Broadband Mobile Communications Toward a Converged World

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Introduction

- Overview
  - Grasp of Global Trends in Mobile Services & Technologies
  - Visions for Future Broadband Mobile Communications

- Keywords for the Technological Scope
  - Seamless Mobility
  - Broadband Delivery
  - Mobile Convergence Network

What will be the Future Mobile Information Society? (1/2)

- Synopsis
  - Expansion of Temporal & Spatial Casualness
  - Advanced Lifestyle with User Context
  - Fully Mobile & Widespread Convergence
  - Improved Quality of Individual Lives & Social Relationships

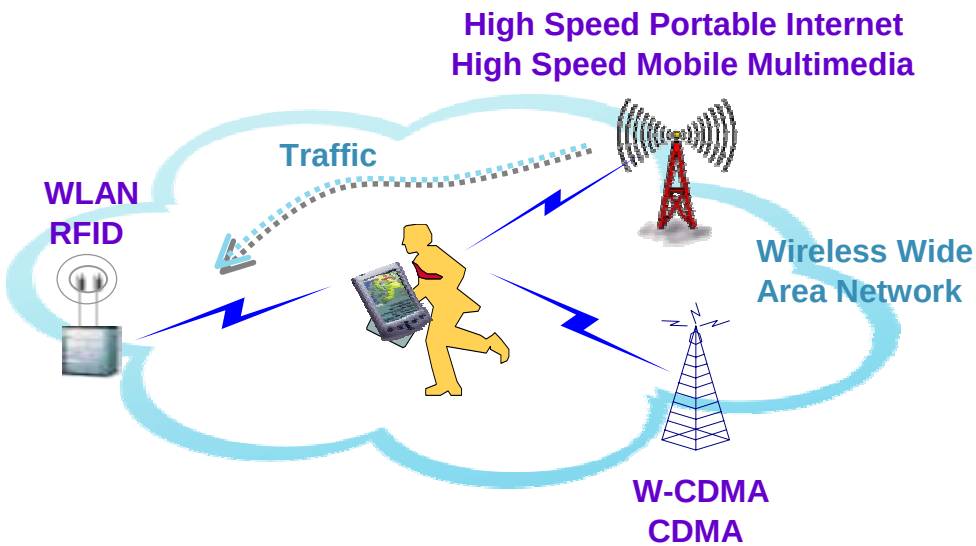
- Lifestyle in Ten Years
  - Scenario based Approach
  - User-centered Environments
  - Convergence Paradigm via Mobile Communications

What will be the Future Mobile Information Society? (2/2)

- Workspaces on Broadband Mobile Multimedia
  - Change on Workspaces & Community Life
    - Broadband Data Transfer
    - Virtual Reality Communication
    - Barrier-free Connectivity
    - Formation of Instant & Temporary Workspaces
- Entering the Ubiquitous Information Society
  - User-centered Seamless Service
    - Terminals & Sensors as Major Data Source
    - Exchange of Meta Data
    - Context-aware Service

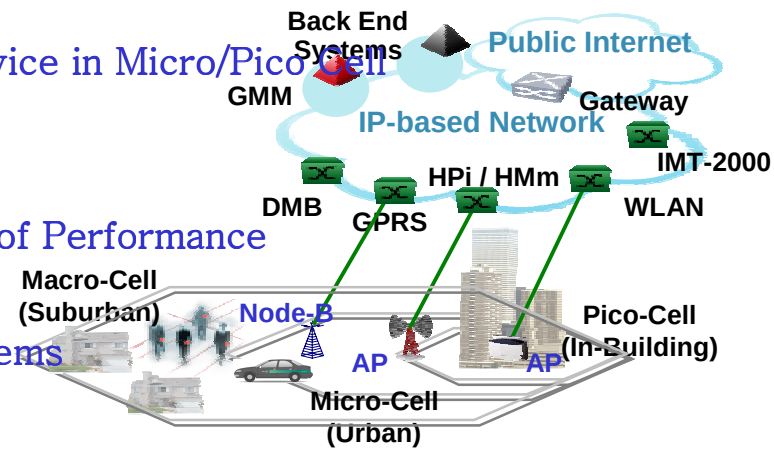
Key Technological Issues & Ongoing Activities (1/7)

