The *OCTAVE* Project

June 2006
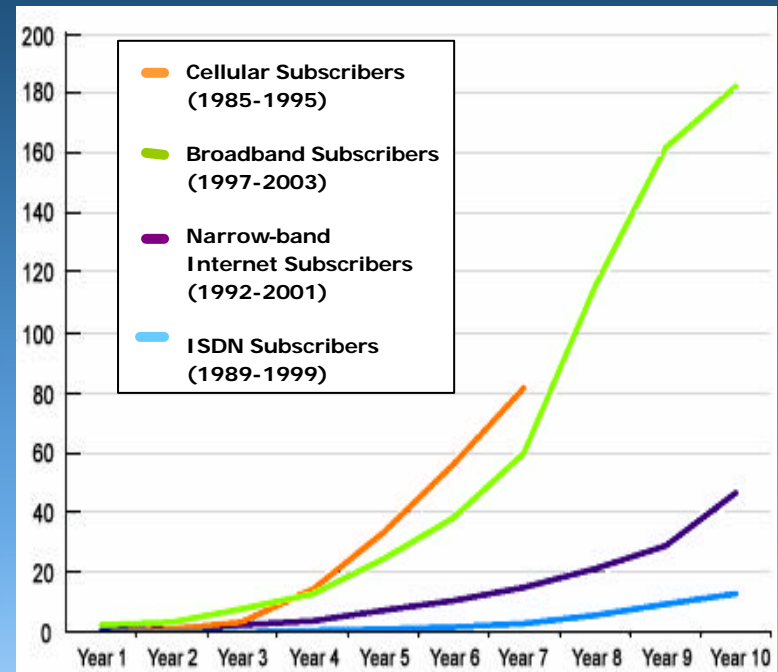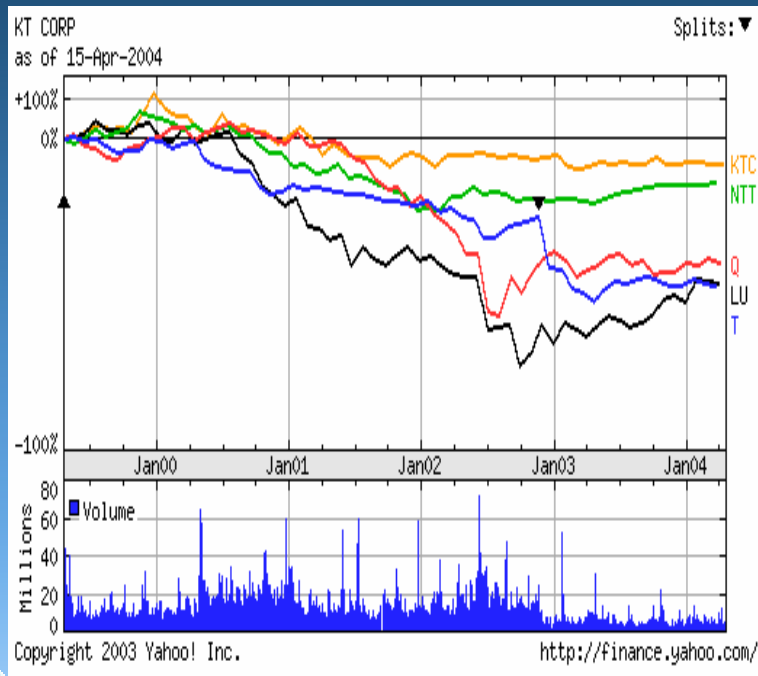
KT Value Networking

Today's Telco - Broadband

⬡ **Downfall of Main Revenue Stream**

- **PSTN Business**
- **Leased-line**

⬡ **Broadband take-up over first 10 years is faster than previous services across the OECD countries.**

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Two Sides of Broadband Internet Business in Korea

Threat & Opportunity

Threat

◆ Revenue: Saturating market with flat rate
◆ Expenditure: Increasing CAPEX/OPEX
　　　　　due to doubling traffic
◆ High customer expectation level:
　- avr. ~4.5Mbps bandwidth per customer
　- customer sensitivity to network quality

