



3G Creating Digital Multimedia Access Opportunities Around the World

3G CDMA Wireless Technologies Benefiting Society

Molly Gavin, May 2005





Agenda

- **IMT-2000 Wireless Technology and its Role in Connecting Citizens Around the Globe**
- **Mobile Statistics**
- **QUALCOMM 3G CDMA Technologies**
- **3G CDMA Connecting People**
- **3G CDMA Enabling Enriched Healthcare**
- **3G CDMA Supporting Public Safety**
- **Wireless Technologies Aiding in Conservation Efforts**
- **“CDMA Experience”: 3G CDMA Trial in South Africa Case Study**
- **3G CDMA Elsewhere in Africa**
- **Conclusion**



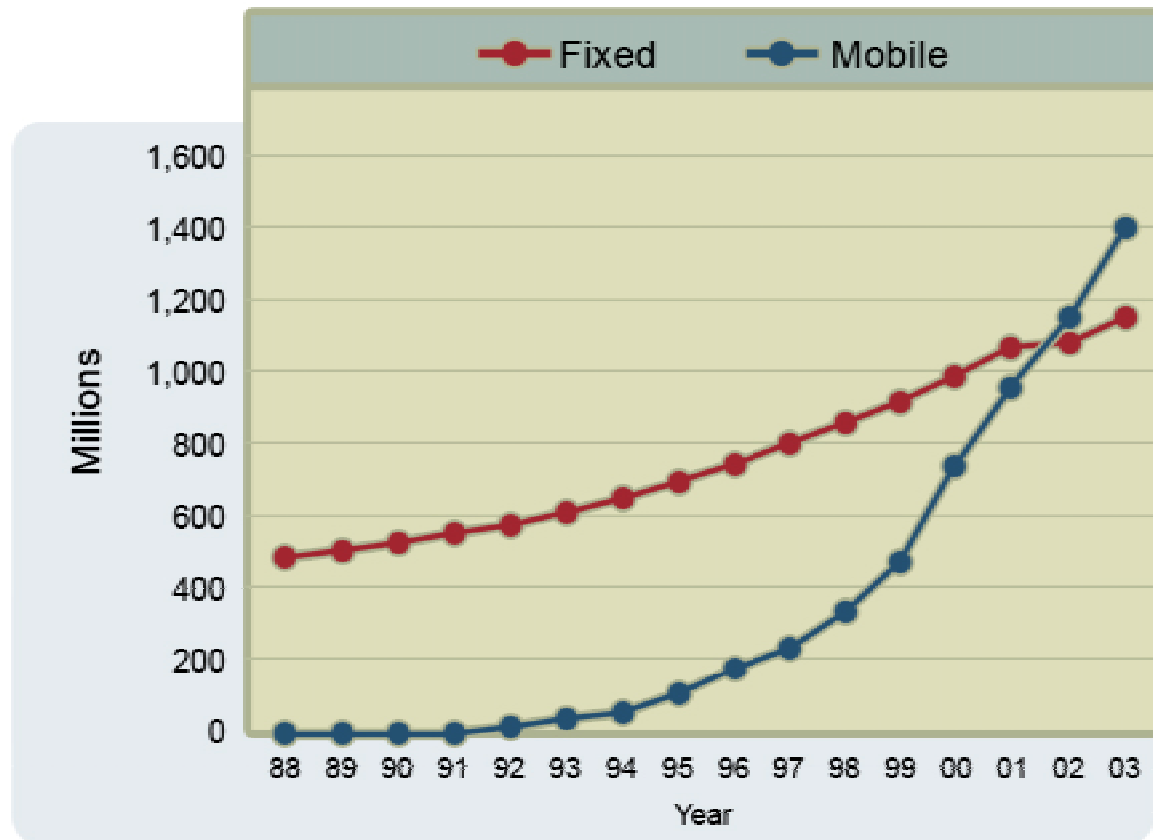
IMT-2000 Technology and its Role in Connecting Citizens Around the Globe

- **Wireless technologies, specifically those developed for Third Generation “3G” personal communications, are providing new avenues to address issues of public importance such as internet connectivity, education, public safety, health-care, e-government, and conservationism.**
- **Around the world, mobile phone users are overtaking fixed-line subscribers due to the affordable high-quality voice and data services that are made possible by today’s technologies. Wireless-only homes are growing and there are far more mobile phones than PCs in the world.**
- **3G CDMA – CDMA2000 and WCDMA foster various levels of global connectivity – from wireless local loop to high speed mobile voice and/or data in many different licensed frequency bands.**
- **3G CDMA Wireless Broadband Technologies, when combined with innovative applications, are addressing the needs of the global community and are helping to improve the quality of life for citizens around the world.**



Mobile surpasses fixed ...

Telephone Main Lines and Mobile Subscribers World Market 1988-2003

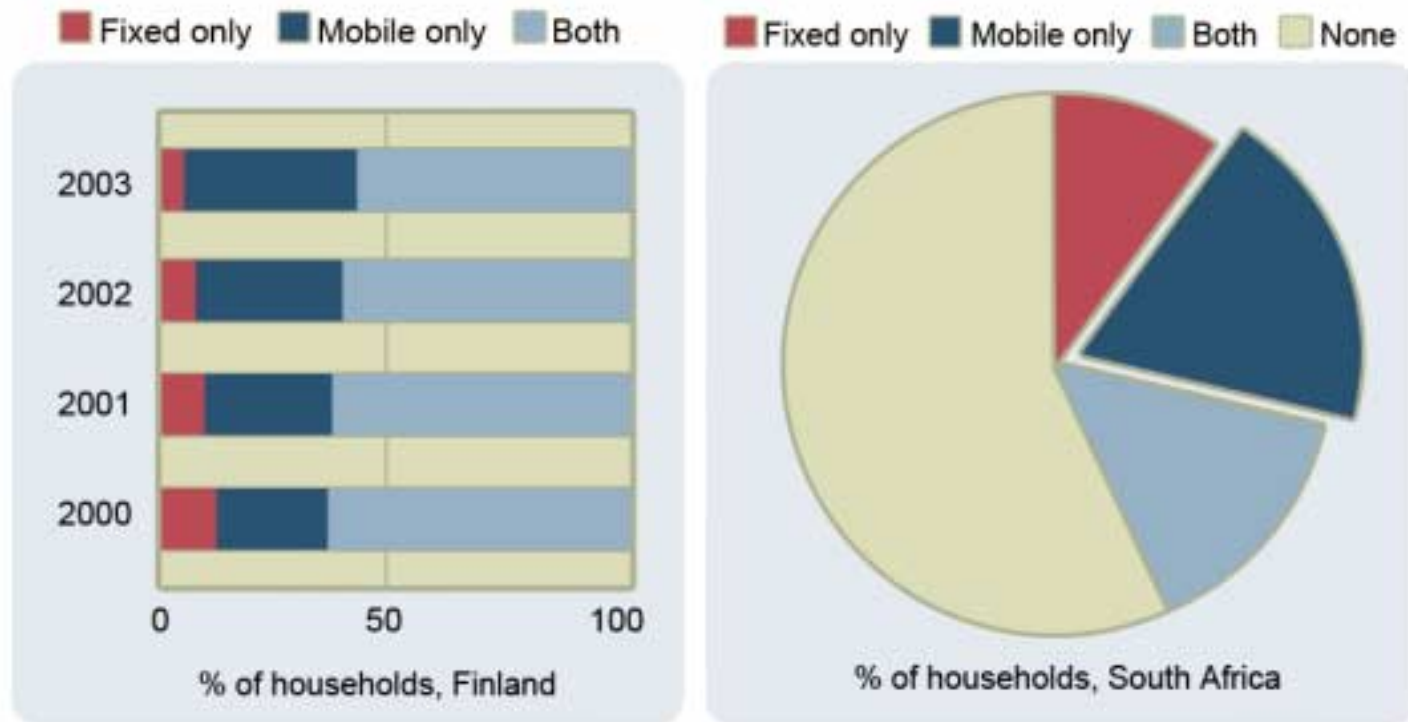


Source: ITU World Telecommunication Indicators, 2004



...and wireless-only homes are growing.