- Seamless Mobility
  - Service Continuity
    - Seamless Service between Different Networks and Terminals
    - Always Best Connection (ABC)
      - Connection through the Best Available Device & Access at All Times



Key Technological Issues & Ongoing Activities (2/7)

- Horizontal & Vertical Handover
  - Global Roaming
    - Global Roaming Approach in 3G
      - The Same Worldwide Technological System & Bandwidth Frequency
      - Divided into Synchronous & Asynchronous System
  - Handover
    - Horizontal Handover
      - Fast Moving Terminal with Seamless Service in Micro/Pico Cell
      - Using Radio Access Technology
      - Fast Handover Processing Environment
      - Without Service Interruption & Lowering of Performance
    - Vertical Handover
      - Seamless Service between Different Systems
      - IP-based Converged Mobile System



Key Technological Issues & Ongoing Activities (3/7)

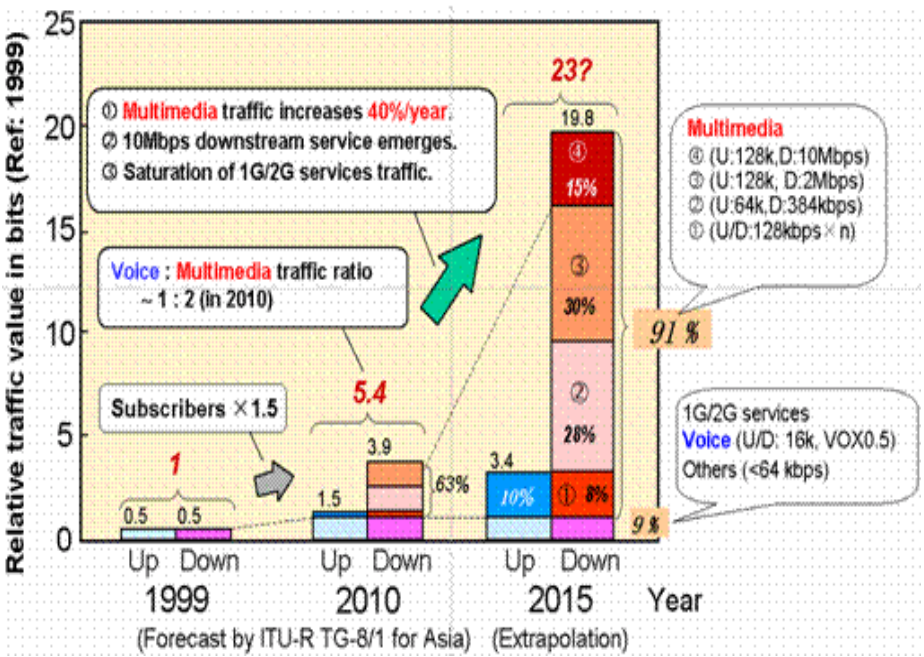
- Horizontal & Vertical Handover
  - IP based Mobility
    - Increased Demand of Mobile Traffic
      - Seamless Service Continuity
    - Fast Mobile IP Handover
      - Minimize the Handover Processing Delay
    - Mobileip WG & Seamoby WG
  - Application Mobility
    - Mobility using SIP
      - Independent of the Underlying Technology
      - Common Form to Support Full Range Mobility