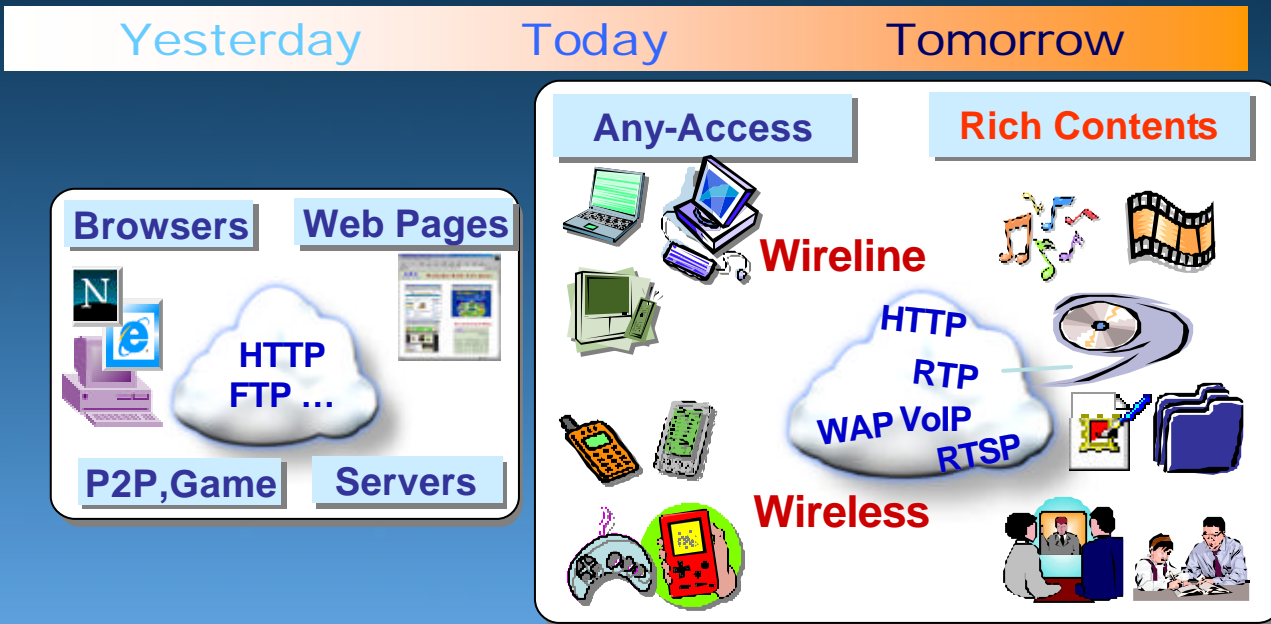### Opportunity

◆ Has established
　- high quality infrastructure
　- Large customer base
◆ Opportunities in application
　& value-added services

(Source by)
• ~2002 : Ministry of Information and Communication
• 2003~ : KISDI

(Unit : Thousand)

14,078 (Cumulative Total)

10,439

3,867 (Annual Increment)

467

12　230

1998　2000　2002　2004　2006

OCTAVE *Challenge for Octave Higher*

Broadband Internet: The Next Stage

- **From simple Internet access to "quality life/work services"**

Yesterday	Today	Tomorrow

Any-Access   **Rich Contents**

Browsers   **Web Pages**

Wireline

HTTP
FTP ...

HTTP
RTP
WAP VoIP
RTSP

P2P,Game   **Servers**

Wireless

Simple Internet Access

Quality Life/work services

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Basic Questions

1. **Will |A| >> |B|?**
2. **Will Telcos dominate the market?**

- **Change in Traditional Telecom Services Revenue** (vertical axis)
- +30%, +20%, +10%, -10%, -20%, -30%
- 1997, 2002, 2007, 2012 (horizontal axis)

Email, Internet Fax/Phone, Web Transport — Alternatives

Zone of Opportunity
Seizing Digital Economy
A

Telecom Baseline Revenue

Boom
- Second lines
- E1/T1 Sales

B **Zone of Adversity**
Impact of Packet Services on Traditional Revenues

Challenge for Octave Higher

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Answers #1
App./Solution Market: Forecasts & Facts

	2000	2001	2002	2003	2004	2005	2006	2007
2003			605,872	646,559	708,828	796,454	895,846	1,011,231
1999	597,800	678,900	776,400	890,500	1,070,800	1,297,700		

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
2003						14,215	16,727	19,688	23,065	26,749	30,666
2000	4,256	4,488	5,856	7,656	10,816	14,728	19,336	23,728	31,704		
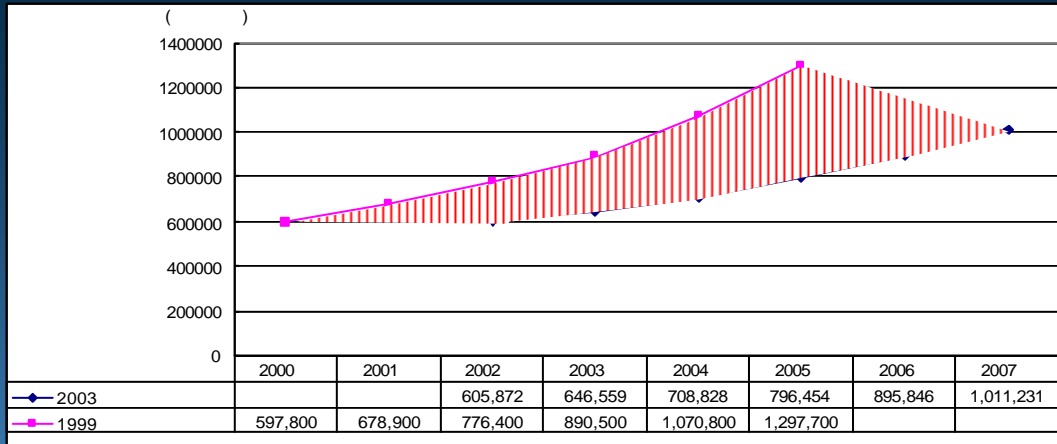
For Digital Content Market (2003, Korea)
- Creation & Service(63.2%)
- Delivery(14.9%)
- Solution(21.9%)
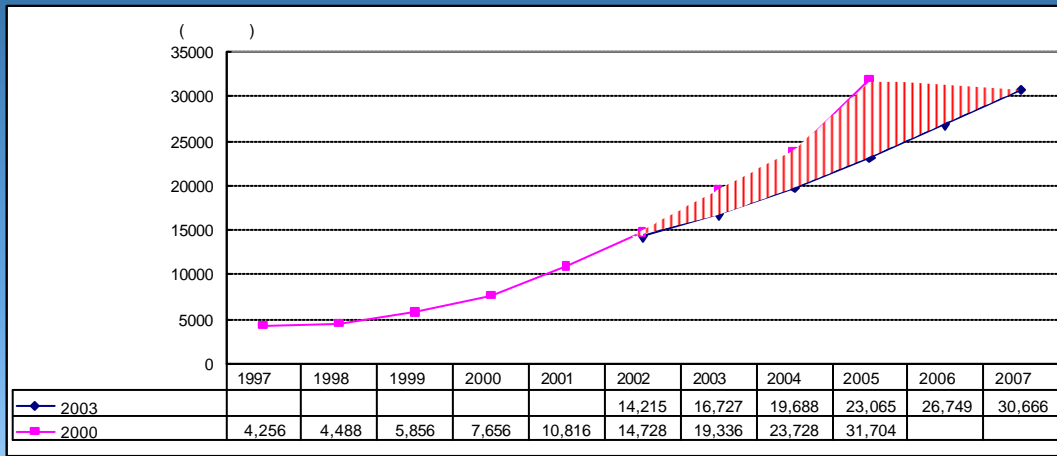
For Delivery
- Off-line(51%)
- On-line(49%)