Telephones in households, Finland (2000-2003) & South Africa (2001)

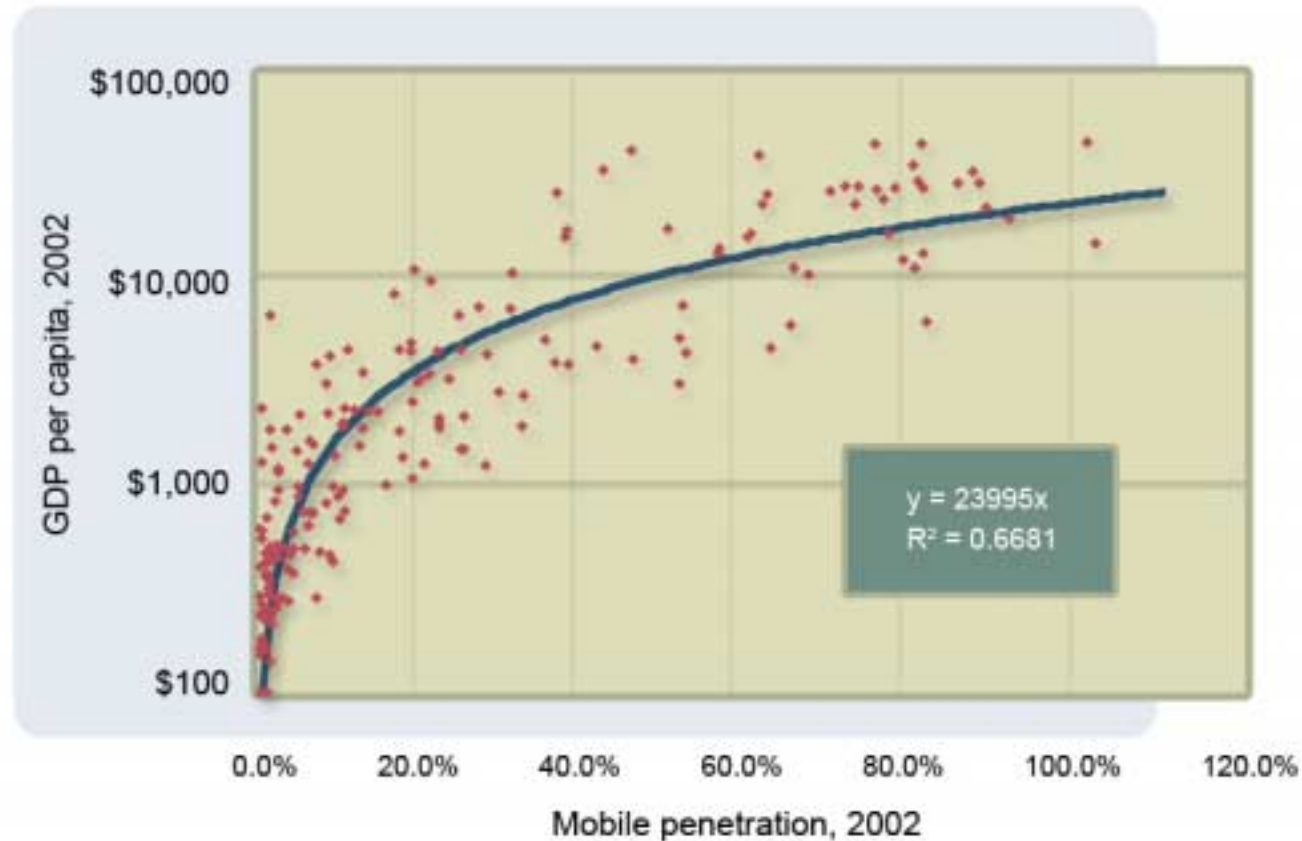


Source: Statistics Finland, Statistics South Africa Census 2001



And it is not just about voice anymore...

For each 1% increase in Mobile penetration, GDP per capita goes up by US \$240

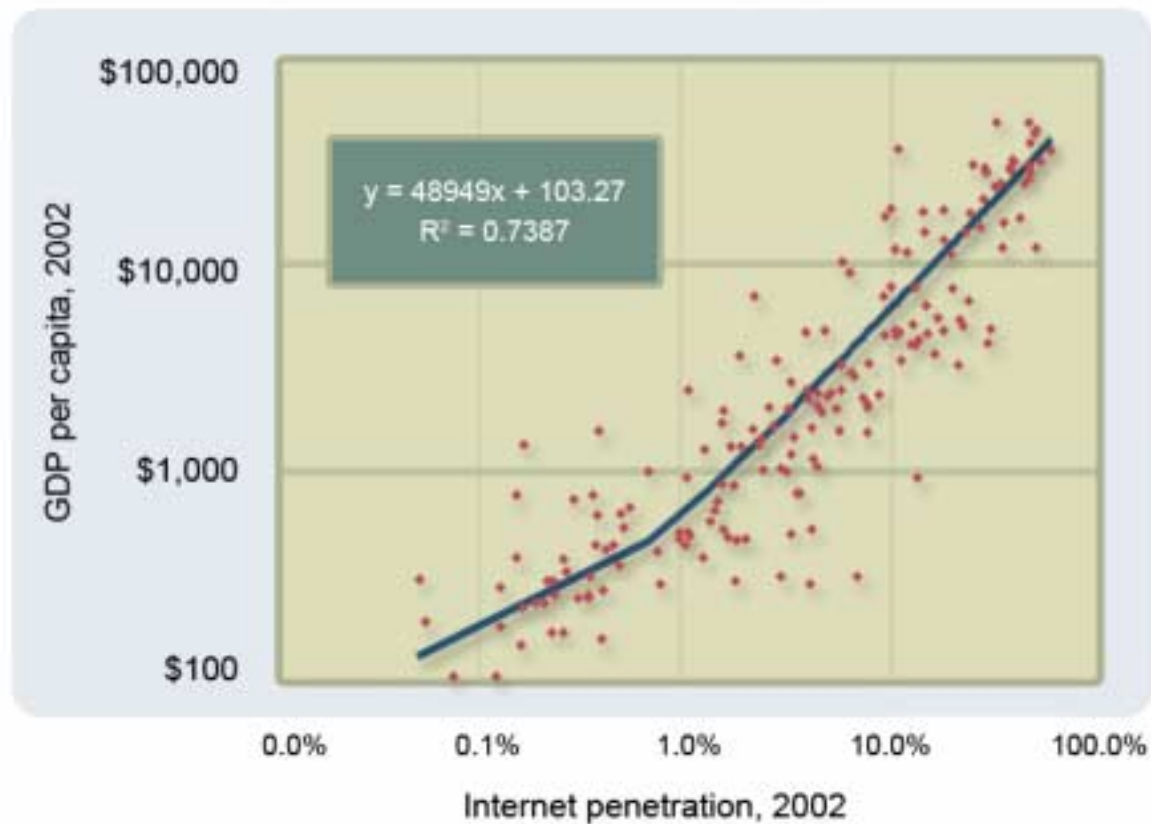


Source: Michael Minges, TMG Telecom, and ITU World Telecommunications Database Statistics, 2003.



...it is about voice and data.

For each 1% increase in Internet penetration, GDP per capita goes up by US \$593

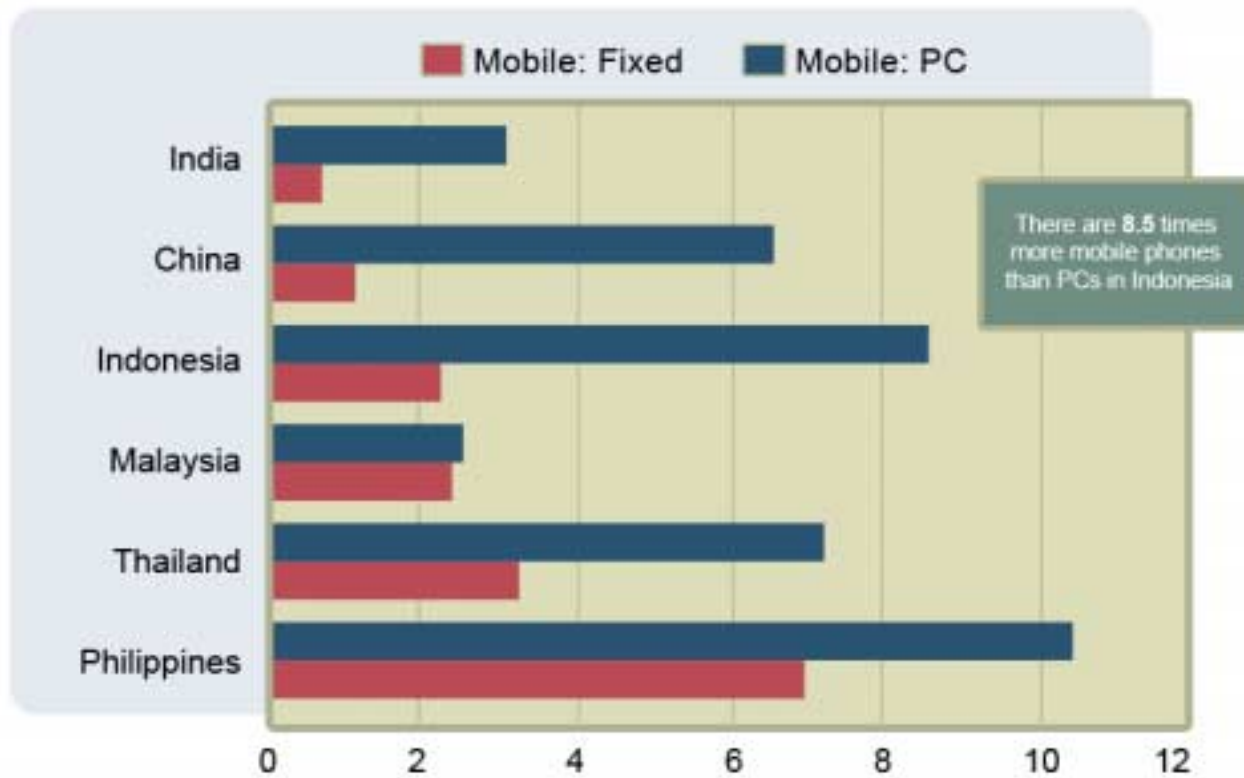


Source: Michael Mingos, TMG Telecom, and ITU World Telecommunications Database Statistics, 2003.