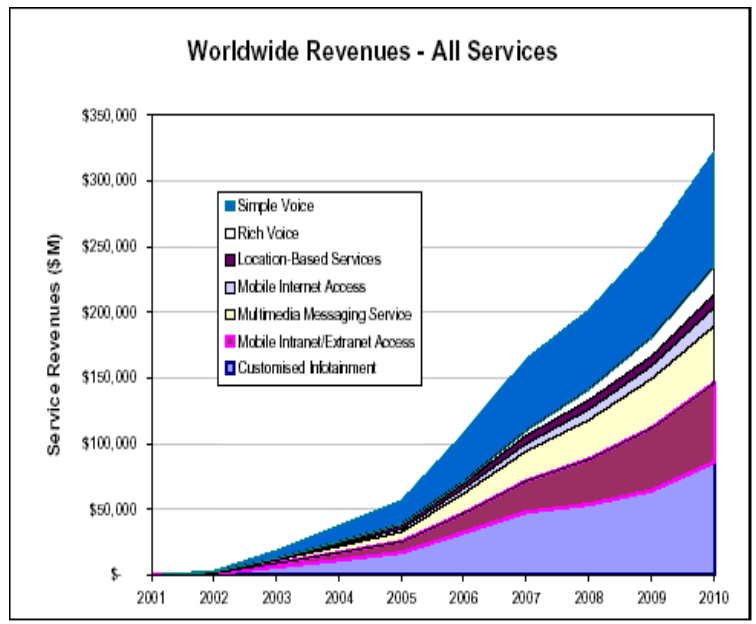
Key Technological Issues & Ongoing Activities (4/7)

▣ Broadband Content Delivery

◈ Capacity & Performance Improvement

➢ Rapid Increasing Mobile Data Traffic





Source: Telecompetition, Inc., February 2001.

Key Technological Issues & Ongoing Activities (5/7)

Broadband Content Delivery

Alternatives for Capacity & Performance Improvement

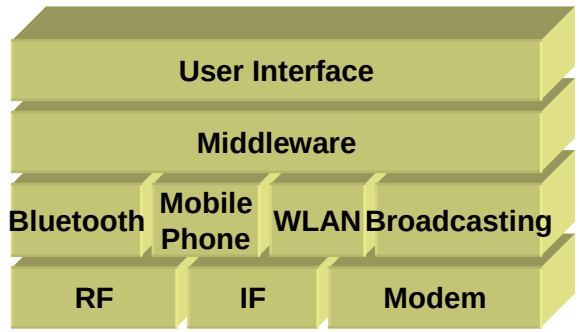
Carrier Bandwidth
PHY (Modulation, etc)
Maximum Physical Data Rate
Maximum Application Data Rate
Medium Access Control/ Media Sharing
UL, DL Duplexing & Multiple Access Scheme
Max. Power
Cell Coverage/Size
Mobility/Handover Support
Radio Link Quality Control
QoS Support
Encryption/Security
Fixed Network Support

Solutions for Broadband Multimedia Service

OFDM
CDMA/TDMA/FDMA
MIMO
AMC
(H)ARQ
Smart Antenna
SDR
WiFi
IPv6
IP Oriented QoS
All IP
VoIP
Other Issues

Key Technological Issues & Ongoing Activities (6/7)

- Innovative Wireless Technologies
  - Software Defined Reconfigurable Radio
    - Software Defined Radio with Programmability
      - Open Modular Concept
      - Universal Hardware
      - Software Download
      - Dynamic Resource/Protocol Management