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Answers #2
Telcos in the App. & Solution Market

🔵 **Small name in the application service market**

Telco: e.g., KT

Free- riding; No differentiation

Best effort Access

best effort Internet

HanMir
Home Media
idisk

NAVER
CINEWEL.COM
MBC www.MBC.com
megastudy

No differentiation

App. Giants
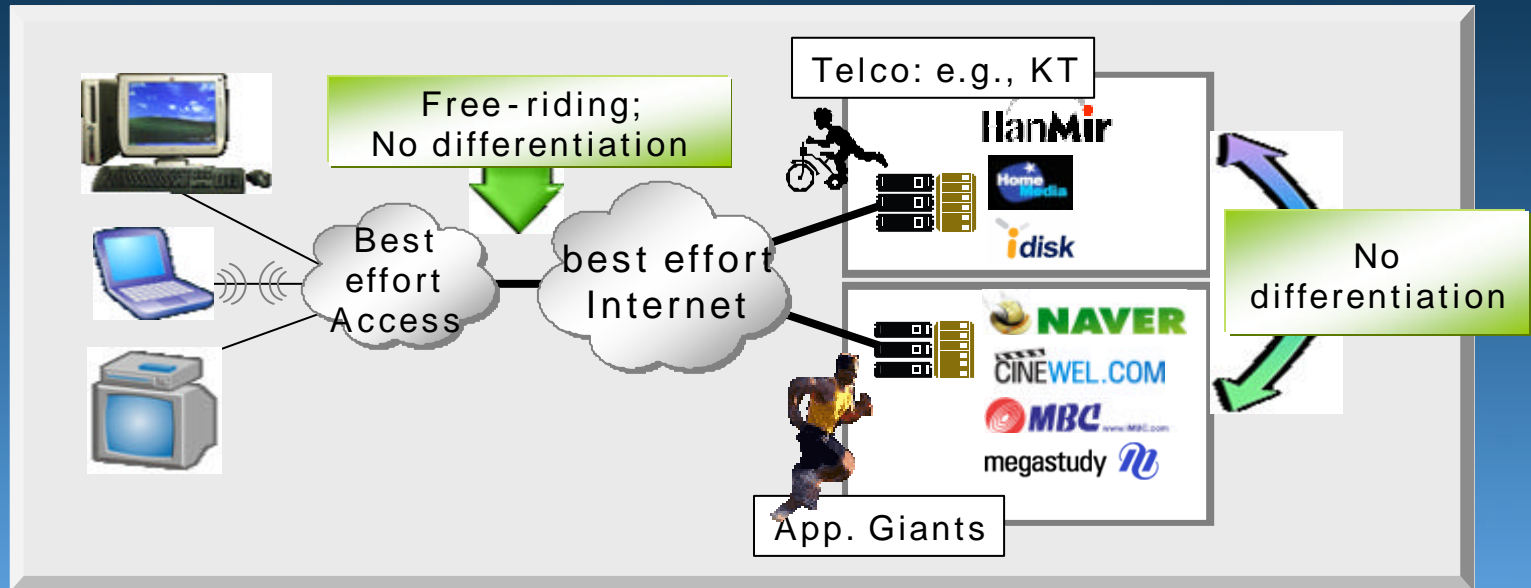
Contents (or App. service) ▷ **Platform** ▷ **Network** ▷ **Terminal**
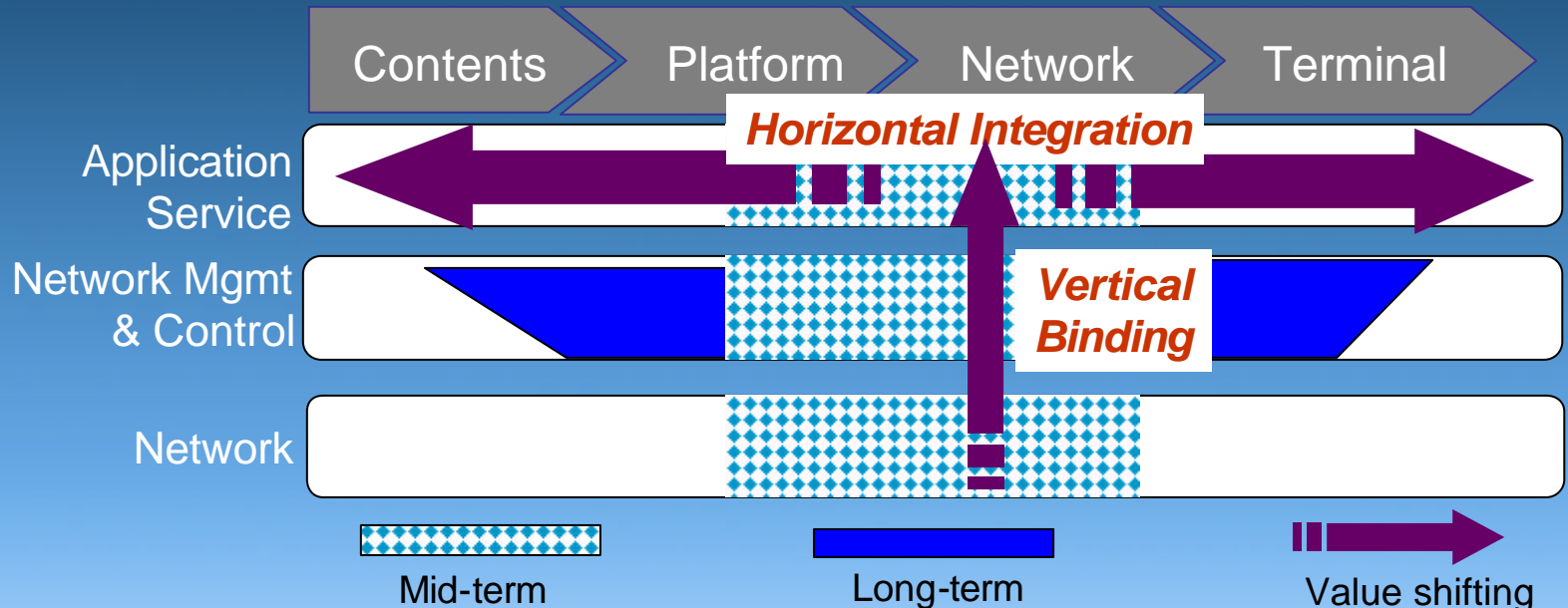
OCTAVE *Challenge for Octave Higher*

