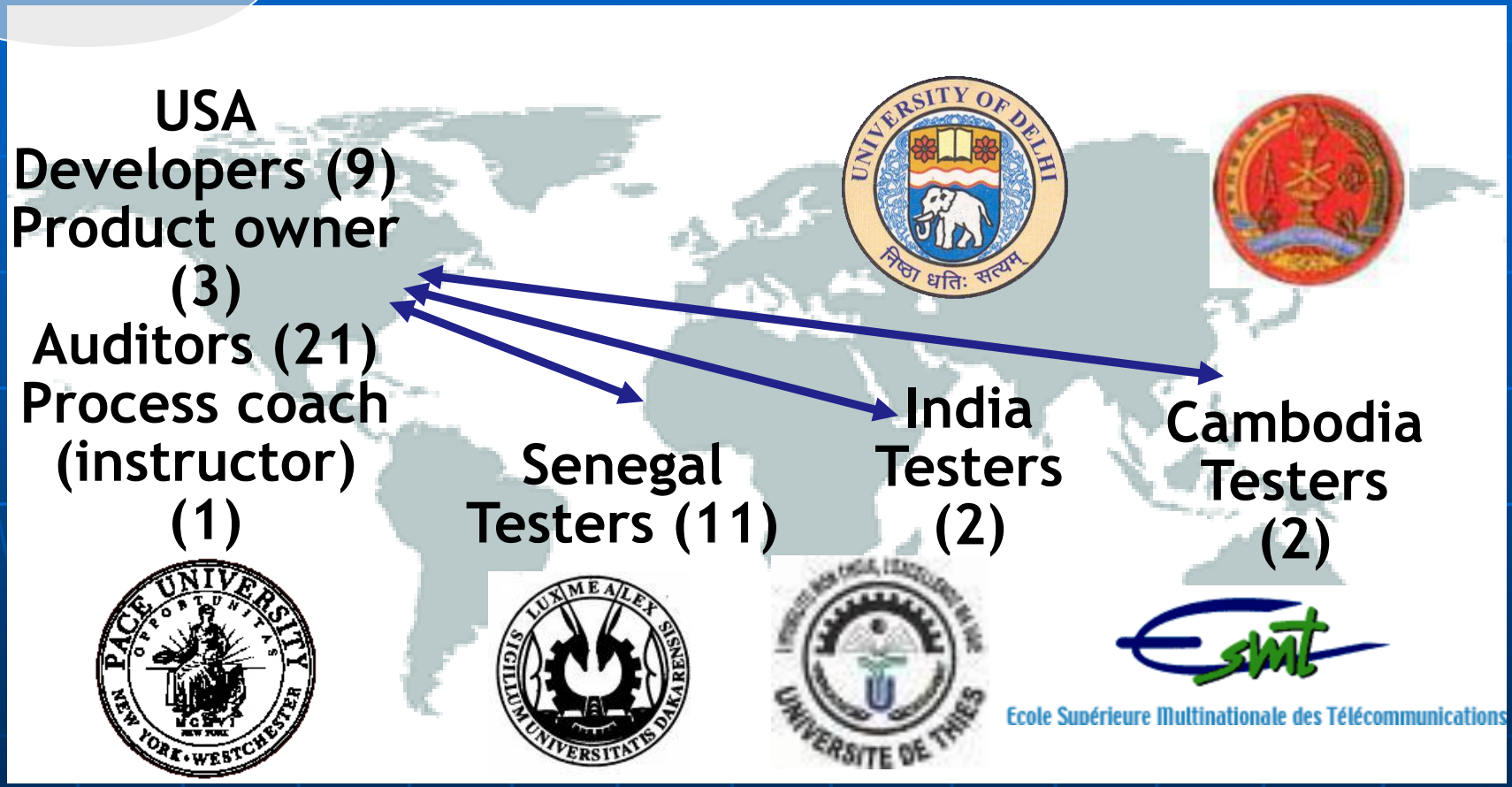
End-to-End Tooling

Scrum

Agile Methodologies

Mobile

GSD 2010



Software Development Projects

- **Project1: No Ink** for Blackberry phones
  - Taking, annotating and organizing notes

- **Project 2: Back Pocket** for basic phones
  - Budgeting for students

- **Project 3: Godiva Flash Cards** for Android phones
  - Social flash cards to revise class topics

End-to-end tooling infrastructure

Questions

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Thanks

- All students involved to date
- Dr. Olly Gotel
- Vidya Kulkarni
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- Balla Diop Dieng
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- IBM
- Google
- Nokia
- Pearson education
- Pace University