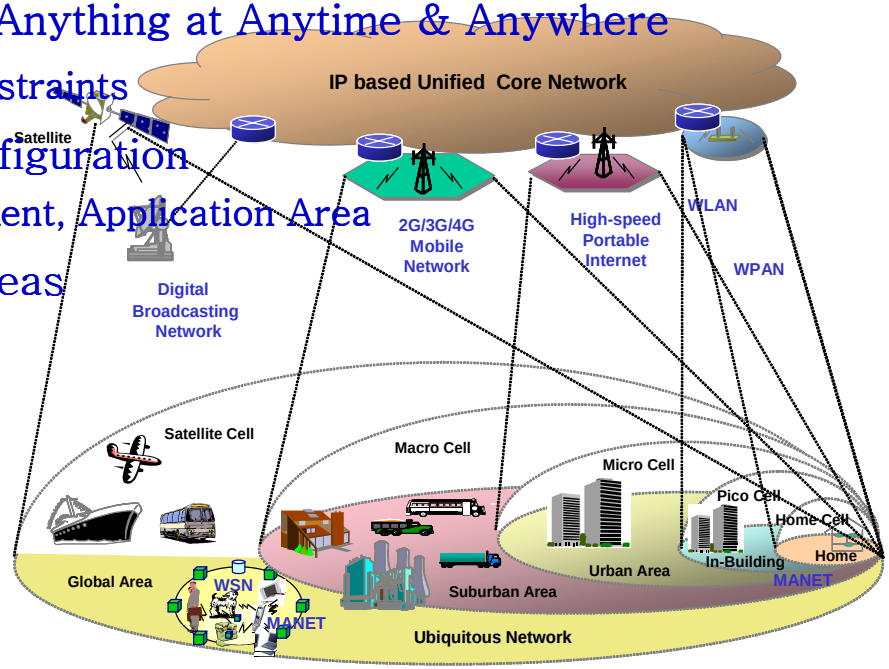
  - Differentiated Service
    - IP Oriented QoS
      - Collective Effect of Service Performance
      - Consideration of Cost, Complexity & Capacity
      - Overcome Wireless and Mobile User Context

Key Technological Issues & Ongoing Activities (7/7)

- Innovative Wireless Technologies
  - Open Spectrum
    - Use of Unlicensed Frequency in 2.4 GHz, 5 GHz Band
    - Allow for Efficient & Creative Usage
      - Easy of Use
      - Security
      - Mobility
      - Network Management

Broadband Mobile Convergence Network (1/10)

- Perspectives on Mobile Convergence
  - Concepts & Characteristics
    - Wired & Wireless Integration Service
      - Quality of Fixed-line & Convenience of Wireless Network
    - Connectivity for Anybody & Anything at Anytime & Anywhere
      - No Spatial & Temporal Constraints
    - ABC in Hierarchical Cell Configuration
      - Cell Range, Radio Environment, Application Area
    - New Entrance from Other Areas
      - Strategic Countermeasures