Value Networking **KT**
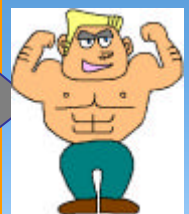
Answers #2
Telcos in the App. & Solution Market

- **Values shifting from the Network to Contents/Platform/Terminal**
- **Expected growth rate:**
  - **- Contents(38.9%), Platform(22%), Terminal(16%), Network(11%)**
- **Telco as the application-to-network binder & service integrator**

| Contents | Platform | Network | Terminal |

Horizontal Integration

Application Service

Vertical Binding

Network Mgmt & Control

Network

Mid-term

Long-term

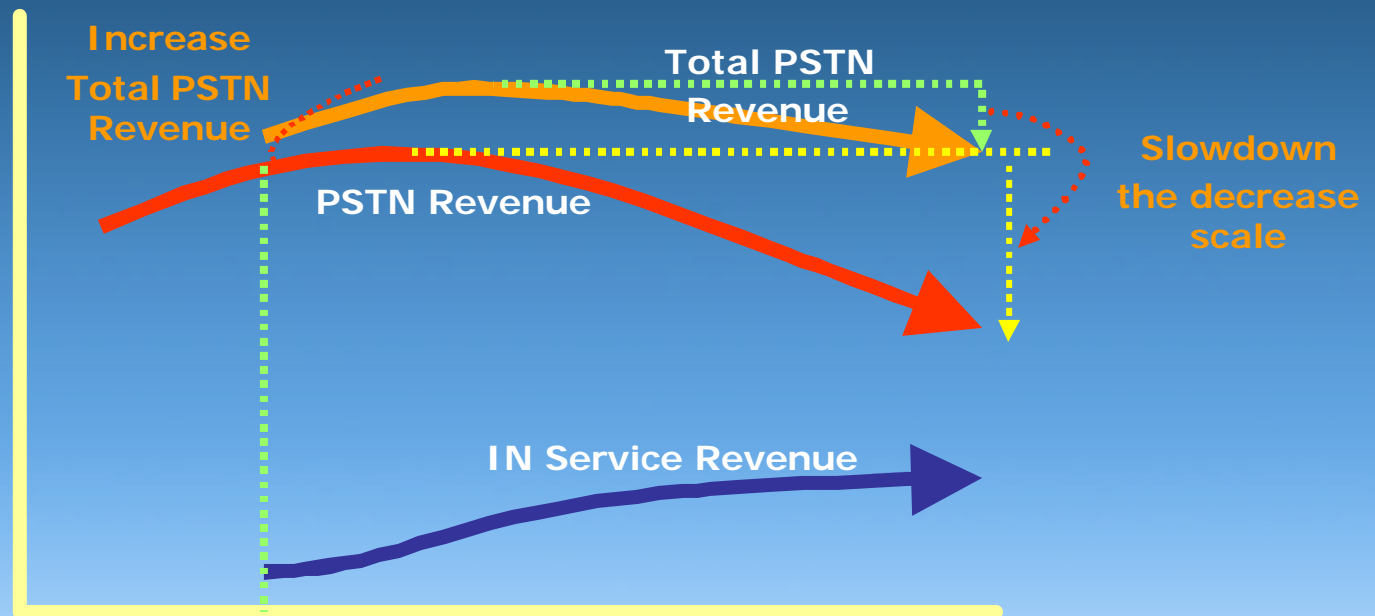Value shifting direction

Value Networking **KT**

Octave Concept

⬡ **Past Case : PSTN and IN(Intelligence Network) Service**

- IN Service Revenue increase Total PSTN Revenue at the early stage
- New Signaling Structure and Device invested
- Recently IN service slowdown the decrease scale of PSTN revenue

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Octave Concept

🔘 **Now : Broadband Service & Managed Service**
- Broadband Service Market almost saturated and will decrease due to other substitute service like Wibro, 4G, etc..
- To expand market size, Managed & Innovative Service needed
- For Managed & Innovative Service, New Signaling Structure and New Device will be invested

➡️ Octave Project

Overcome & Expand total Market Size
by Managed & Innovative Service

One Octave Higher!

