Seminar Conclusions

4.2.2: Conclusions and Closing Remarks

ITU-BDT Regional Seminar on Fixed Mobile Convergence and New Network Architecture for the Arab Region

Tunis, Tunisia, 21-24 November 2005

John Visser, P.Eng.
Chairman, ITU-T SG 19
Phone: +1-613-763-7028
Fax: +1-613-765-6257
Mobile: +1-613-276-6096
Email: jvisser@nortel.com

Sr. Mgr., Intl. NW Stds.

Introduction

- **This presentation, prepared in real time to reflect the key points in about 58 presentations (approx. 1717 slides!) and discussions, aims to provide a summary of the workshop and to provide an aid to more in depth review of the material contributed.**

Quotations

- **"When you get to a fork in the road, take it!" ***
- **"We always over-estimate the change that will occur in the next two years, and underestimate the change that will occur in the next ten years." ****

* *Yogi Berra, American baseball player*
** *Bill Gates, Chairman, Microsoft Corporation*

Key Messages

- "Next Generation Users" (today's young people) are the target market for tomorrow: high expectations!
- Convergence is happening: IMT-2000, IMT Advanced, NGN, BB wireless access ...:
  - Standards efforts focussed on making vision a reality
  - IP-based access independent core network
  - IMS a core part of architecture
  - Essential alignment in long term objectives of NGN and SBI2K; FMC an important aspect of both
  - Wireless technologies provide the means to bridge the broadband access digital divide
- Strong industry alignment of visions, perspectives

Let's make it happen!

Session 1.1: Opening

1.1.1 Welcome Address

- **Mme. Khadija Ghariani** (Sec. d' État d'Informatique, Internet et Logicielles Libres)
  - Warm welcome to delegates; this is first event post-WSIS II
  - Take advantage of "18 Nov" document: make progress
- **M. Ahmed Nahjoub** (Prés. & Dir.-Gén., Tunisie Telecom)

1.1.2 ITU/BDT projects of interest in the Region

- **Miloud Ameziane** (ITU/BDT Regional Office)
  - Welcome on behalf of ITU-BDT

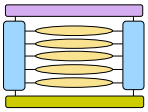
1.1.3 Introductory remarks/Keynote address/ITU Structure

- **John Visser** (ITU-T)
  - Seminar outline and objectives
  - ITU structure, sector roles

Session 1.2: International framework

1.2.1 ITU-T Activities on NGN Architecture and Issues

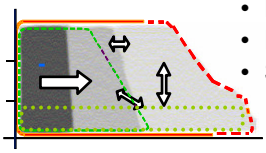
- **Brian Moore** (ITU-T SG 13 Chairman, presented by John Visser)
  - Establishing the FG NGN
  - Key Study Groups 11, 13, 19: coordinate through JCA
  - Involve other SGs, external SDOs
  - Transition into regular SGs: maintain momentum
- **Chae-Sub Lee** (FG-NGN Chairman, presented by John Visser)
  - Overview of FG NGN structure, release planning, structured deliverables
  - Significant participation (>140), inputs (>1000)
  - Extensive collaboration
  - NGN Management Focus Group (NGNMFG)



Session 1.2: International framework

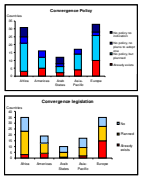
1.2.2 ITU-R: Mobile convergence issues

- **Colin Langtry** (ITU-R; presented by Kevin Hughes)
  - Highlighted process for identifying and allocating spectrum
    - IMT-2000, IMT-Advanced is being implemented and deployed, will evolve over next 10-15 years
    - Mobile, Internet and broadband access growing rapidly
    - Convergence is occurring in many spheres
    - New radio interfaces required around 2010-2015
    - Long lead times required for spectrum planning
    - Spectrum aspects will be considered at WRC-07



Session 1.2: International framework

1.2.3 ITU-D: Regulating Convergence



- **Fabrizio Savi** (Telecom Italia; Rapporteur ITU-D Q.10/1):
  - Converged regulator should ensure a level playing field
  - Recommend light and cost-effective regulation with limited intervention
  - Need forward-looking and timely regulatory framework