...More Mobiles than PCs...

Ratio: Mobile phones to fixed lines and computers, 2003

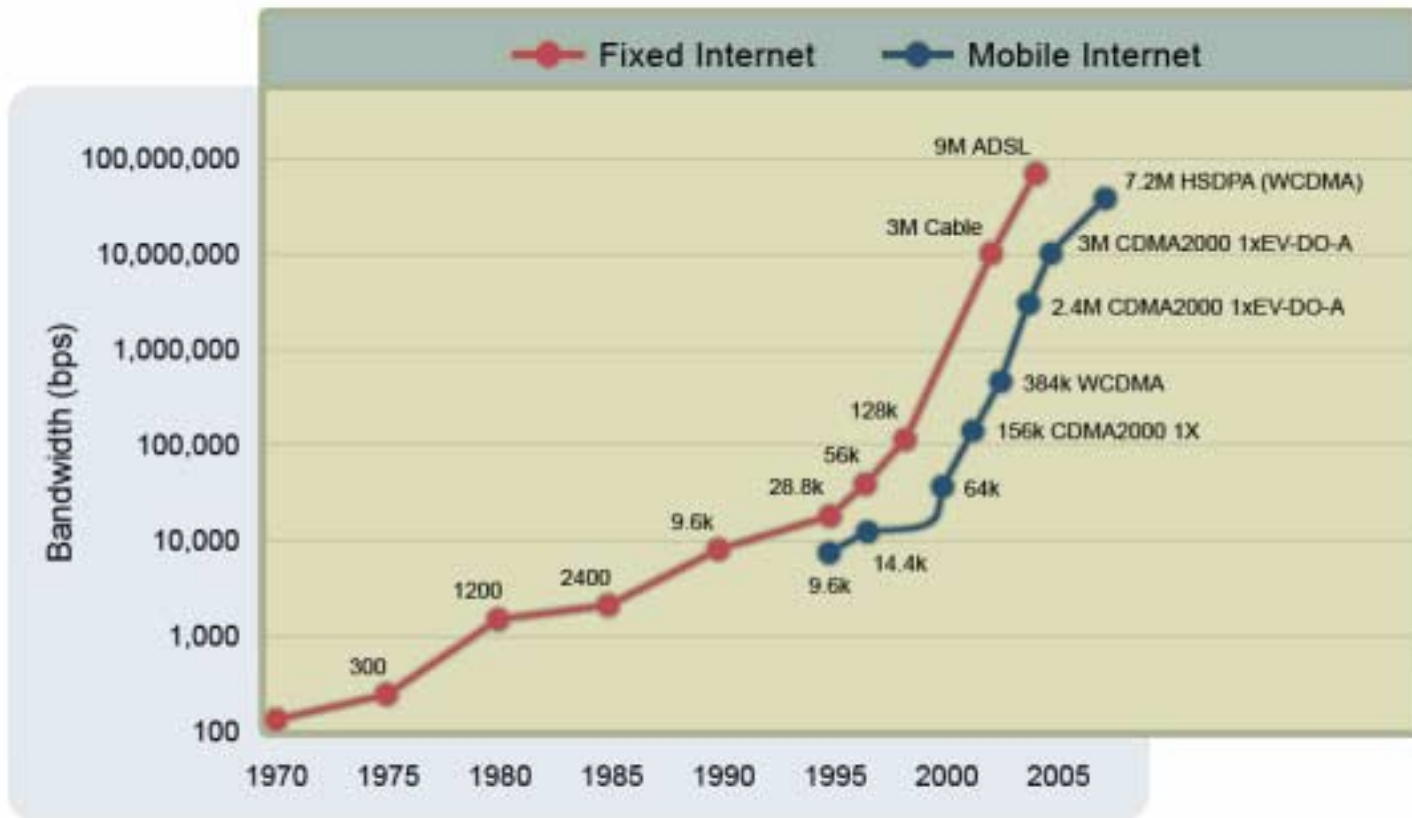


Source: TMG Telecom Asia-Pacific Mobile Multimedia Outlook, 2004



....Mobile data rates have become much faster with 3G....

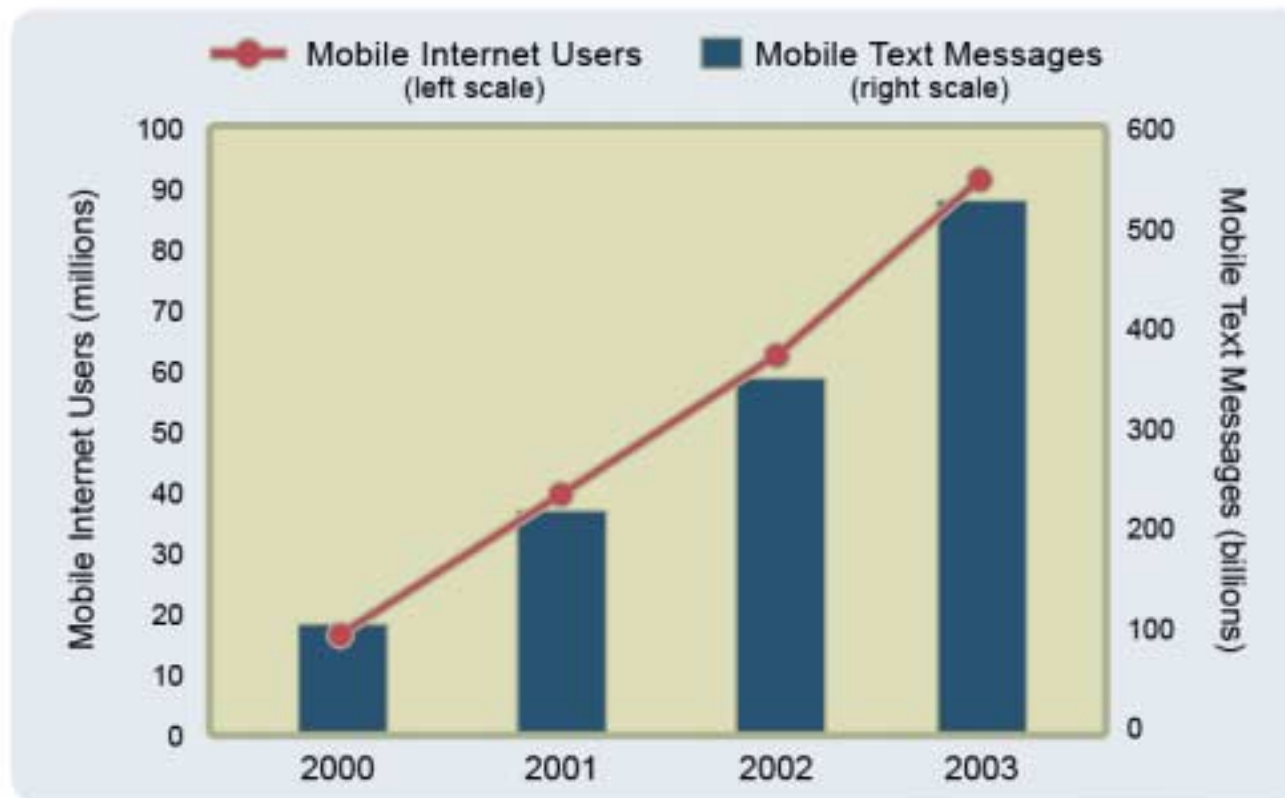
Internet Evolution: Bandwidth





...and Mobile Data Users are Growing...

Mobile Internet Users & Mobile text messages (SMS), 2000-2003



Source: TMG, 2004



3G CDMA Wireless Broadband QUALCOMM's Key Wireless Technologies

- **CDMA2000**
 - CDMA2000 1x** (voice & high-speed data)
 - CDMA2000 1xEV-DO** (very high-speed data)
 - CDMA2000 1xEV-DV** (voice and very high-speed data)
- **Wideband CDMA (also known as WCDMA or UMTS)**
 - WCDMA** (voice and high-speed data)
 - HSDPA** (very high speed data)



3G CDMA Wireless Broadband Mobile Internet Access

- **3G CDMA technologies make it possible for end users to connect with the world at anytime and anywhere.**
 - Communities, both large and small, are gaining access to a wealth of resources and opportunities not previously available.
 - **Applications pertaining to Connectivity, Public Safety, Healthcare, Education, Government and Conservation are particularly enticing!**

- **3G CDMA technologies provide end users with extensive broadband access even while traveling at high rates of speed.**
 - Since 2000, wireless carriers have begun to deploy mobile broadband technologies, such as CDMA 1x, EV-DO and WCDMA, over their existing networks in order to extend service offerings to their customers.