Cause of Other Substitute Service

The Octave Project

Service	From network provider to total solution provider
Strategic Direction	**Differentiated services on differentiated infrastructure** • step 1: basic application services over the Octave infra • step 2: innovative ICT-based life/work application services over the consolidated Octave infrastructure
Analogy	From plain seaside to water park

Best Effort Internet

Quality-guaranteed, secure IP network

• Free/cheap, Unstable Quality, Unmanaged, Insecure

• Fee-based, Guaranteed Quality, Managed, Secure

OCTAVE *Challenge for Octave Higher*

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Octave Service

- **New Application Services that will Take Up Broadband Internet Revenue**
  - **Providing octave service and device to the home with broadband access**
 - **Reaching up to the next octave level : twice the size of the current broadband revenue**

Red Service Entertainment

Green Service Communication

Blue Service Education

Yellow Service Secure Home

KT Octave Device

Managed Broadband Network (Megapass/NESPOT/Wibro)

Challenge for Octave Higher

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Beyond Broadband : Services

Contents

- Multimedia conferencing
- High quality voice service
- Multimedia messaging

- Broadcast over IP
- Media on-demand
- Interactive TV
- Personal/Enterprise casting
- Interactive learning
- Embedded communication

Computing

m   ic

Commerce/ Finance
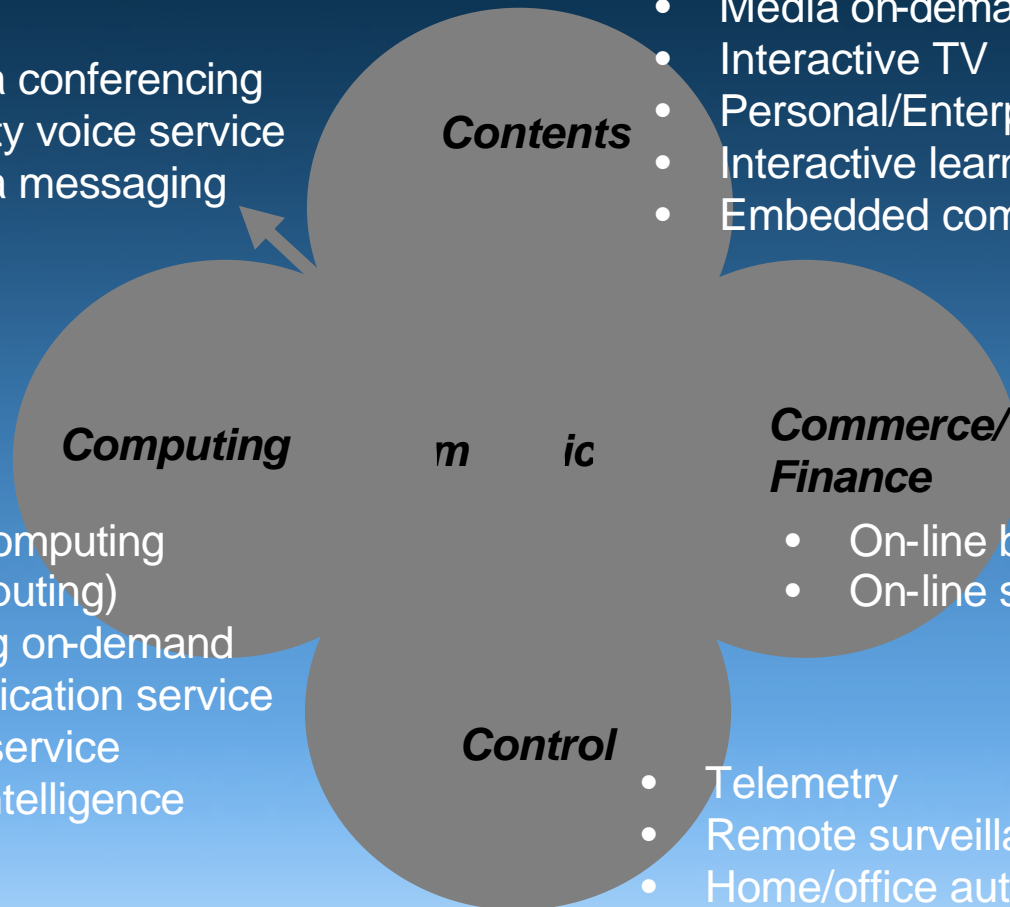
- Network computing (Grid computing)
- Computing on-demand
- ASP (Application service provider) service
- Network intelligence

- On-line banking
- On-line stock trading

Control

- Telemetry
- Remote surveillance
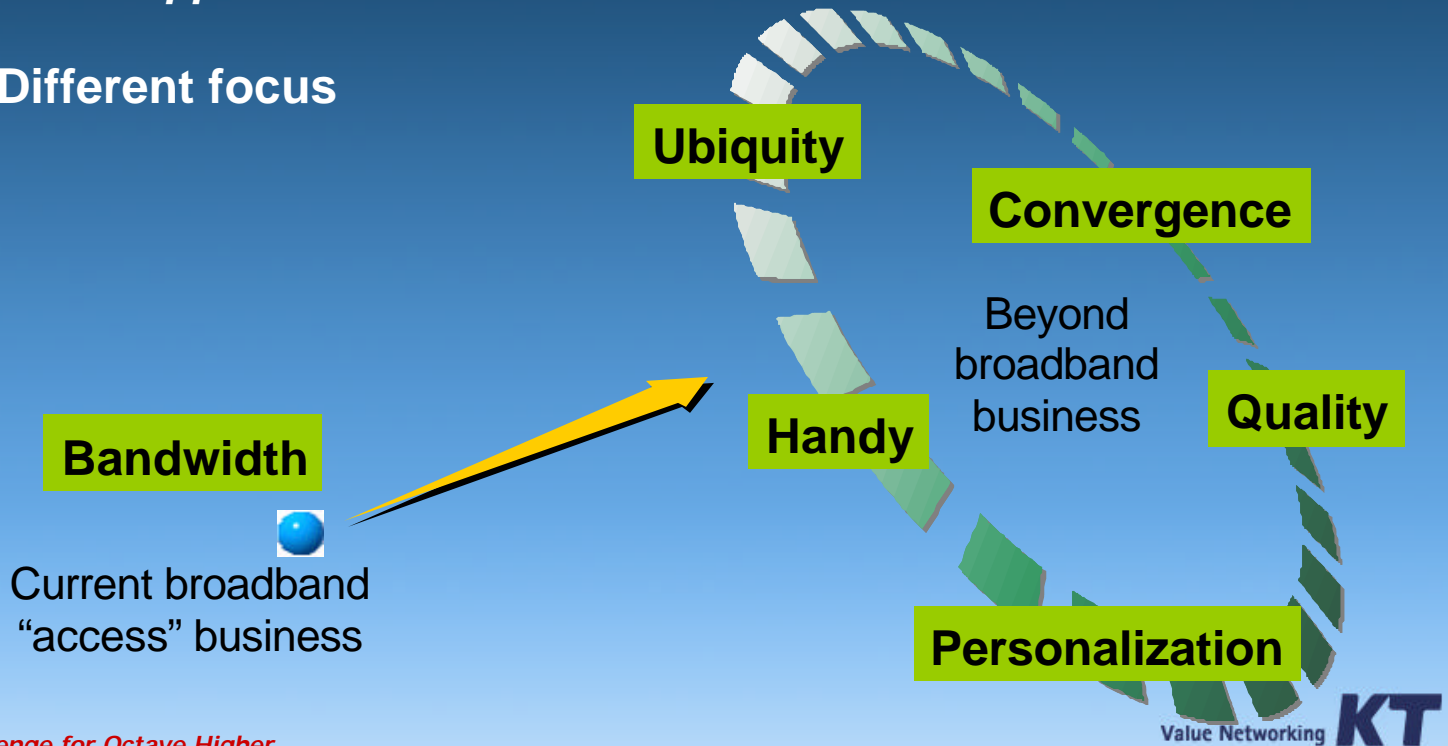- Home/office automation