1.2.4 TISPAN: Telecommunications and Internet converged Services and Protocols for Advanced Networking

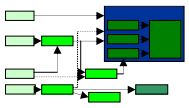
- **Alain Le Roux** (France Telecom, TISPAN Chairman); presented by John Visser)
  - Strong industry demand for Multimedia services on xDSL
  - Rel. 1 target: end 2005 -> realistic, implementable solutions
  - Architecture based on maximizing fixed/mobile convergence through adoption of 3GPP IMS

Session 1.3a: Network Evolution to NGN and Convergence

1.3.1 Shaping the Future: Mobile Network Evolution to NGN

- **John Visser** (Nortel, Canada)
  - Network transformation, convergence essential to simplifying, enhancing user experience, driven by demand
  - Services must be "anytime, anywhere, in any form; secure, trusted, reliable"

1.3.2 3G/UMTS – An evolutionary Path to NGNs

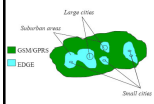


- **Jean-Pierre Bienaime** (Chairman UMTS Forum)
  - Arab Region: commercial mobile BB: EDGE & 3G/UMTS
  - Timely licensing: alignment w/ GSM/UMTS world to gain greater economies of scale, simplified international roaming, IPR export opportunities for services and applications, and wider choice of cost-effective terminals

Session 1.3a: Network Evolution to NGN and Convergence

1.3.3 Mobile Network Evolution: Economic Aspects of Evolution towards IMT-2000

- **Sami Tabbane** (Superior School of Communications of Tunis)
  - Trends: convergence, new entrants, new technologies
  - Why evolve to 3G? New revenues, competition, user demand, ready for the future, regulatory issues
  - Moving to 3G is complex!



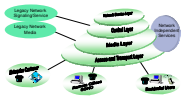
1.3.4 New Generation Networks enabling convergence of Services – Experience of Tunisie Telecom

- **Houerbi Rafaâ & Rim Belhassine-Cherif** (Tunisie Telecom)
  - Services: VoIP, IP backbone, ADSL, Wi-Fi, UMTS, WLL
  - Technologies must co-exist, need transition period; must be demand driven; convergence is key; costs are not negligible

Session 1.3a: Network Evolution to NGN and Convergence

1.3.5 Network Architecture consolidation in the evolution towards NGN

- **Oscar Gonzalez-Soto** (Spain)
  - Plan business and services first, then the technology
  - Implement pilot cases before network migration
  - Competitive differentiation to competitors: services, quality



1.3.6 Mobile Network Evolution to NGN

- **Roland Thies** (Alcatel)
  - NGN: 3G UMTS R4/R5, CDMA2000 1x EV-DV
  - Strong architecture similarities, especially IMS/MMD
  - Separation of control and transport
  - NGN: Transport network simplification; bandwidth savings; unified new services through standardized Interfaces
  - New and enhanced messaging services

Presentation brought forward due to availability constraints

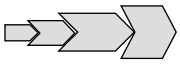
Session 3.1b: Operational and Regulatory Aspects of Convergence

3.1.6 Case Study: Unified Licensing Regime in India

- **Rajendra Singh** (TRAI, India)
  - Convergence forcing industry realignment
    - Technologists can't foresee impacts on telecom evolution
    - Regulators: don't get in the way of market forces
  - Rural-urban teledensity gap widening:
    - Mobile phones most sensible, effective response to digital divide, ∴ must address access to a mobile network
    - Technology and service neutral licensing: best way to encourage competition, accommodate convergence
    - Partnering with poor for sustainable win-win scenarios with product and service providers
  - Industry supports unified licensing, industry now enjoying very rapid growth

Session 1.3b: Network Evolution to NGN and Convergence

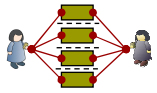
1.3.7 IP Multimedia Sub-system (IMS) and Evolution to NGN



- **Sami Tabbane** (Superior School of Communications, Tunis)
  - Evolution of services and service capabilities
  - Evolving to strong separation of service / control / transport
  - Fixed-mobile convergence based on UMTS R5 IMS in NGN

1.3.8 Mobile Core Evolution towards IMS

ERICSSON



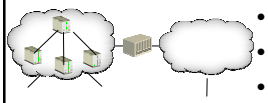
- **Elena Romero** (Ericsson)
  - IMS: common ground for datacom and telecom worlds
  - Standards secure interoperability and industry consensus
  - Trends in evolution paths: step by step evolution and migrations to using IMS as a key service enabler
  - "Presence" will change the way we use telecom services
  - Services: legacy / standardized mass market / differentiated