3G CDMA: Connecting People



3G CDMA2000 for Voice Access: CDMA Fulfilling Universal Service Obligations (USO) in India

- **The evolution of CDMA technologies has given a tremendous boost to the spread of telecommunication services in rural areas.**
- **In March 2005, BSNL, Reliance Infocomm and Tata Teleservices won the most SSAs as part of the Government's ~\$1.6 billion dollar plan to provide 8 million fixed line telephones to rural households by 2007. This project is supported by the Universal Services Obligations Fund.¹**
 - Such high participation in the project has brought the cost down by 60-75 per cent. This will allow for 8 million lines, as opposed to 6 million proposed earlier.²
 - This USO project is aimed toward telephone lines for rural households. In addition, the USO Fund is focused on bringing public phones to rural communities in over 50,000 villages with population of more than 2,000 without a public phone facility.³
 - The USO fund administration will eventually cover the 570,000 villages with public phones.

1. "BSNL, Tata, Reliance Bag Rs. 8,000-cr Rural Phone Project", K. Thomas, Hindu Business Line, March 16th, 2004

2. Ibid

3. "BSNL and Reliance Bag Deal for Community Phones", K. Thomas, Hindu Business line, September 19th, 2004, <http://www.thehindubusinessline.com/2004/09/20/stories/2004092002090100.htm>



3G CDMA2000 for Voice Access: Connecting Citizens in India – Rainbow Chalta Firta PCO

- In Rajasthan, India, Shyam Telecom has equipped a fleet of rickshaw drivers with a mobile calling office consisting of two or three CDMA terminals with basic fax capabilities, a battery, a billing machine and a printer.
- Approximately 200 rickshaw drivers pedal mobile payphones throughout the capital, Jaipur, and the surrounding countryside.
- The self-employed drivers can earn enough money to support themselves and their families.
- **Benefits of Project:**
 - Operator increases the traffic on their network
 - The driver earns a living based on commission
 - Consumers get access to voice and fax services





3G CDMA2000 for Voice Access: Partnership in Dominican Republic to Deploy CDMA Public Pay Phone System

- Telecom company Tricom and infrastructure company Bec-Telecom have partnered to deploy a wireless public phone system in the Dominican Republic.
- The contract was awarded by Dominican Republic regulator, Indotel and will provide and install a CDMA based network of over 1,700 wireless pay phones in underserved rural areas.
- The public phone system will eventually be used to provide rural communities with high-speed internet services.
- “Partnership will focus on bringing thousands of people into the Dominican telecommunications network for the first time.”

Source: BNAmericas.com, “GEC-Tel, Tricom Partner for wireless Network – Dominican Republic, November 20th, 2004



CDMA2000 for Wireless Broadband Access: CDMA2000 1xEV-DO: Verizon Wireless Broadband Access

- Verizon Wireless is currently offering CDMA2000 1xEV-DO Broadband Access at a flat rate (unlimited MB) price in over 30 markets nationwide (coverage of more than 30 million Americans) including Atlanta, Austin, Baltimore, Kansas City, Las Vegas, Los Angeles, Miami, Milwaukee, New York, Philadelphia, San Diego, Tampa, Washington, D.C. and West Palm Beach. (1)
- In the US, ACS Wireless, Alltel and Midwest Wireless have also launched flat rate EV-DO access in some of their markets.
- Sprint PCS (merging with Nextel) have also announced CDMA2000 1xEV-DO plans
 - Select cities 2H'04, majority of markets in 2005
 - Plans to invest \$1B US to complete upgrade
- It is expected that networks using EV-DO technology will be available to 150 million Americans by the end of 2005.

BROADBAND ACCESS COVERAGE AND RATE AREA



“The Verizon Wireless EV-DO network is the clear leader among 3G high-speed wireless options. Already available in 32 U.S. metro areas, it’s your best bet for getting the mobile Internet from anywhere at any time. It’s powerful and addictive, and it’s our Editors’ Choice.”

PC Magazine, March 2, 2005
(Volume 24, No: 5)

(1)Source: Verizon Wireless Expands BroadbandAccess 3G Network to Cover 14 Markets From Coast to Coast *Nation’s Leading Wireless Carrier Delivers the Fastest Commercially Available High-Speed Wide-Area Network in the United States*
<http://news.vzw.com/news/2004/09/pr2004-09-22c.html>



3G CDMA2000 in Lower Frequency Bands: Providing Extended Coverage

- CDMA2000 in regions such as Australia, Russia, Brazil, China and India has proven to be an effective technology to provide vast coverage benefits to rural areas.
- For example, in rural areas of Australia, Telstra's CDMA2000 1X network offers typical connectivity speeds of 80-100 kbps, bursting up to 153 kbps. Coverage is available nationally on Telstra's CDMA network, covering approximately 1.5 Million square km and 98% of Australia's population.¹
- In CDMA 1xEV-DO coverage areas, Telstra Mobile Broadband offers connections with data rates of 2.4 mbps and typical speeds between 300-600 kbps. Telstra's user base for broadband services are growing 51 percent each month.²
- 3 million people have access to CDMA 1xEV-DO services in Australia.³
- Lower bands (such as 800MHz and 450 MHz) are ideal for covering vast areas because:
 - Large areas are otherwise difficult to reach using fiber and copper.
 - Favorable propagation characteristics of lower frequencies grant significant cost advantages. Because lower bands propagate further, they require less infrastructure equipment and cover a greater distance.

1. <http://www.telstra.com.au/mobile/business/products/mobilebroadband.htm?tR=3m>

2. http://www.3gnewsroom.com/3g_news/mar_05/news_5703.shtml

3. ibid



CDMA2000 for Wireless Broadband Access: CDMA2000 1xEV-DO at 450 MHz: Pilot Project in Brazil

Partnership between Lucent and Anatel (Brazilian telecom regulator) to demonstrate CDMA2000 1xEV-DO broadband data capabilities and coverage at lower frequencies for universal broadband access.

Bus visits government agencies and rural public schools to provide broadband access.

Broadband data coverage, distance from the base station:

- 45 Km Outdoor – 800 Kbps Peak Speed (with External Antenna)
- 17 Km Indoor – 800 Kbps Peak Speed (with no External Antenna)





CDMA2000 for Wireless Broadband Access: CDMA2000 1xEV-DO at 450 MHz: Pilot Project in Brazil





CDMA2000 for Wireless Broadband Access: CDMA2000 1xEV-DO at 450 MHz: Pilot Project in Brazil



****See online video in English, Spanish, and Portuguese : <http://projetoscd.isat.com.br>**



CDMA2000 for Wireless Broadband Access: CDMA2000 1X for Internet Access: Public Schools in Ecuador

- Edumasters, a US-based company, has introduced students at public schools throughout Ecuador to the Internet using CDMA2000 1x wireless data services.
- Edumasters has installed a small kiosk at each school with a computer and a 1x data connection. The free Internet access is paid for by organizations and corporations that pay to advertise on the kiosk.
- QUALCOMM has sponsored this project through purchasing advertising space on the kiosk.
- Edumasters is looking to replicate this model elsewhere in Latin America. The next target market is Panama.

Source: www.edumasters.net





CDMA2000 for Wireless Broadband Access: BellSouth Chile Connects Rural Schools with Broadband Access using CDMA2000 1xEV-DO

- In September 2004, BellSouth Chile implemented a pilot project providing CDMA2000 1x EV-DO broadband access to a school at Placilla (141 Km from Santiago).
- This project is part of a Government plan to bridge the digital divide and invest more than \$US 4 million to connect rural schools to the internet.
- More than 51,000 students will benefit from this project at 667 schools across the country.
- According to Fernando Saiz, a manager at BSI, *“While providing Internet access to rural schools is a tremendous step to bridging the digital divide, doing so through 3G technology is exceptional, and a privilege that hopefully fosters information access and an improved future for the children.”*



Minister of Communications, Javier Etcheberry, launches the pilot project using CDMA2000 1xEV-DO to connect schools to the Internet in rural areas.



CDMA2000 for Wireless Broadband Access: CDMA2000 1xEV-DO Connecting Students UCSD CyberShuttle

- Bus passengers with a laptop or handheld computer equipped with WLAN connect to access point in the bus, which communicates with the Internet by 3G network.
- No extra payment required.
- 2.4 Mbps peak, 600–800 kbps average-- fully supported bus load of students/faculty.
- Good implementation model for public transportation systems such as trains, subways, etc.





