

Let's **KT**

Beyond Broadband Services

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KT

"The Value Networking Company"



Contents

Broadband Internet Business in Korea

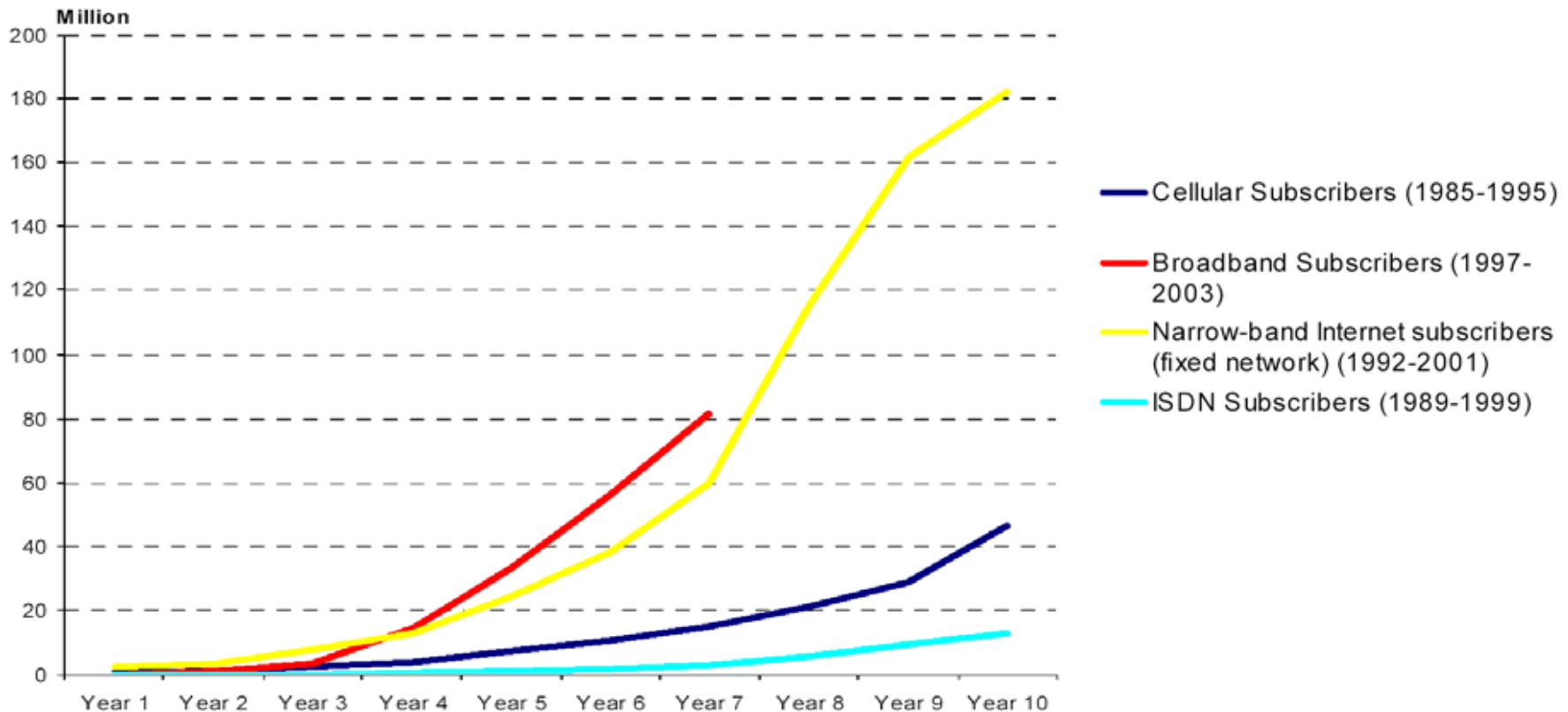
Beyond Broadband: Next Generation Services to Come