Session 1.3b : Network Evolution to NGN and Convergence

1.3.9 Multiservice Packet-based Transport Network Enabling Digital Services Delivery

- **Mauro Filippi** (Marconi)
  - New bandwidth hungry broadband services enable the "digital life." How do we get there?
  - "Quality of Experience" a key factor in user acceptance
  - Keys: manageability, reliability, convergence, scalability

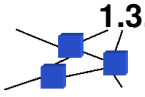
1.3.10 IMS, an evolutionary network architecture towards NGN



- **Khaled Rifai** (Lucent)
  - IMS overlay: converged W+/W- arch. for blended services:
    - investment protection; product & service differentiation
    - multi-market segment applications and databases
    - Fosters and promotes the introduction of new services

Session 1.3b : Network Evolution to NGN and Convergence

1.3.11 Network Modeling and PSTN-NGN Migration



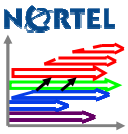
- **Soulaimane El Bouarfati** (University of Applied Sciences Frankfurt)
  - Describes a modeling approach to address IMS-based NGN complexity in 3 dimensions: strata, functions, planes
  - Significant savings in switching nodes required
  - Media Gateways required peak and become obsolete (ease with clever migration scenarios)

1.3.12 Signalling Protocols and Evolving Architectures for NGN

- **Riccardo Passerini** (ITU-BDT)
- **Kamel Hjaiej** (SUP'COM, Tunisia)
  - On CD-ROM, not presented

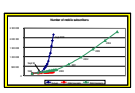
Session 2.1a: Broadband Technologies and Solutions

2.1.1 BWA: Standards, Regulatory and Spectrum issues



- **John Visser** (Nortel, Canada)
  - Telecom landscape is and continues to evolve rapidly
  - Telecom & ICT policy is critical to a nation's future
  - Spectrum for mobility integral: get involved!

2.1.2 ITU Development activities on Wireless Communications



- **Riccardo Passerini** (ITU-BDT)
  - Digital Divide is narrowing but still a long way to go
  - Broadband access in developing countries still expensive and deployment economics are difficult

Session 2.1a: Broadband Technologies and Solutions

2.1.3a Bridging the Communications Divide through WiMAX and WiMESH Solutions

- **Bilel Jamoussi** (Nortel)
  - Enabler: economic growth (knowledge economy), R&D (access to knowledge), energy savings (teleworking)
  - WiMAX is the next phase in BB technology

2.1.3b WiMAX Update from Beijing, China Meeting Nov 7-11, 2005

- **Bilel Jamoussi** (WiMAX Forum)
  - WiMAX delivers on its promise: certified products 4Q05
  - Market acceptance: >350 members, with >150 operators trialing and deploying WiMAX
  - 16e Mobile WiMAX profile 4Q05: Nov 05 Korea WiBRO launch, will use Mobile WiMAX Certified Product in '06

Session 2.1a: Broadband Technologies and Solutions

2.1.4 Wireless Access: the Convergence Digital Bridge - a Regional Perspective

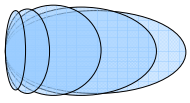
- **Ibrahim Kadi** (CITC, Saudi Arabia)
  - Arab Region, Africa lagging: paying more for less
  - Developed countries need to move to NGN, but need to consider legacy investment; mature population
  - Developing countries need to move to NGN but can do so at much lower cost: "leapfrogging"

  - Debate: is BB a developed country luxury? Focus instead on basic services? Leapfrog to BB may not make sense!
  - Can take advantage of FMC; W- BB is a better solution than deploying costly legacy style wired infrastructure

Session 2.1b: Broadband Technologies and Solutions

2.1.5 Global BWA studies in ITU-R

- **Kevin Hughes** (ITU-BR)
  - Details of ITU-R structure for fixed, mobile, satellite
  - Noted harmonization of global and regional BWA standards, considering IMT-2000 and satellite
  - Example to illustrate complexity of sharing studies