Access to Mobile Phones and the Internet: Agents for Democracy

- **Wireless communication devices can be used as a powerful discussion tool and are helping to foster democratic revolutions throughout the world.**
- **Globally, citizens are turning to the Internet and mobile phones as a battleground for political ideals.**
 - **Over the past four years, the amount of Internet users in Iran has increased by 1,620%, 650% in Saudi Arabia, and 630% in Syria.¹**
- **In Kenya, cell phones have been an instrumental aid for democracy. During the 2002 elections, poll workers were given mobile phones and were quickly able to call results into the media and election headquarters, avoiding vote-rigging possibilities.²**
 - **Other countries using mobile-phone technology to increase voter turnout include Oman, Malaysia, China, New Zealand and the Philippines.**
- **The lack of cell phone usage in Eritrea has been viewed by some as a “symbol of an increasingly repressive regime.”³**
- **In the Philippines during the 2001 People Power revolution, text messaging and the Internet brought 200,000 people into the streets within a few hours, and the result was the overthrow of the Estrada government.⁴**
- **In 2005, the largest demonstration for women’s voting rights in Kuwait’s history was organized via text messaging.**
 - ***“Kuwaiti women organizing protests for voting rights said they had been more effective during their 2005 campaign than during their last serious effort five years ago because text messaging had allowed them to call younger protesters out of schools and into the streets.”⁵***

1. “Democracy Web; Internet Gives Rise to Freedom Seekers”; Erick Stakelbeck, August 23, 2004 – Washington Times

2. “Eritrea Cell Phone Curbs Put Democracy on Hold”; Emily Wax, April 23, 2004 – The Seattle Times

3. <http://www.seeingisbelieving.ca/education/unit2en.pdf>

4. “In the Gulf, Dissidence Goes Digital: Text Messaging is New Tool of Political Underground,” Steve Coll, March 29, 2005- Washington Post



3G CDMA: Enabling Enriched Healthcare



3G CDMA Wireless Broadband Supporting Healthcare

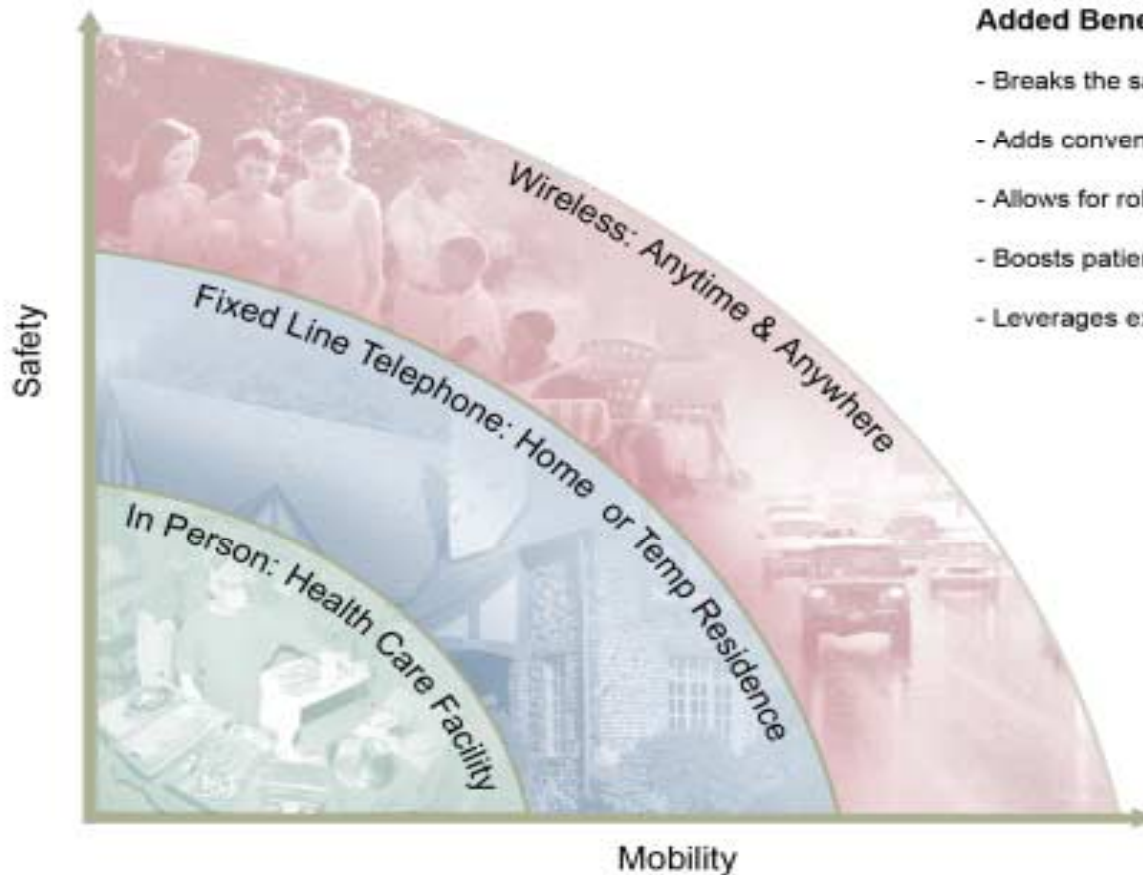
- **Wireless technology has a considerable amount of potential to significantly enhance the quality of the healthcare and pharmaceutical industries.**
 - **Wireless technology “provides benefits that directly satisfy the needs of the healthcare community such as patient care improvement and regulatory compliance, while meeting goals such as cost savings and streamlined processes.”¹**
- **QUALCOMM is currently exploring technical innovations that address today’s healthcare needs- including the area of converged sensors and mobile phones.**
- **In addition to identifying needs of healthcare facilities, QUALCOMM’s technology solutions reach out to the Tele-homecare and Telemetry industries. (For example, working with CardioNet to wirelessly enable cardiac monitoring services.)**

Source: QUALCOMM, “Wireless Opportunities in the Healthcare and Pharmaceutical Industries”; White Paper:
http://www.qualcomm.com/qwbs/industries/healthcare_overview.shtml



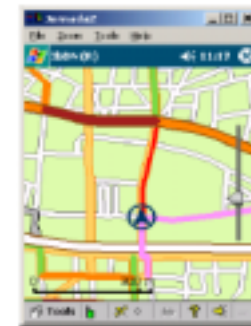
Wireless is the Next Step in Remote Patient Monitoring

Evolution of Patient Monitoring



Added Benefits of Wireless

- Breaks the safety/ mobility compromise
- Adds convenience (and compliance)
- Allows for robust alerting capabilities
- Boosts patients sense of security
- Leverages existing infrastructure





Cell-Life: An Organization Dedicated to Utilizing Mobile Technology to Help Manage the HIV/AIDS Pandemic in Africa

- Crucial issue at hand: South Africa has the largest population of people living with HIV/AIDS in the world.
 - estimated 5.3 million people (21% of the population) infected as of July 2004.*
- Cell-Life uses a combination of mobile technology and the Internet to monitor HIV patients, especially patients of Antiretroviral (ARV) therapy. ARV therapy requires 95% adherence to be effective, and must be supported by strict time and dietary requirements. Patients must be monitored closely to ensure the condition does not worsen.
- Cell-Life's system captures ARV sensitive information in a user-friendly way through a mobile phone application.
 - Especially important in rural areas as the flow of information between Drs, hospitals and patients is a challenge.
 - Counselors are trained to gather patients' vital information by using a cell phone equipped with Cell-Life software.
 - The software provides a menu-based, real-time system that captures data relevant to the treatment. (symptoms, drug adherence and socio-economic factors).
 - Information is instantly and directly logged to a central database.
 - The solution logs accurate patient data on a large scale and with minimum cost, maximum efficiency and significantly less human error.
- Cell-Life's solution enables vital data collection fulfills the specific needs of ARV monitoring.
- Similar solutions can be used for other health pandemics where monitoring is the essence of successful treatment.

Source: <http://www.unaids.org/EN/other/functionalities/Search.asp>
<http://cell-life2.os.org.za/home/home.html>



CardioNet: Cardiac Monitoring Service -- Enabled by QUALCOMM's Wireless Network Management Services

- **CardioNet provides the world's first mobile outpatient cardiac telemetry service using a QUALCOMM developed wireless electrocardiogram (ECG) device.**
- **Service allows for continuous monitoring of the patient's ECG's as they go about their normal daily activities.**
- **Provides faster diagnosis/treatment of potentially life-threatening conditions and immediate intervention when an urgent or emergency cardiac condition is detected.**
- **Connected by QUALCOMM's CDMA technology and QConnect wireless networking services:**
 - Unit activation/provisioning
 - Network monitoring
 - Billing
- **Over 4,000 CDMA based monitors provisioned**
- **Deployed in Philadelphia, New York, New Jersey, Washington D.C., and Indianapolis**





Korea's KTFreetel Diabetes Phone: LGE and Healthpia

- BREW enabled phone (LGE KP8400): world's first "diabetes phone".
- Phone features a microchip that is able to monitor user's glucose and comes with blood sugar reader and calorie meter.
- Handset provides health and diet information based on user's blood samples.
- "Diabetes Phone" accumulates the disease data and delivers them to a doctor, thus enabling the patients to get consultation and medication services without having to visit the hospital in person.
- Useful device for the more than 170 million people throughout the world who suffer from diabetes.





CDMA2000 1xEV-DO: Virtual Remote Mammography Telstra and the Victorian Regional Health Alliance

Breast cancer is a common healthcare issue in Australia

- 1 in 11 women in Australia will be diagnosed with breast cancer before age 75.
- 9 in 10 women diagnosed have no family history of breast cancer.
- Breast cancer is the 2nd most common cancer and the #1 cause of cancer-related death in Australian women.

BreastScreen Australia is an organized national breast cancer screening program for women.

- Provides free mammogram every 2 years for women >50 with the aim of early detection. Women over 40 also eligible if they request it.
- BreastScreen Australia currently operates in over 500 locations via fixed, relocatable and mobile screening units covering urban, rural and remote areas.