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Beyond Broadband : Business

- ⬡ **Different business**
  - – *From access service to end-to-end service*
  - – *Both best-effort & quality service*
  - – *From network service to solution/application services*
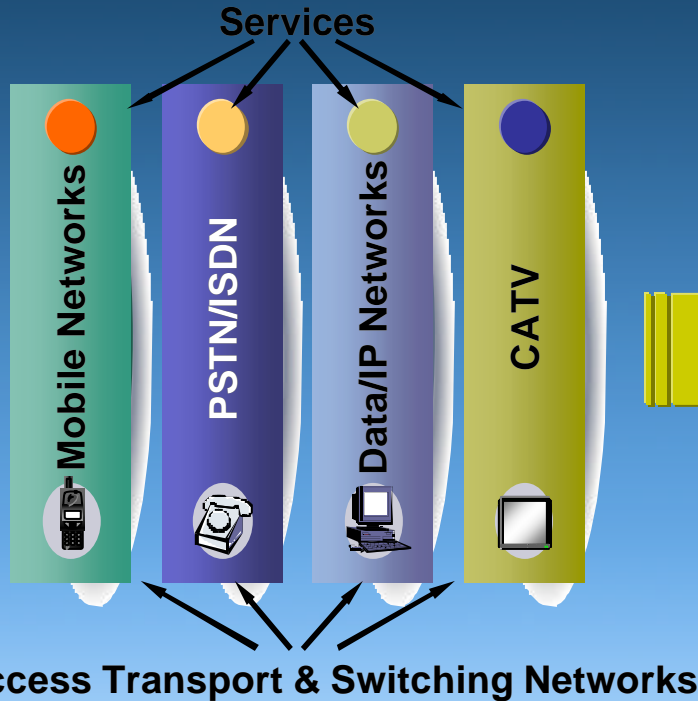 - – *Applications: from niche market to mass revenue market*

- ⬡ **Different focus**

Ubiquity

Convergence

Beyond broadband business

Bandwidth

Handy

Quality

Current broadband "access" business

Personalization

Value Networking **KT**

The Next Generation Networks

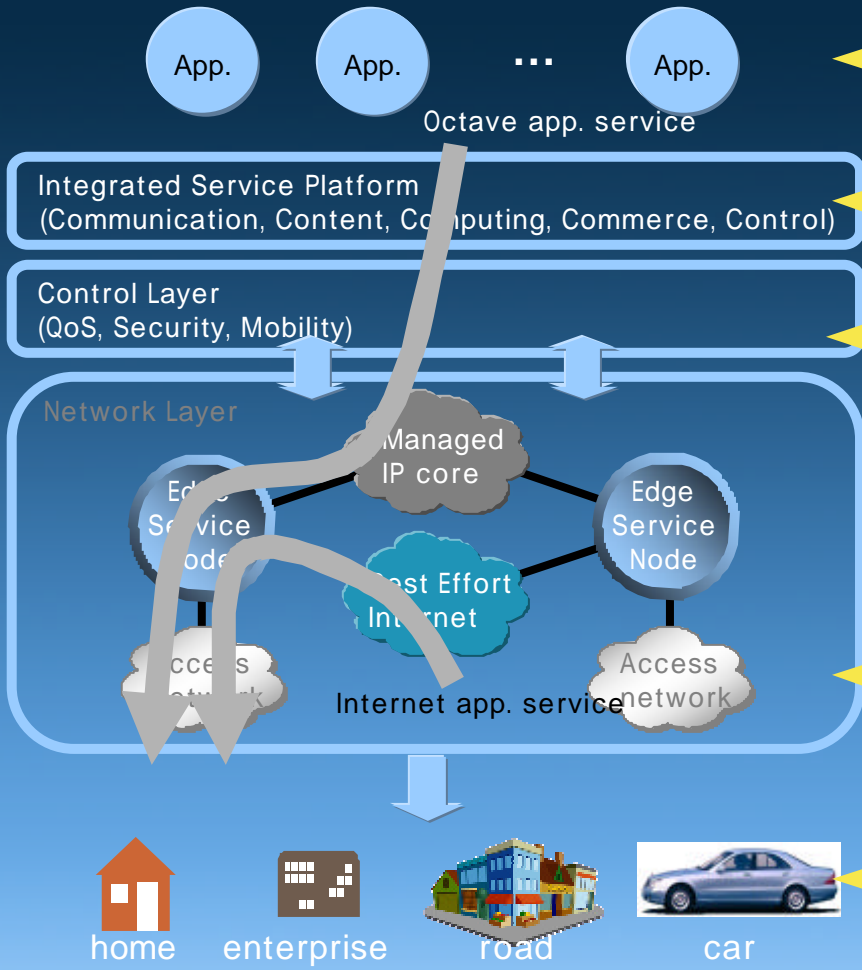🔹 **The following picture has been in place for more than 10 years**