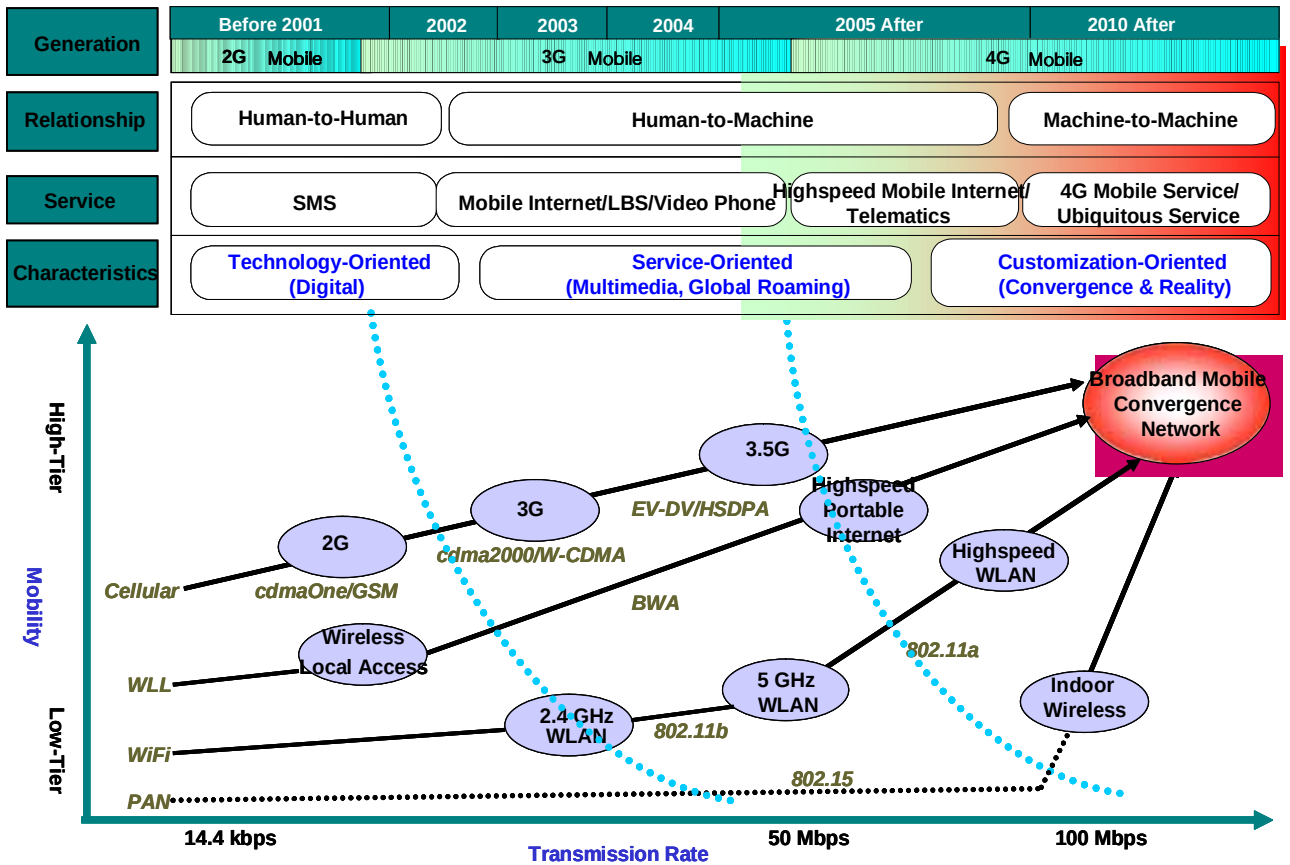
Broadband Mobile Convergence Network (2/10)

- Visions & Directions
  - Discovery of New Growth Energy
    - ITU-R WP8F
      - Vision on Future Development of 3G & SB3G
      - Overall Objectives, Technical, Operational & Spectrum Issues
    - 3GPP & 3GPP2
      - Enhancement of IP Mobility & Application Flexibility
      - Harmonization toward Converged IP-based Mobile Networks
    - WWRF
      - Vision on the Direction of Future Strategic Research
      - Generate, Identify, Promote of Research Areas & Technical Trends
    - Etc
      - NGMCF, mITF, FuTURE

Broadband Mobile Convergence Network (3/10)

Visions & Directions

Evolution of Broadband Mobile Communications



Broadband Mobile Convergence Network (4/10)

Possibilities & Challenges

Driving Forces

- Expanded Sensing & Tracking Capability
- Augmented Connectivity of Cyber Space & Real Space
- Always Best Connected Service
- Need to Generate Additional Revenues