Networking Capabilities for Next Generation Services

Summary & Remarks

Broadband Internet Business

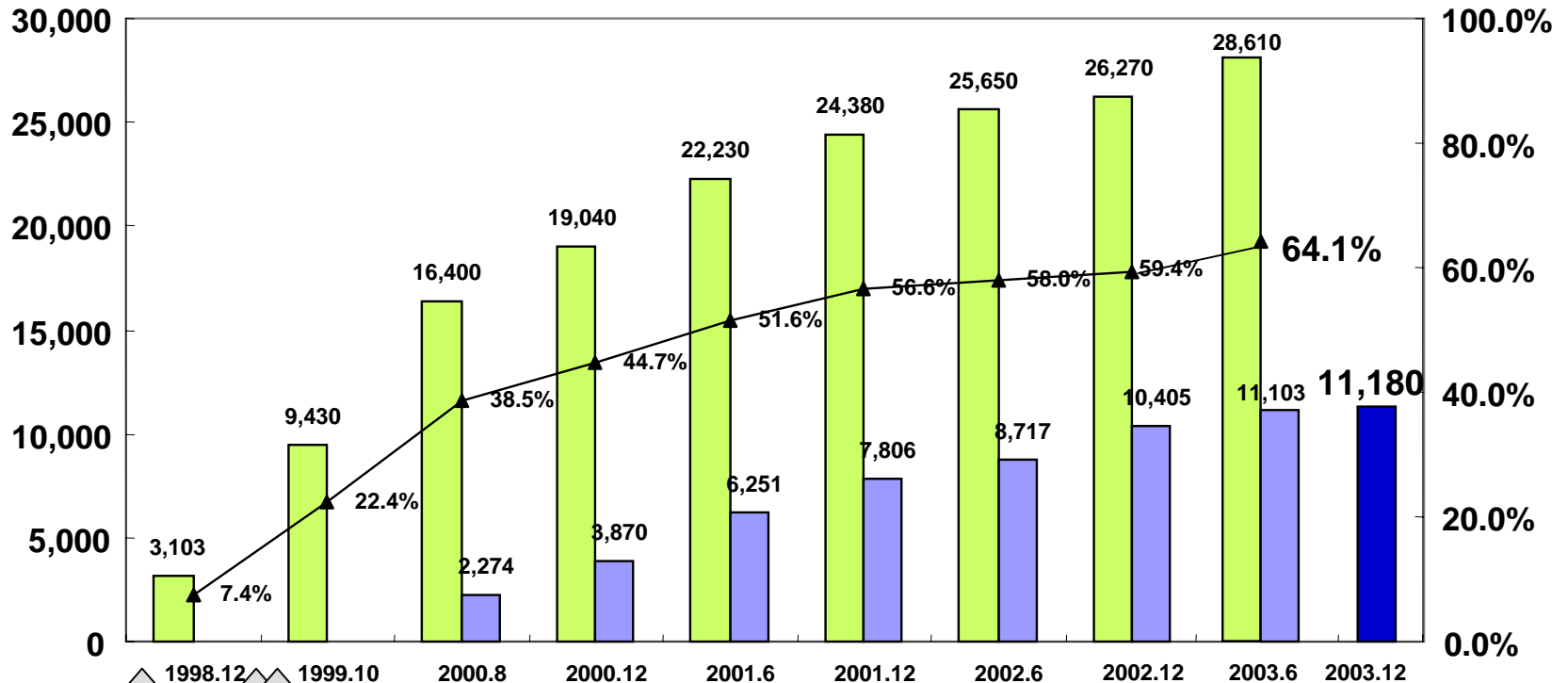
- **Broadband take-up over first 10 years is faster than previous services across the OECD countries.**



(ref: www.oecd.org)

Broadband Internet Business in Korea

(unit: thousands)



↑ 1998. 7 Thrunet
 ↑ 1999. 4 Hanaro
 ↑ 1999. 6 KT



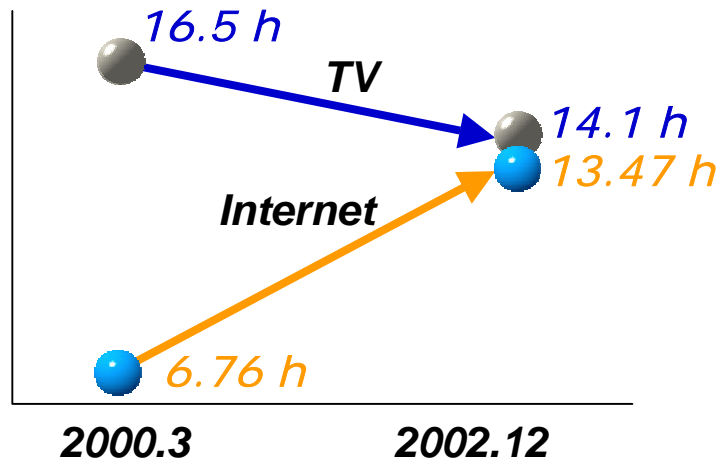
↓
~73% of total households

(ref: www.krnic.or.kr)