2.1.6 Application of Wi-Fi in supplementing Fixed, GSM and CDMA networks in the last mile

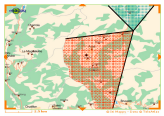
- **Jared Baraza** (Telkom Kenya)
  - Wi-Fi useful transition 2G to 3G: offers fixed and mobile operators a cheap solution to roll out 3G networks
  - Provides cost effective (~US$1K) means to provide rural, sub-urban connectivity for communities, schools, health care, research and scientific applications

Session 2.1b: Broadband Technologies and Solutions

2.1.7 Mobile Broadband in Rural and Remote Areas

- **Hamdi Breik** (Lucent)
  - CDMA2000 1x: mature, stable, proven technology
  - Offers W- BB services with capacity, coverage, quality needed for urban and rural applications; compatible with future evolution; usable on many frequency bands

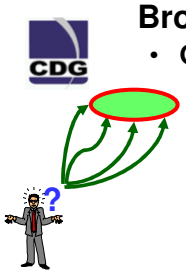
2.1.8 WiMAX: Application Scenarios, first experiences and evolution



- **Michele Morganti** (Siemens)
  - WiMAX is important in developed countries as well as developing countries
  - Fits: WLAN (Hot-Spot) feed; SDSL alternative (urban, sub-urban); xDSL (rural) alternative; direct broadband wireless access depending on geography, population density, etc.

Session 2.1b: Broadband Technologies and Solutions

2.1.9 IMT-2000 Regulatory and Spectrum Issues for Broadband Application



- **George Mansho** (CFMA Development Group)
  - Small % change in telephony, internet usage stimulates substantial increases in GDP
  - Data is never fast enough nor cheap enough
  - Internet brings access to the world's libraries
  - "When you come to a fork in the road, take it." *i.e., keep going, you'll get there!
  - Future is internet and telephony: accelerate growth
  - Regulators encourage to be flexible and supportive

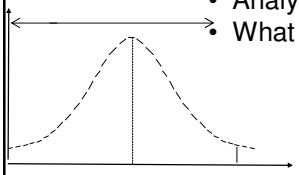
* *After Yogi Berra*

Session 2.2a: Network Evolution to NGN - NGN Network Planning

2.2.2 Modeling Issues in Integrating Services in NGNs

2.2.4 Service Level Agreement (SLA) and Global QoS index for 3G networks

- **Villy Iverson** (Technical University of Denmark; , Vice-Chairman, ITC)
  - Starting with the Erlang B formula, look at considerations in QoS: guaranteed through resource reservation; blocking probability, priority mechanisms, widely varying traffic characteristics and how they might be mixed
  - Analysis vs. simulation: pros & cons
  - What an SLA is; SLA framework & criteria

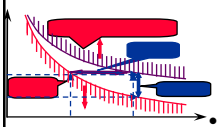


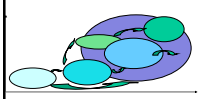
Session 2.2a: Network Evolution to NGN - NGN Network Planning

2.2.1 Decision Making Requirement in Network evolution, Strategic Planning and Solution Mapping

2.2.3 Convergence Strategy for a Universal Operator and role of Business Planning

- **Oscar Gonzalez-Soto** (Spain)
  - Key requirements in network planning
    - Modeling of multi-service flows
    - End-to-end performance with interconnection
    - Must customize to scenario: one size does not fit all
    - High quality tools needed for complex networks
  - Best solution applies appropriate technology in each area
  - Many potential areas of convergence: service, network, radio access, operational, terminal; economies of scale key
  - Maintain business indicators within margins in competition
  - All services, multiple customers approach: maximum returns

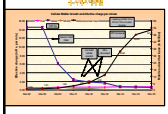




Presentation brought forward due to availability constraints

Session 2.2a: Network Evolution to NGN - NGN Network Planning

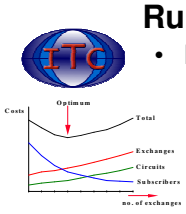
4.1.3 Migration to IMT-2000 in Developing Countries: The view of Policy Makers and Regulators and Market Reaction



- **Rajendra Singh** (TRAI, India)
  - Drivers for IMT-2000 reviewed
  - Spectrum utilization efficiency, licensing process important
  - Spectrum allocations iun India closely match ITU allocations