Mobile screening service: Telstra CDMA2000 1x EV-DO Network, BreastScreen Victoria and Victoria Regional Health Alliance Network

- The CDMA2000 1xEV-DO network links the mobile screening service vans to the regional network allowing transfers of digital files to assessment centers and a client information management system. The mobile mammography service utilizing EV-DO will be available in 15 Victorian towns.





Vodafone, Clinics Investigate Telemedicine Applications UMTS Mobile Phones

- **How can UMTS mobile phones be used in telemedicine?**
 - Six German clinics joined forces to conduct research on this topic. Research is taking place in the neurosurgical departments of the hospitals.
 - Vodafone Germany provides technical support, mobile phones and SIM cards for the project.
 - First tests used camera phones for the transmission of X-rays.
 - "This first project shows that it is possible to photograph X-rays with a camera phone and to send them to a consultant for his opinion via MMS. The advantage is that prompter decisions can be made in medical emergencies and external specialists can easily be involved in the diagnosis. "I'm sure that we will discover many new and interesting telemedicine applications as a result of the UMTS field test," said Dr. Thomas Eichmann, Chief Consultant at Rotenburg Hospital's Neurosurgery Clinic.
 - Research also focuses on video telephony applications.

- In each case, Source:http://www.3gnewsroom.com/3g_news/mar_05/news_5628.shtml



Sprint PCS Solution : Around the Clock Access to Patient Information – Central DuPage Hospital

- **Central DuPage Hospital is the second busiest surgical center in Illinois and has a staff of nearly 800 physicians.**
- **Hospital established a CDMA2000 multi-platform wireless solution to allow access to patient information 24 hours a day, inside and outside of the hospital.**
 - Coverage is available inside hospital by extending the CDMA signal into the facility.
 - Beneficial for caregivers who do not have Wi-Fi enabled data devices.
 - New multi-platform solution enables additional time with patient, less time on paperwork and fulfills hospital’s “one enterprise – one record” goal.
- **Home healthcare nurses are now able to communicate with their counterparts during home visits through the CDMA2000 high speed data service.**
 - Reduces the need for multiple devices and helps simplify many daily processes.
 - Sprint PCS specialized “Ready Link” device enables home healthcare professionals to:
 - Perform triple duty of: walkie-talkie calls, regular cellular calls, and data transmission.
 - Real-time messaging services replace pagers.



A variety of mature and emerging bio sensors are in the market which target various diseases and conditions



- Implanted Devices**
 Mature: Pacemakers
 Emerging: IOP MEMS, Electro-Neuro Stimulators, Smart wireless pills
- Disposable Patches**
 Mature: None
 Emerging: RFID-Temperature, Identification, Smart 'Wireless Band-Aids'
- Body-Worn Sensors**
 Mature: ABPM
 Emerging: ECG Chest Straps, Armbands, Clothing
- Imbedded Sensors**
 Mature: Watch HR Monitor
 Emerging: Phone Glucometer, Watch Pulse-Oximeter, BMI, ECG, Temperature
- Around-Body Sensors**
 Mature: Weight Scales, Glucometers, Peak flow
 Emerging: RFID Bio-Markers



3G CDMA: Supporting Public Safety



3G CDMA Wireless Broadband Supporting Public Safety

- **There are numerous ways in which the public safety community can utilize mobile wireless broadband technologies to support their critical work:**
 - **Position location applications**
 - **Real-time access and transfer of critical information**
 - **Driver's license records, vehicle registrations, local crime data, etc...**
 - **Surveillance applications**
 - **Enhancement of response to natural disasters and terrorist attacks.**



Position Location: Beijing School of the Blind Community Wireless Enablement Program: Kid Tracker Application

- **QUALCOMM and China Unicom donated 150 Kid Tracker devices to the Beijing School for the Blind in an effort to enhance mobile communications among students, teachers and parents and improve the quality of life of a particularly disadvantaged group in Chinese society.**
- **The Kid Tracker devices enable the visually impaired students to seek help in the case of an emergency, and will provide a safer environment for the school, family and society in general.**
- **QPoint location based services allows parents/emergency services to track loved ones' locations via the Internet.**
- **Device equipped with three preset keys: one which dials a parent's cell phone, one dials the home number and one dials emergency services.**





Wireless Enhanced 911 (E911) in the United States: The Role of 3G CDMA Technology and gpsOne / QPoint

- **The Federal Communications Commission has undertaken several programs to promote wireless E911 and public safety.**
- **Specifically, they have mandated that all wireless carriers must connect their customers to the emergency provider network (accessed by dialing 911) as well as identify their position location for rescue purposes in the case of an emergency.**
- **Today, CDMA operators in the United States- Alltel, Qwest, Leap, US Cellular, Western Wireless, Verizon and Sprint are providing public safety agencies with accurate E-911 position location information based on QUALCOMM's position location technology to locate wireless callers in emergency situations.¹**
- **QUALCOMM's position location technology gives the police and other public safety agencies the highest levels of accuracy, typically within 10 to 30 meters) to pinpoint the location of wireless callers to 911.**

1. These operators account for more than 40 % of wireless users in the United States; EMC Database, September 2004.



E911 Success Story

Emergency:

- November 17, 2001 - Three distressed boaters were lost in the middle of Lake Michigan in the fog.
- E-911 pinpointed the boat's longitude and latitude within 15 seconds and made a rescue.





Other Location-Based Public Safety Applications: Korea - SKT and National Police Agency: Missing Children Service

- Service sends out photo and description of missing children to subscribers in areas where there are instances of missing children reported.¹
 - **Example: A 13-year old girl lost her mother near a movie theater in Jeonju, Korea. The mother reported her missing daughter's picture, appearance and clothing to the police, who in turn sent it out to 700,000 mobile phone users in the neighboring provinces. Later a welfare officer in a nearby hospital found that the photograph she received was very similar to an unknown girl who was under protection of the hospital. She reported this to the police and the little girl was reunited with her parents the following day.**
 - **The police noted that they asked 15 million registered users whether they would agree to receive SMS messages searching for missing children and 6.5 million agreed to do so. KTF is also preparing a similar program.**

Sources:

1. Chosun Ilbo, "Mobile Phone Service Helps Find Missing Children," <http://english.chosun.com/w21data/html/news/200408/200408290024.html>
2. www.cnn.com, Friday October 1st, 2004



QWBS Public Safety and Homeland Security Solutions: QUALCOMM and Wal-Mart Partner to Alert Truck Drivers about Missing Children

- **QUALCOMM and Wal-Mart partner to increase support of the nation's AMBER Plan program through Wal-Mart's newly created "Roadwatch: Missing Child Alert" system.**
- **The AMBER Plan is a voluntary partnership between law-enforcement agencies and broadcasters to activate an urgent bulletin in the most serious child-abduction cases.**
- **Together the companies will issue the alerts that come through the National Center for Missing and Exploited Children to drivers of Wal-Mart trucks nationwide via QUALCOMM's OmniTRACS™ mobile communications system.**
- **This program expands Wal-Mart's "Missing Children's Network" efforts to the nation's highways and the watchful eyes of the trucking fleet's drivers. The "Missing Children's Network" is a partnership between Wal-Mart and the National Center for Missing and Exploited Children.**



Real-time Access to Critical Information: Ontario Police Department

- The City of Ontario Police Department serves a community of 165,000 people and 52 square miles.
- **Objective:** Improve community safety by allowing police officers to identify subjects and verify their identity in the field.
- **Solution:** Custom built HP iPAQ with software to capture fingerprints and photos, and wireless connectivity using Sprint's CDMA2000 network.
- **Results:**
 - Increased fingerprint scans
 - Detained 6% of subjects in question
 - Over 500 transactions and 45 arrests in one month
 - Increased communication among officers
 - Saved time for officers and potential false arrests