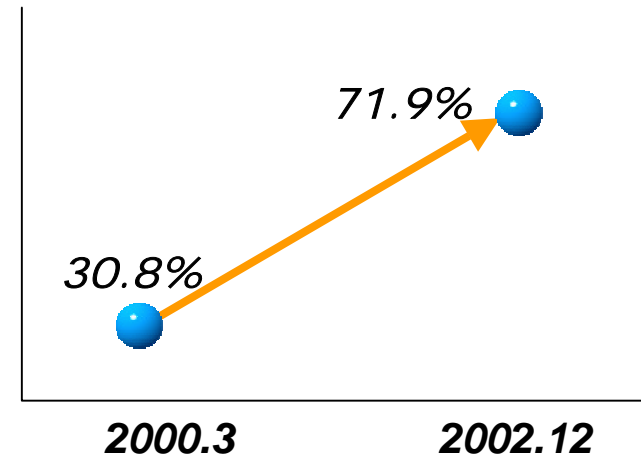
Broadband Internet & Change of Life Style

- Phenomenal increase of broadband Internet usage

Weekly hours spent on Internet & TV



% of daily Internet users



(ref: isis.nic.or.kr)

On-Line Activities

● Off-line activities being shifted into on-line activities

| | |
|------------------------------|--|
| On-line Banking | <ul style="list-style-type: none">• More than 30% of transactions done through Internet• 0.12 Million users in 1999 → 22 million in 2003 |
| On-line Stock trading | <ul style="list-style-type: none">• More than 50% of total transactions via on-line• 11 Trillion in 1998 → 3732.7 Trillion in 2003 (Korean Won) |
| e-Commerce | <ul style="list-style-type: none">• 17% of total commerce transactions• 58 Trillion in 2000 → 238 Trillion in 2003 (Korean Won) |
| Public certificates | <ul style="list-style-type: none">• 7.7 million public certificate users (2003.4) |
| On-line game | <ul style="list-style-type: none">• Market size 2.5 times the size of console game market• Evolving into another type of entertainment area• Game league similar to professional basketball league |

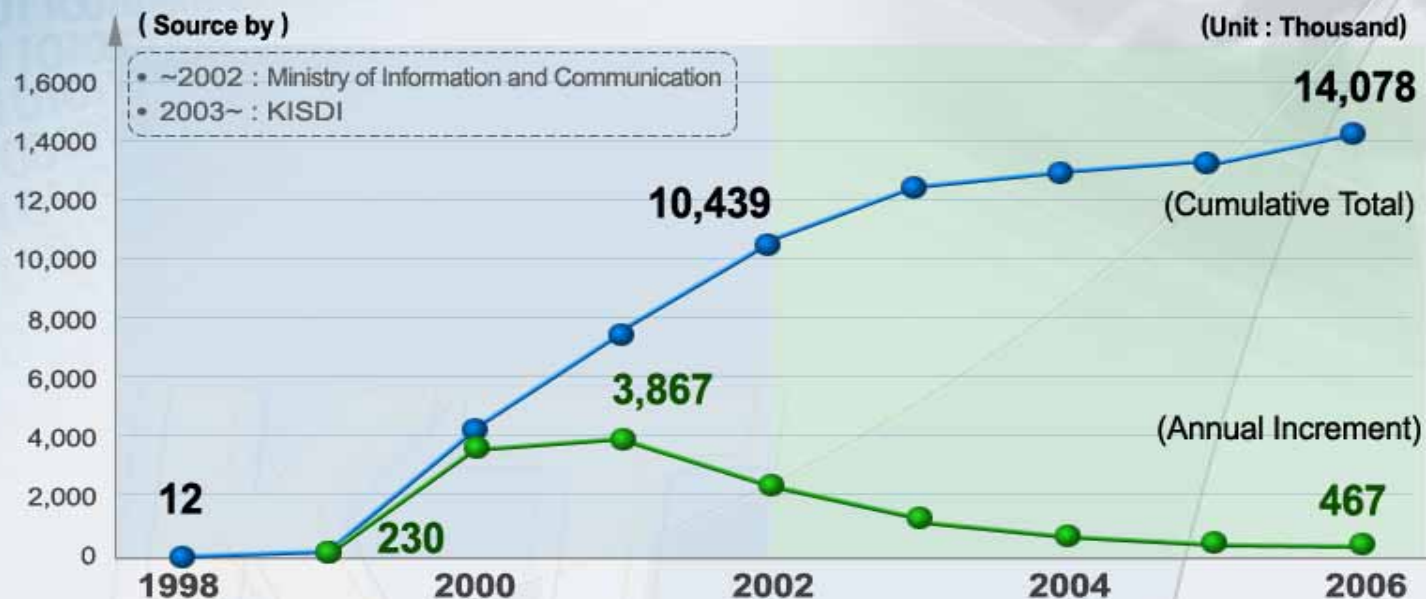
Two Sides of the Broadband Internet Business