Seeds for New Service

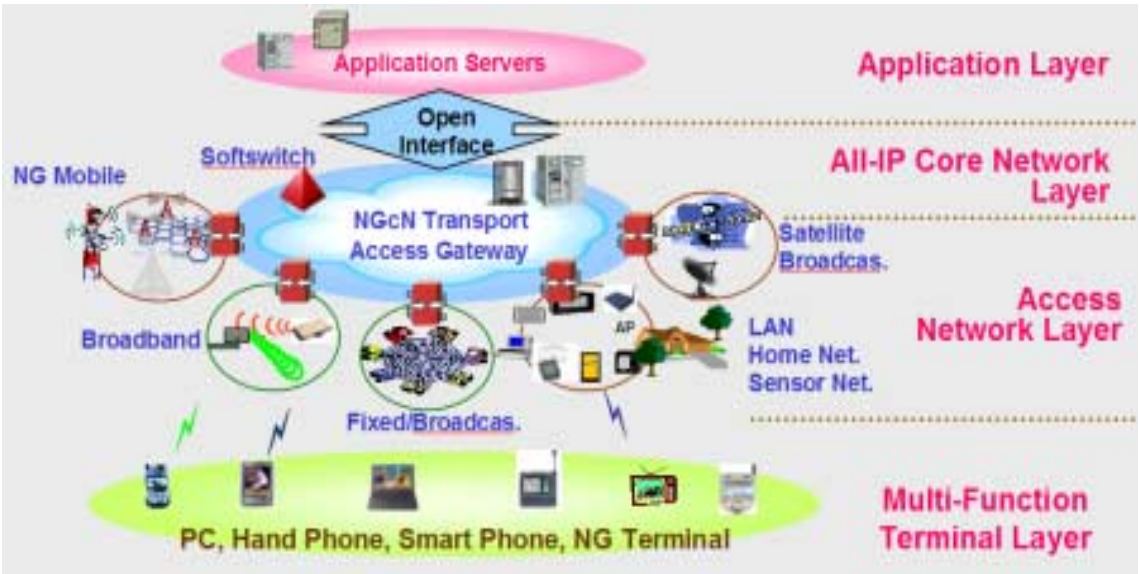
- New RTT
- WPAN, WSN, Mobile Ad-hoc Network
- Cellular & WLAN Interworking
- Global ALL-IP Network
- Mobile Multimedia Service Control
- Service Differentiation & Customization
- Seamless Service Continuity
- Location & Context based User-centered Service

Broadband Mobile Convergence Network (5/10)

- Technical Approaches to Mobile Convergence Networks
  - All in One
    - Concept of Convergence
      - Integrated or Coupled Phenomena in Association with Diverse Networks, Services, Providers
      - Service/Network/Terminal Convergence
    - Network Convergence
      - Wired & Wireless Service Provision via Common Infrastructure
      - Flexible & Easy-to-Deploy Architecture for New Service
      - Migration Path Independent on Network Technologies

Broadband Mobile Convergence Network (6/10)

- All in One
  - Conceptual Model of NGcN
    - Common, Unified & Flexible Architecture
      - Layered Architecture
      - Open Service Interface
      - Distributed Network Intelligence

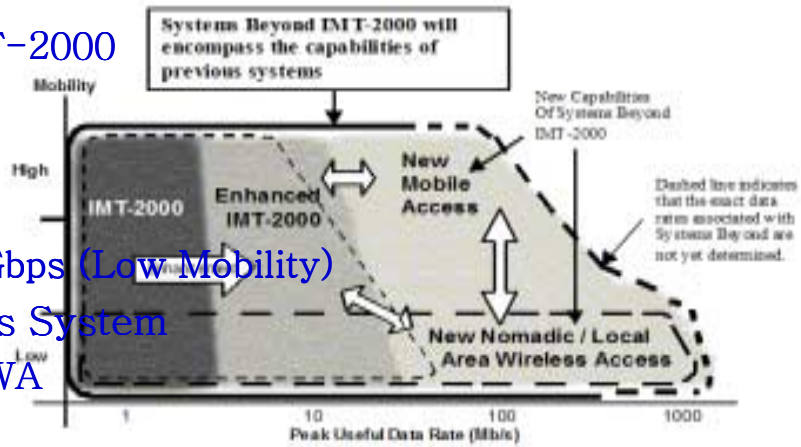


Broadband Mobile Convergence Network (7/10)

- Integration, Interworking & Interoperability
  - Integration & Interworking
    - Consistent Service Regardless of Device or Network Types
  - Interoperability
    - Well-defined Gateway Points & Functions between Networks
    - Global Standardized Interfaces between Networks