Session 2.2b: Network Evolution to NGN - NGN Network Planning

2.2.5 Planning of Broadband Wireless Access for Rural and Remote Areas



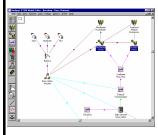
- **Ignat Stanev** (Technical University, Sofia, Bulgaria)
  - Service/market forecasting, access network optimization
  - Additional analysis to optimize for terrain coverage
  - Apply appropriate planning tools
  - Muscat-Oman case study

2.2.6 Planning of New Generation Wireless Networks: Challenges and Solutions

- **Roland Goetz** (LS Telcom)
  - Provided description of scenarios for a case study and the results achieved, illustrating aspects that need to be considered in developing an appropriate business an d technical plan

Session 2.2b: Network Evolution to NGN - NGN Network Planning

2.2.7 Analysys STEM Case Study: Migrating Voice and Data services to an NGN platform



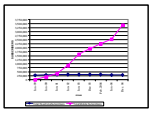
- **Robin Bailey** (Analysys)
  - Convergence is inevitable. Best way = f(starting point)
  - Reduce scale of problem by analyzing a select subset
  - Migration process: deploy IP, migrate customers, remove old - gets worse before it gets better
  - Scenarios modeled: proactive, as-required, no migration:

2.2.8 VPI case study: Planning of different Broadband solutions in last mile for Urban and Suburban areas

- **Ignat Stanev** (Technical University, Sofia, Bulgaria)
  - Described scenario and showed results from applying tools

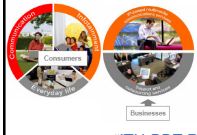
Session 3.1a: Operational and Regulatory Aspects of Convergence

3.1.1 VPI case study: Planning of different Broadband solutions in last mile for Urban and Suburban areas



- **Mwende Njiraini** (CCK, Kenya)
  - Rapid growth of mobile: hard for regulators to keep pace; need to be proactive, responsive, do just what is necessary
  - Convergence is an opportunity: understand it, leverage it
  - Regulators need to be proactive, responsive, flexible
  - Q&A: competition in fixed segment: handle carefully!

3.1.3 Spectrum Regulation at the Age of Convergence

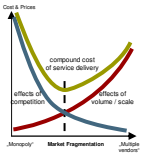


- **Lamia Delenda** (France Telecom)
  - Challenges: are new services fish or fowl? (Is mobile TV on cell phone broadcast? Is nomadic WiMAX fixed or mobile?)
  - Rules should aim for equitable access, fair competition, investment to foster growth and economic advantage, avoid risk from precarious businesses

Session 3.1a: Operational and Regulatory Aspects of Convergence

3.1.4 Current public Wireless Spectrum Regulation Issues

- **Margit Brandl** (Siemens)
  - No global database on national allocation, use of spectrum
  - Dichotomy: spectrum harmonization has benefits (economies of scale, roaming) but technology innovation requires flexibility (risks fragmentation)
  - Electronic spectrum information services are necessary if industry has to adopt to modern regulatory rules
  - Harmonized standards and spectrum are the way forward
  - Q&A: some differences in perspective on "technology neutrality"



Session 3.1b: Operational and Regulatory Aspects of Convergence

3.1.5 The new Code for electronic communications: a technologically neutral solution

- **Fabrizio Savi** (Telecom Italia)
  - Key words wrt new Italian Code: objective, transparent, non-discriminatory, proportional, efficient (spectrum usage), timely, simple, interoperable, freedom in use, flexible regulation for interconnection

3.1.2 Licensing Aspects for IMT-2000

- **Riccardo Passerini** (ITU-BDT)
  - Statistics, competition stimulates growth; licensing approaches with pros & cons, considerations, etc.
    - "Beauty contest" approach preferable to auctions
  - Case study, consideration, results: opportunity to learn from others' experience; focus on long term


Licensing Approaches

Session 3.1b: Operational and Regulatory Aspects of Convergence

3.1.7 Convergence in new generations of licenses: Experience of Morocco

- **Gihane Belhoussain** (ANRT, Morocco)
  - Role of regulator, forces affecting regulatory directions
  - Review of telecoms situation in Morocco: operators, uptake
  - Principles: technology neutral, convergence, freedom in infrastructure selection; measured and realistic approach
  - Timetable for evolution of licenses: end 2005, potential 3rd licensee in 2007