Too costly, per-service network architecture

Single/simple/cost-effective network infrastructure for existing & new services

Services

Mobile Networks

PSTN/ISDN

Data/IP Networks

CATV

Access Transport & Switching Networks

Existing and newly emerging services

Network control (QoS, Security, IP Mobility)

Multi-Service IP Backbone

Wireless Access

Wireline Access

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Octave Infra

App.   App.   ...   App.

Octave app. service

Integrated Service Platform
(Communication, Content, Computing, Commerce, Control)

Control Layer
(QoS, Security, Mobility)

Network Layer

Managed IP core

Edge Service Node

Edge Service Node

Best Effort Internet

Internet app. service

Access network

Access network

home   enterprise   road   car

Timely deployment of Octave services

Common application platform functions
? application level AAA (SSO with network AAA)
? Billing & user management
? Communication session management
? Content delivery networking
? Interface with the control layer

Network control functions
? per person/device AAA
? end-to-end QoS
? managed security
? IP mobility
? interface with the service platform

Common access network for Octave services
? multi-access, dual-backbone
? Fixed & wireless/mobile access
? IP transport with QoS, security

Premise networking & terminal devices
? Optimal premise networking
? Octave devices

(AAA: Authentication, Authorization, Accounting) (SSO: Single Sign-On)

OCTAVE   *Challenge for Octave Higher*

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Challenge for One Octave Higher

- **Octave is the Vision for Next Generation Network and Services of KT**

- **Octave Infra aims One Network for Multiple Services (triple play services, broadband wireless services, etc)**

- **Octave Service will integrate various broadband services and provide them to customers homogeneously**

Octave Project will give One Octave Higher in Broadband Service Revenue

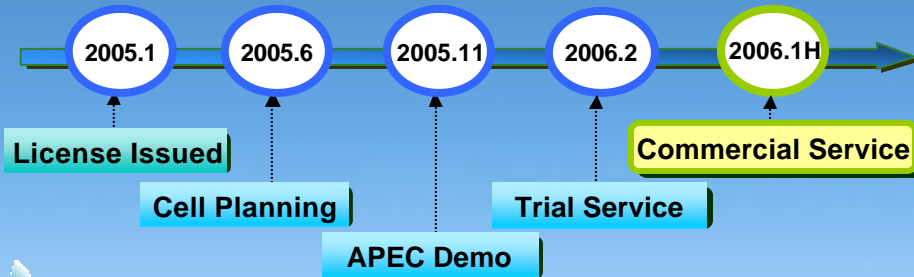Value Networking **KT**

WiBro

Coverage

2G/3G

Hot Zone

WiBro

Hot Spot

WLAN

Library   Airport
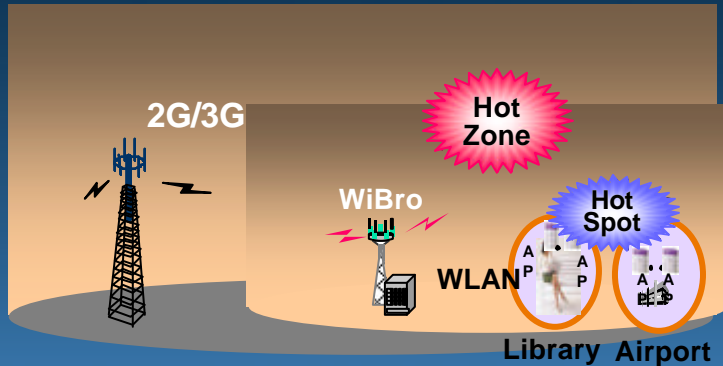
- 2G/3G : Voice-oriented, wide-area, narrow-band
- WiBro : Cities, broad-band
- WLAN : Hot-spot