Broadband Mobile Convergence Network (8/10)

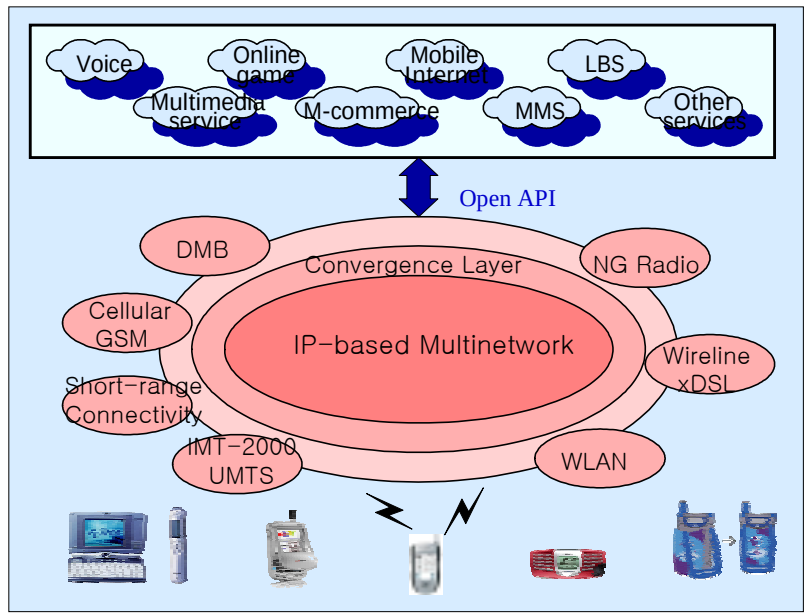
- Enabling Mobile Network Technologies
  - Evolving Mobile Network
    - Future Development of 3G
      - Steady & Continuous Evolution of IMT-2000
      - Increased Capacity up to 10~30 Mbps
    - New Capability of SB3G
      - New Wireless Access Technology
      - Up to 100 Mbps (High Mobility) or 1 Gbps (Low Mobility)
    - Relationship of 3G, SB3G & Other Access System
      - WPAN, WLAN, Digital Broadcast & FWA
    - Timeline
      - Market Trends, Requirements & User Demands
      - Technical Capabilities & Technology Developments
      - Standards Development
      - Spectrum Availability
      - Regulatory Considerations
      - Systems Development & Deployment



ref. ITU-R WP8F PDNR

Broadband Mobile Convergence Network (9/10)

- Enabling Mobile Network Technologies
  - Omnibus & Ubiquitous Network toward Convergence
    - Evolving Mobile Network
    - IP based Unified Core Network
    - Heterogeneous Access Network
    - Digital Broadcasting Network
    - Mobile Ad-hoc Network
    - Wireless Personal Area Network
    - Wireless Sensor Network



Broadband Mobile Convergence Network (10/10)

- Opportunities & Threats to the Mobile Converging Service Market
  - Faster, Riskier & More Complex World
    - Understand of Key Technology & Direction
    - Flexible Rolling Plan
    - Beneficiary Business Model
    - Time-to-Market Strategy
  - Role of Technology Planner
    - Identify Promising Technology for Maximum Benefit Generation
  - Pros & Cons
    - Generate New Sources of Revenue
    - No Guarantee for Commercial Success
  - First Mover vs. Fast Follower
    - No 1 Innovation Leader in New Service Market
    - More Resource Intensive in Creating Demand

Conclusions

- Glimpse of Future Mobile Landscape
  - User-centered New Lifestyle
  - Change on Workspaces & Community Life

- Guideline for Future Mobile Information Society
  - Seamless Broadband Mobile Service
  - Wave of Mobile Convergence Paradigm
  - The Advent of Ubiquitous Service Era
  - Heavy Influence of Mobile Communication Sector

THANK YOU !!!

감사합니다 !!!

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