Session 3.2a: Fixed Mobile Convergence

3.2.1 Trend for Fixed and Mobile users growth based on Statistics data for ICT Indicators

- **Ignat Stanev** (ITC)
  - Mobile growth >>fixed; fixed not declining yet; traffic higher on fixed: lots of potential, especially in developing countries
  - Traditional voice expected to dominate with low IT density
  - Voice expected to dominate in developing countries

3.2.2 Mobile 2G/3G networks: a Universal Communication and Service solution

- **Roland Thies** (Alcatel)
  - End user and operator frustrations!
  - Drivers: user expectations, operator needs; standards
  - Obstacles: regulation, NW-centric views, commoditization
  - 2.5G local loop/WiMAX: rapid deployment, low cost, data

Session 3.2a: Fixed Mobile Convergence

3.2.3 IP based architectures for Wireless networks in countries with Low Fixed Line penetration

- **Luigi Gasparollo** (Qualcomm)
  - CDMA provides a WLL solution
  - Evolve from W+ IP --> W- IP Core --> RAN IP
  - EV-DO road map offers near-DSL service

Session 3.2b: Fixed Mobile Convergence

3.2.5 Towards Fixed and Mobile Convergence

- **Dan Chen** (ZTE)
  - Carriers focus on services and applications
  - Hard to find killer applications so build a "killer service platform: IMS; Softswitch and IMS are closely related.
  - Fixed carriers more aggressive on FMC than mobile
  - Different carriers may have different FMC scenarios

Session 3.2b: Fixed Mobile Convergence

3.2.7 WiMAX Solutions - Integral Elements of Fixed Mobile Convergence Networks

- **Hendrik Prins** (Cemdia-Asia Ltd.)
  - WiMAX can bridge the broadband access digital divide
  - Quoted Nokia: "WiMAX will do for the Internet what GSM did for voice"
  - IMT-2000+: important in delivering high speed access
  - Will deliver low cost W+ speed and wide scale BB access
  - Critical to examine regulatory hurdles
  - WiMAX can deliver IMT-Advanced

Session 3.3: Convergence in the Information Communication Technology

3.3.2 Bridging the Gap: taking Tomorrow's Network into Today

- **Maria Cristina Bueti** (ITU/SPU)
  - Ubiquitous Networks: anytime/where/thing/one
  - NGNs: packet-based, service-related functions independent underlying BB transport
  - Italy conducting trials: tomorrow's network today
  - Italy, a developed country, but digital divide in some areas: trials addressing how to bridge

Session 3.3: Convergence in the Information Communication Technology

3.3.3 Meeting UNICT Open Telecommunication Access Goals Using SWANsat

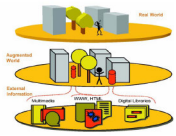
William P. Welty (SWANsat Project)

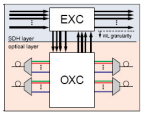
- SWANSat: set of geosynchronous satellites to provide global BB solution for developing countries, esp. remote underserved nations
- Distinctive aspect: shareware model for pricing (non-profit!)

Session 3.3: Convergence in the Information Communication Technology

3.3.4 ICT Developments: Technological, Architectural, Traffic Engineering and QoS Challenges

Universität Stuttgart

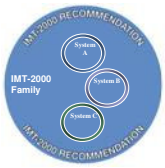




- **Paul J. Kuehn** (Chairman ITC)
  - Paradigms changing: heterogeneous technologies, services
  - Success: time to market, openness, user acceptance
  - Design processes: specialization and automation
  - Standardization: open platforms, standards, quality
  - Research: integration of network technologies, middleware
  - New service paradigms: location, context-based; nomadic communications, ubiquitous computing
  - New business models: micropayment, QoS, security

Session 4.1a: 2G to 3G Migration / Evolution

4.1.1 Guidelines on smooth transition from existing mobile networks to IMT-2000 for Developing Countries



- **Nataša Gospić** (Rapporteur ITU-D Q.18/2):
  - Developing countries entering global e-economy markets
  - Telecom traditionally technology and supply driven, becoming end user and market
  - IMT-2000 is technologically and commercially ready
  - Mobile BB access enables personalized service portability across network boundaries and between terminals
  - Transition policy to IMT-2000 must be based on analysis of key aspects impacting demand, investment and revenues