Milestones

2005.1 — 2005.6 — 2005.11 — 2006.2 — 2006.1H

License Issued

Cell Planning

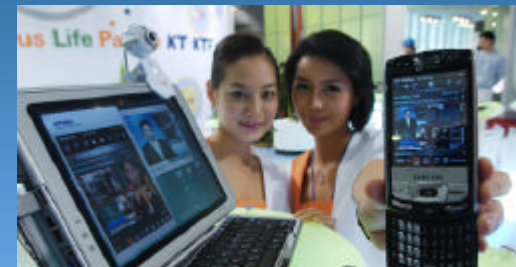**APEC Demo**

Trial Service

Commercial Service

APEC 2005 Demonstration

KT Wibro Demonstration in Shuttle Bus

KT Wibro Devices

- Wireless TPS
- IP Multicasting (VoD & MoD)
- Portals, Games, LBS's

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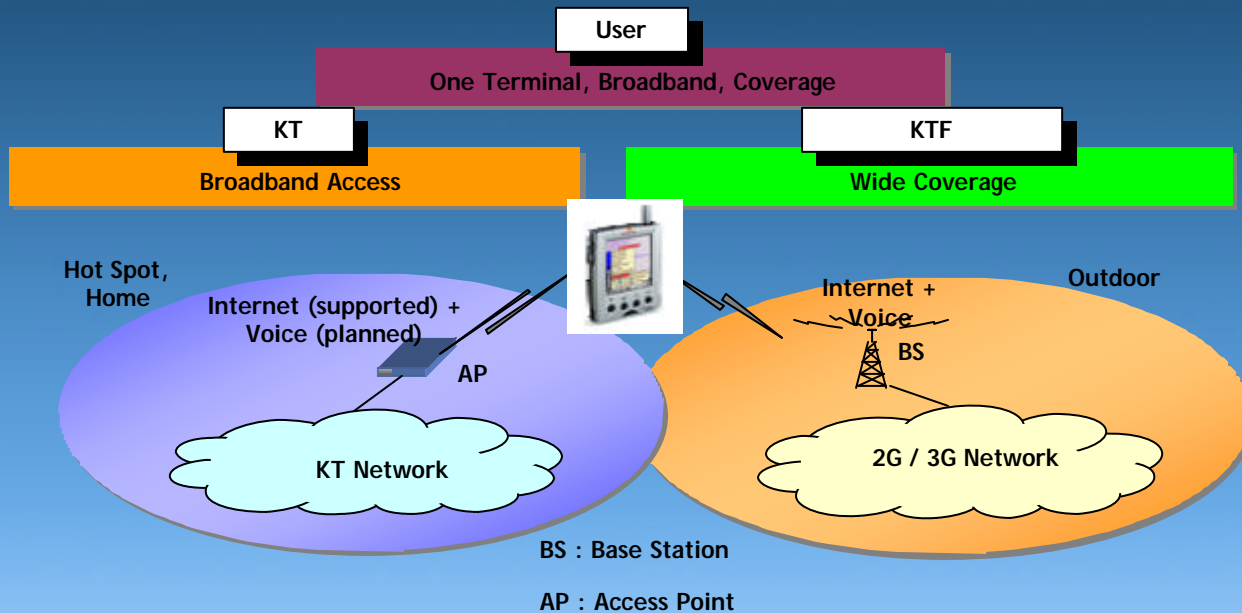
IP-Media (IP-TV)

- TPS (Telecom. + Broadcasting + Data), may be launched in 2006.

- **Telecom. : T-communication**
- **Broadcasting : T-channel**
- **Data : T-interactive**

Configuration

T- channel service
- Digital TV
- VoD, etc.

T- Communication service
- Short Message Service
- Messenger
- Conferencing service, etc.

T- Interactive service
- Auction,
- T- Commerce service
- Karaoke, game, etc.

IP Media center

Receive System

Head/End System

Management System

NGN Back bone

Metro Switch

Ntopia Switch

IP- VDSL, Ntopia — SD

IP- VDSL, Ntopia — HD

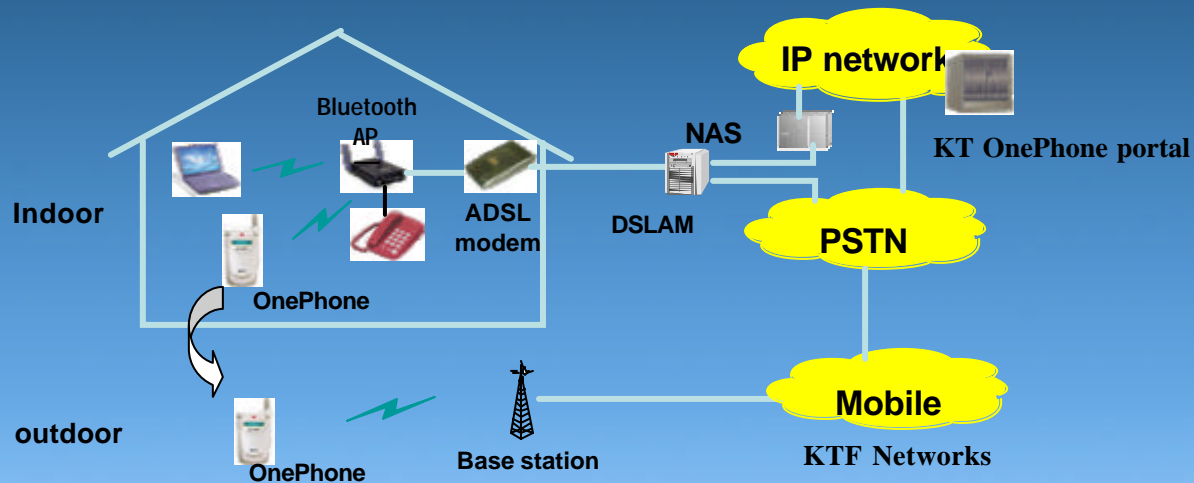OLT — RN — ONU — Pseudo FTTH — HD

OLT — RN — FTTH — ONT — HD

Nespot-Swing

- Integrated mobile phone and Wi-Fi module
- Provides voice (CDMA) and data service (wireless internet service)
- Cellular phone + Wi-Fi module

User

One Terminal, Broadband, Coverage

KT

Broadband Access

KTF

Wide Coverage

Hot Spot, Home

Internet (supported) + Voice (planned)

AP

KT Network

Outdoor

Internet + Voice

BS

2G / 3G Network

BS : Base Station

AP : Access Point

Value Networking **KT**

One-Phone

- Integrated mobile phone and landline service using bluetooth technology
- Cordless phone and mobile phone are integrated into a single terminal
    - Outdoor : Cellular phone
    - Indoor : Cordless phone based on bluetooth technology
- Provides voice and data service (wireless internet service)
- Cellular phone + Cordless phone

IP network

Bluetooth AP

NAS

KT OnePhone portal

Indoor

ADSL modem

DSLAM

PSTN

OnePhone

Mobile

outdoor

OnePhone

Base station

KTF Networks