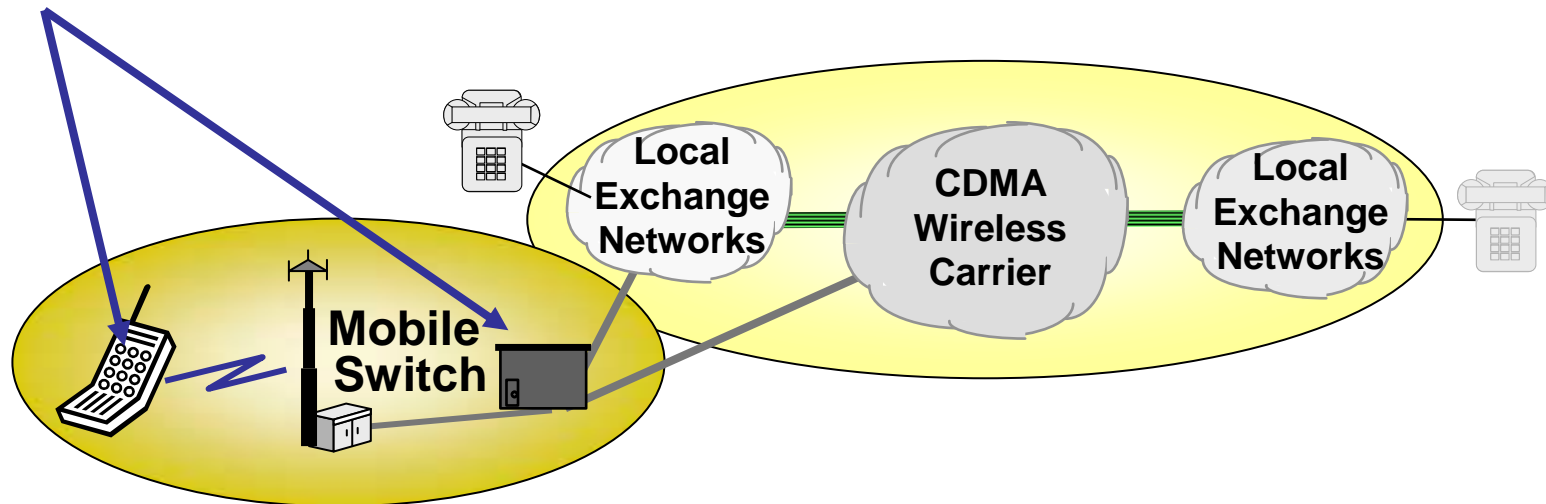


Surveillance: Tata Teleservices India: Mobile Police Surveillance System

- India CDMA operator Tata Teleservices has a pilot mobile police surveillance system deployed in Hyderabad.
- Application: a police van fitted with a pole carries a rotating digital video camera that is connected via CDMA to the police station.
- Benefit: useful in a situation of public unrest, such as a riot so that the police can be fully aware of what is taking place and react quickly to dangerous emergency situations.



Additional 3G CDMA Public Safety Initiatives: CDMA Support for Wireless Priority Access through the National Communications System (NCS)



In a time of crisis, authorized first responders and government users get priority use of the cellular infrastructure.

The Wireless Priority Service addresses wireless congestion experienced on the radio channels in cases of emergency.



Tsunami Disaster Relief

- On Sunday, December 26, 2004, the largest earthquake to strike the world since 1964 rocked the ocean floor off the coast of Indonesia.
- The 9.0 magnitude earthquake triggered a massive tsunami that caused record flooding and swept away entire coastal communities.
- Tens of thousands of lives were lost, from Southern Asia to Eastern Africa.
- CDMA technology can be rapidly deployed by operators in areas where communications infrastructure has been wiped out by the tsunami.
 - Example – Reliance establishing service in the Nicobar Island Chain
 - Also a small, easily deployable “mini-network” has been developed which could be deployed instantly. See next slide for further details.
- Recognizing that technology is not enough in a case such as this, QUALCOMM contributed to relief efforts in the areas devastated by the tsunami with a million dollar donation to the American Red Cross for humanitarian aid and assistance. QUALCOMM also has an active and ongoing employee Matching Grant Program and will continue to match donations made by its employees to a variety of international relief efforts.



Example of a Deployable Cellular System

OA&M Computer

BTS

BSC Server

Power Panel

Power Amp

Mobile Switch &
Media Gateway

PDSN (Packet Data)

Power Panel

Switch OA&M Server

Asynch Data IWF



*Radio Access
Node Case*

*Network Switch
Center Case*

The deployable cellular system is a cost effective, low power, and small infrastructure solution based on CDMA 1X and EV-DO that can be deployed immediately in any area requiring a cellular network. Perfect for setting up an instant communications network in a disaster relief situation.

Also, indoor and outdoor solutions exist.



Reliance Infocomm's Launch of Cellular Services in the Andaman and Nicobar Islands, April 2005

- **First cellular operator in India to launch mobile services beyond the geographical limit of Port Blair.**
 - **First phase: Port Blair, Dilanipur, Huddo and Mini Bay¹**
- **Since the Indian Ocean tsunami devastation, recharge cards for prepaid connections (currently offered by BSNL in Port Blair), have been extremely difficult for residents on the Islands to obtain.**
- **Reliance Infocomm's mobile service offerings will enable communication for the Andaman and Nicobar island communities during the aftermath of the tsunami, as they currently lack access to competitive mobile coverage.**

“On a stretch of land a couple of kilometers long, there were now only five structures still standing: the staring, skull-like shell of a school that had lost all its doors and windows;...and lastly the skeleton of a church, with a row of parallel arches rising from the rubble like the bleached ribs of a dead animal.”² – Amitav Ghosh, world renowned novelist's description after a post-tsunami visit to Car Nicobar Islands.



1. “Reliance to Launch Services in Andamans”, Joydeep Ray, Port Blair, March 16, 2005
2. “Overlapping Faults”, The Hindu, January 11, 2005 - <http://www.hindu.com/2005/01/13/stories/2004011309081100.htm>⁴⁸



Wireless Internet Information System for Medical Response in Disasters

- **At the University of California, San Diego, Cal-(IT)2 researchers www.calit2.net are using sophisticated wireless technology to coordinate and enhance care of mass casualties in the event of a terrorist attack or natural disaster.**
- **The goal of this project is to develop a wireless Internet information system for medical response in disaster situations.**
 - The system would provide emergency personnel and disaster command centers with medical data to track and monitor the condition of hundreds to thousands of victims on a moment to moment basis.
 - It would use 3G and 802.11 to support high-speed transmission of medical and other data from local fire fighters, hospitals and emergency medical responders to a command center operated by the County of San Diego.
 - The project will also have interlocking software/hardware systems linked by a location-aware system and an advanced wireless Internet networking infrastructure.
- **A Shuttle/Ambulance type of vehicle with computing and display capabilities would become the hub for wireless data transmission at the site of a disaster, including victim tracking and vital-signs monitoring.**
 - Researchers and industry partners set up an ad hoc, multi-hop 'mesh' video transmission network.
 - Each camera was equipped with wireless transmission capabilities, and each video feed was transmitted to the command center over the shuttles' Wi-Fi /3GCDMA hybrid network.
 - The video gave emergency officials the ability to "see" the disaster site remotely, prior to dispatching hazmat and other crews to the scene.
 - The medical response system greatly enhanced the ability of emergency response personnel to evaluate and respond to disaster situations.



Wireless Internet Information System for Medical Response in Disasters Cont...

The project will:

- Utilize radio-frequency (RF) tags placed on all patients to track the location of victims and healthcare providers. The most severely ill patients will also receive a medical sensor, a finger-tip pulse oximeter which monitors the degree of blood oxygen saturation and pulse rate. Data from the RF tags and sensors will be sent to a collector unit that buffers, compresses and wirelessly forwards data to a central database.

- Equip frontline emergency responders with Personal Digital Assistants (PDAs), which provide location-based access to patient medical data and enhanced communications via instant-messaging with field healthcare providers and the disaster command center.

- Maintain a record of medical care with a disaster database based on an electronic medical record system.

- Transmit medical data from the field to hospitals in a secure manner, and provide a record of patient transfer to specific hospitals.



This solution is a battery-powered, briefcase-size device that integrates a Wi-Fi access point with EV-DO. It can be easily transported to any location within the coverage of an EV-DO network, and instantly extends the reach of the EV-DO system to Wi-Fi-enabled devices nearby. Ideal for crisis situations where communications infrastructure is destroyed and tracking of first responders, resources and casualties is required.



Wireless Technologies Aiding in Conservation Efforts



Text Messaging on Cell Phones to Save Endangered Kenyan Elephants

- A group of conservationists keep track of elephants and their locations through cell phones and SMS messages in the Samburu National Park in northern Kenya.
- Elephants are tranquilized in order to place a collar containing a SIM card. A nearby research station shows all of the collared elephants on computer screens, enabling the conservationists to follow the elephants' movements.
 - Tracking the elephants reveals their migration paths, and helps reduce conflict with humans.
 - Tracking elephants provides a mechanism to monitor illegal ivory trade, which once nearly caused extinction of the race.

“It’s important for us to learn about elephants movements, because their situation is pretty precarious. They are an animal with great demands and needs. And they’re actually living with another animal with even greater demands, and that’s the human species.” –Mr. Douglas-Hamilton of Save the Elephants



Iain Douglas-Hamilton (STE), Ian Craig (LEWA), and Bernard Lesowapir (STE) fit a new GSM collar on "Michael Joseph" (named after Safaricom's General Manager)



“CDMA Experience”

CDMA2000 Trial in South Africa

An Overview

Source: CDMA Special – Cost and Tech Advantages but can it Break into Africa's GSM Markets? - Balancing Act, London, March 13th, 2005; <http://allafrica.com/stories/200503140608.html>



“CDMA Experience” - CDMA Trial in South Africa An Overview

- In March of 2005, the first CDMA technical trials were conducted in South Africa to highlight the benefits of CDMA2000 1x and CDMA2000 1xEV-DO to ICASA, the South African telecommunications regulator and key industry decision makers from throughout Africa.
- Trial was organized by QUALCOMM and Ericsson in association with MTN and Transtel, a stakeholder of the future second national operator (SNO) in South Africa.
- The goals of the trial were to:
 - Exhibit how 3G CDMA has the potential to enable cost-effective, high-quality voice communications and high-speed data connectivity to both urban and rural populations of Africa *without* compromising other technologies that are in operation.
 - Highlight specific CDMA enabled applications that can satisfy the needs of African subscribers, such as those enabled for health, security, and education.
 - Demonstrate the need and ability for ICASA to permit shared access to the 800 MHz spectrum between television broadcasters and telecommunications operators.
- Trial was attended by ICASA officials, members of the future South African SNO, equipment manufacturers, and representatives from various telecommunications operators and regulators throughout the African continent.