Session 4.1a: 2G to 3G Migration / Evolution

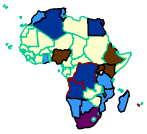
4.1.2 Deployment steps for a successful UMTS launch: Example of Orange France Network

- **Rémi Thomas** (Orange)
  - Description of key aspects of UMTS: same network, coverage, roaming; new radio with enhanced capabilities
  - Migration to UMTS: co-existence with GSM, site re-use
  - Enables new and innovative features
  - Next steps: HSDPA, HSUPA, all-IP architecture
  - Spectrum opportunity in "digital dividend" bands (~500MHz) for global harmonization for lower density population areas

Session 4.1b: 2G to 3G Migration / Evolution

4.1.5 Challenges facing operators in the transition from 2G to 3G in Africa

- **Jared Baraza** (Telkom Kenya)



- Challenges: ICT priority; regulator not independent; frequency hoarding & misuse; costs; tariffs; skills shortage
- Solutions: ICT to a tool for development; independent regulation; rationalized frequency allocations & licensing; transparency; broader viewpoints: local --> regional

4.1.6 From 0G to 3G in four easy steps

- **Helga Waage** (Hex Software)
- Value added services over voice network, more services via SMS, add value via MMS, enable users to easily create & share local content. Operators, techies: poor content providers
- Grow with low and high end services. Data hooks customers.

Additional resource material

- **Appendix provides some additional references of interest:**
  - **Material on ITU web site**
  - **Material on non-ITU web sites***

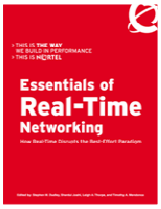
*** N.B.: These are provided for convenience only. For non-ITU references, being listed here does NOT indicate ITU endorsement.**

Appendix: Some Additional Resources (1/3)

- **For supporting Developing Countries, SG 19's action plan includes:**
  - Implementation of ITU-T Recommendations
    1. How to use ITU-T Recs., what are their relationships
    2. Support BDT: applying ITU-T Recs. (Annex to Res. 44)
  - Action: create a SG 19 discussion forum where DC-CET representatives can **submit their questions:**
    - http://forum.itu.int/jive/index.jspa?categoryID=157

- **ITU-SPU reports**
  - 2002 Report: **"Internet for a Mobile Generation"**
    - www.itu.int/osg/spu/publications/sales/mobileinternet
  - 2004 Report: **"The Portable internet"**
    - http://www.itu.int/osg/spu/publications/portableinternet/

Appendix: Some Additional Resources * (2/3)



- **Nortel's "Essentials of Real Time Networking":** http://www130.nortelnetworks.com/cgi-bin/eserv/cs/main.jsp?BV_SessionID=@@@@044962930 9.1115789159@@@@&BV_EngineID=gadddhfhejghbhkc ginchgcgjg.0&cscat=DOCDETAIL&DocumentOID=292677 &searched="real%20time%20networking

- **Shosteck free white papers:** www.shosteck.com
  - **1 of several: "Lessons From Metricom and MobileStar: Success Factors for the Portable Internet Access Market"**

*** N.B.: These are provided for convenience only. For non-ITU references, being listed here does NOT indicate ITU endorsement.**

Appendix: Some Additional Resources * (3/3)

Some web sites with resource material for Regulators:

ITU:	www.itu.int
European Commission:	www.europa.eu.int
Australia:	www.aca.gov.au
Bahrain:	www.tra.org.bh
Brazil:	www.anatel.gov.br
Equador:	www.conatel.gov.ec
Guernsey:	www.regutil.gg
India:	www.trai.gov.in
Ireland:	www.comreg.ie
Jordan:	www.trc.gov.jo
Kenya:	www.cck.go.ke
Lesotho:	www.lta.org.ls
Macau:	www.gdtti.gov.mo
Malaysia:	www.mcmc.gov.my
Macau:	www.gdtti.gov.mo
Malaysia:	www.mcmc.gov.my
Mauritius:	www.icta.mu
Nicaragua:	www.telcor.gob.ni
Nigeria:	www.ncc.gov.ng
Panama:	www.enteregulador.gob.pa
Singapore:	www.ida.gov.sg

*** N.B.: These are provided for convenience only. For non-ITU references, being listed here does NOT indicate ITU endorsement.**

Thank you!