“CDMA Experience” - CDMA Trial in South Africa

Inetcam’s Solution for CDMA2000 1xEV-DO Trial in South Africa

- The CDMA2000 trial used remote-monitoring and distance-learning technology applications to demonstrate potential wireless services for customers and highlight the capability of 3G CDMA networks.
- Project demonstrated high-impact, live audio/video streaming applications over a CDMA2000 1xEV-DO trial network utilizing Inetcam’s audio/video management software and emphasized CDMA as a technology solution for applications such as:
 - Real-time monitoring for security and surveillance
 - Traffic cameras
 - Remote tele-medicine
 - Distance learning
- Such applications were demonstrated using CDMA2000 1xEV-DO handsets and the remote-monitoring and tele-medicine solutions.
- Collaboration with Inetcam successfully demonstrated the vast possibilities of CDMA-based networks and advanced wireless data solutions.



“CDMA Experience” - CDMA Trial in South Africa

Remote-Monitoring and Tele-medicine Solutions

CDMA2000 1xEV-DO Trial in South Africa

The CDMA network, working with Netcam's™ WISTA™ provides the ability for medical specialists to view and help diagnose patients remotely by accessing live video and audio from their computer, PDA, or mobile handset.

Challenges

South Africa, like most developing countries, seeks effective means of extending specialized medical care to rural areas. Most specialists are based in cities such as Johannesburg.

Limited number of medical specialists

Protect against liability

Multiple specialist need to access the live video/audio remotely

Solutions

Equipping a train traveling through the remote and rural areas with cameras and a microphone, live video and audio can be transmitted via the CDMA wireless network.

Medical specialists can remotely assist in diagnosis via live video and audio from remote locations.

The system can record all video and audio, allowing administration to review content later in the event an allegation or issue arises in the future.

The live video and audio can be accessed remotely by multiple locations simultaneously regardless of the viewer's wireless connection.

Ericsson CDMA2000 & Netcam's™ WISTA™ let you monitor your business and residence from almost any type of device.

Challenges

Bandwidth usage must be controllable

Use existing cameras

Monitor events remotely and wirelessly

While monitoring remotely, trigger event recording manually

Provide flexible storage options

Monitor multiple cameras concurrently

Solutions

Dynamic Bandwidth Allocation: Allows the user to maximize network efficiency by dynamically monitoring and adjusting to the network's availability.

Camera flexibility: Mix and match all brands of analog, IP, and/or wireless cameras.

Wireless Monitoring: Allows the user to monitor any location real-time from their wireless device (cell phone, PDA or browser).

Alarm notification: Allows the user to be alerted on their wireless device.

Snap recording: Allows the user to initiate recording by the click of a button.

Storage Cluster: Allows the user to record across their network or utilize DAS (Direct Attached Storage), for maximum flexibility.

Customize display views: Allows the user to modify their display to suit company or individual viewer preferences.



“CDMA Experience” - CDMA Trial in South Africa

CDMA for Crime Protection Surveillance

- The trial also demonstrated remote-monitoring technology, specifically a crime surveillance technology application which has been successful in decreasing crime by 80% in Johannesburg central business district after installing 200 surveillance cameras around the city in 2001.
- During the trial, a live remote-monitoring video feed illustrated the potential for real time security monitoring over the CDMA 2000 EV-DO broadband network.
- The 3G CDMA network allows the user to monitor places of interest remotely from any location within the coverage area and allows high-bandwidth data transfers.
- In order to expand its successful service, Cueincident, a remote-monitoring company is interested in the cost-effectiveness of CDMA, as it does not require fiber optic infrastructure.
 - *“CDMA has major advantages, particularly connectivity in an area, as you will need less base stations to cover a large area, and in relation to the expense and vulnerability of cable. CDMA would definitely result in a major {cost} saving in installation...you don’t have to link each user to a cable.”* – Neville Huxham, Marketing and Communications, Cueincident
- Remote- monitoring cameras can also provide critical information that contributes to the city such as broken traffic lights and burst water pipes.

Source: CDMA Special – Cost and Tech Advantages but an it Break into Africa’s GSM Markets? - Cueincident uses CDMA for Crime Protection Surveillance; Balancing Act, London, March 13th, 2005; <http://allafrica.com/stories/200503140608.html>



“CDMA Experience” – CDMA Trial in South Africa

CDMA for Online Learning

- A central objective of the trial was to utilize an e-learning application over the CDMA network to offer personal mentored instruction. Greater data capacity enabled the provision of high quality e-learning video transmissions.
 - A trainer and students were involved in a live class conducted in real time.
- The trial proved CDMA technology to be an enabler of flexible and efficient access to distance learning and training experiences.
- Through a handheld phone, PDA, laptop or desktop computer containing a 3G CDMA card, subscribers have access to distance learning capabilities.
 - *“The advantage of CDMA is definitely its wireless connectivity. In penetrating under-serviced areas, people from villages and rural communities can have access to the best educational resources through the internet. It can definitely help bridge the digital divide and help educate the masses.”* – Ian de Villiers, Technology Services Manager, CampusWise, an e-learning company based in Pretoria.



3G CDMA Networks: Elsewhere in Africa



3G CDMA2000 in Nigeria

- Africa has been the fastest-growing mobile market in the world during the past 5 years. Nigeria's mobile market in particular is growing at over 100% per year.¹
- There are currently seven CDMA WLL operators in Nigeria, consisting of IS-95 and CDMA2000 1X, with approximately 450,000 subscribers. There exists the possibility for four additional CDMA operators by 2009.
- Recently the Government of Nigeria and Huawei announced a \$US 200 Million dollar project with a loan from the China Development Bank for the deployment of a nationwide CDMA2000 450 MHz network for use by 220 local governments in Nigeria.
 - *“the CDMA450 wireless solution will help address the wireless communications needs of Nigeria's 220 local governments and increase the telecommunications coverage of the country. The new technology solutions will also be conducive to our efforts in developing Nigeria's online capabilities in education and healthcare.”*³
- Currently, CDMA is only deployed on a fixed wireless platform, but is expected to be deployed on a mobile platform next year when that market is opened for further competition.
- Competition in the local loop has led many Private Telecom Operators in Nigeria to choose CDMA as their technology of choice.
 - *“Even Nitel, the Nigerian wireline incumbent, is changing to CDMA because of its advantages. These are that it is easier to maintain CDMA and easier to rollout.”* – Mr. S. A. Bello, Director of Engineering, Nigerian Communications Commission.

1. Vodafone: “Africa – The Impact of Mobile Phones – Summary of Report and Key Facts”

http://www.vodafone.com/article/0,3029,CATEGORY_ID%3D30402%26LANGUAGE_ID%3D0%26CONTENT_ID%3D255218,00.html#

2. EMC World Cellular Database

3. Huawei Technologies and Nigeria Ministry of Communications Signs a US\$200 Million Telecommunications Partnership Agreement <http://www.huawei.com>



Additional CDMA Networks in Africa

CDMA2000 Networks

- Algeria: Algerie Telecom
- Angola: Movicell
- Egypt: Telecom Egypt
- Ethiopia: ETC
- Kenya: Telkom
- Madagascar: Telecom Malagasy
- Mozambique: TDM Trial
- Nigeria: Multiple (6)
- Tunisia: Tunisia Telecom Trial
- Uganda: MTN and UTL

WCDMA Networks

- Vodacom South Africa
- Mtn EmTel Mauritius
- Tunisia Trial Network
- Algerie Telecom Trial Network

2G CDMA Networks

- DRC
- Ghana
- Mauritius
- Zambia



Conclusion

- **Globally, 3G CDMA wireless technologies are introducing an entirely new meaning to the term mobile communications.**
- **With the mobility that 3G CDMA wireless technologies offer, a host of new applications have emerged such as in the areas of connectivity, education, public safety, health care and conservationism.**
 - **Connectivity applications:**
 - Connecting people with voice, low and high speed data.
 - Increasing education opportunities via e-learning.
 - Expanding opportunities to participate in government and democratic movements.
 - **Public safety applications:**
 - Making cities and people safer.
 - **Health care applications:**
 - Improving accuracy, streamlining processes, cutting costs, new applications, converged devices.
 - **Conservation applications:**
 - Tracking and increased protection of endangered species



THANK YOU SO MUCH FOR YOUR ATTENTION!

QUALCOMM Contacts:

- **Regulatory Affairs:**
 - Molly Gavin
 - email: mgavin@qualcomm.com

 - Samantha Craig
 - email: scraig@qualcomm.com

- **Business Development:**
 - Sachin Bhatmuley
 - email: sachinb@qualcomm.com



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SDTC Corporate Citizen Group	Inaugural Corporate Citizen Award
Association of Fundraising Professionals	Outstanding Philanthropic Corporation in San Diego
The United Nations Association, San Diego Chapter	UNA Global Corporate Citizenship Award