Dark Side

&

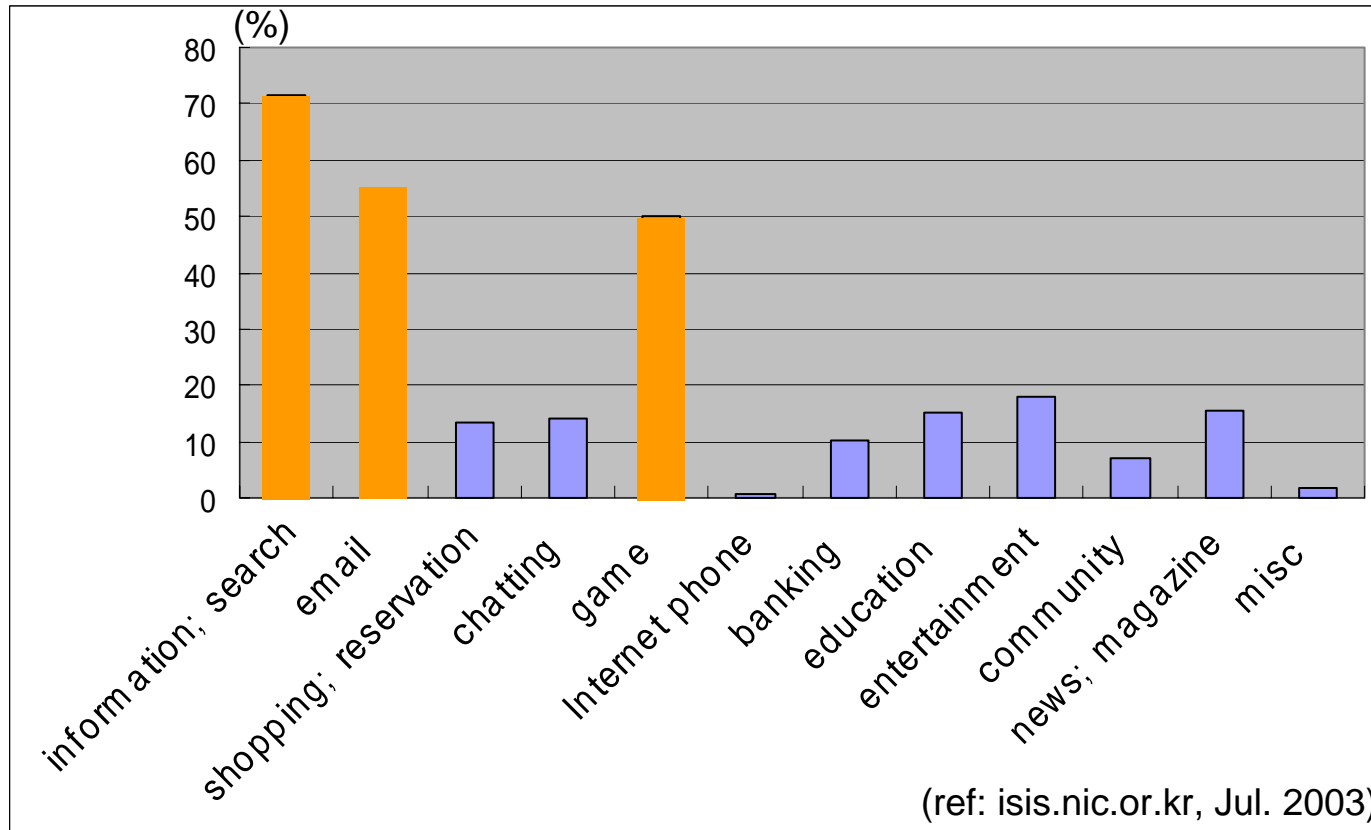
Bright Side

Subscription Growth and Forecasting



The Way Broadband is Being Used Today

● Survey on main Internet usages

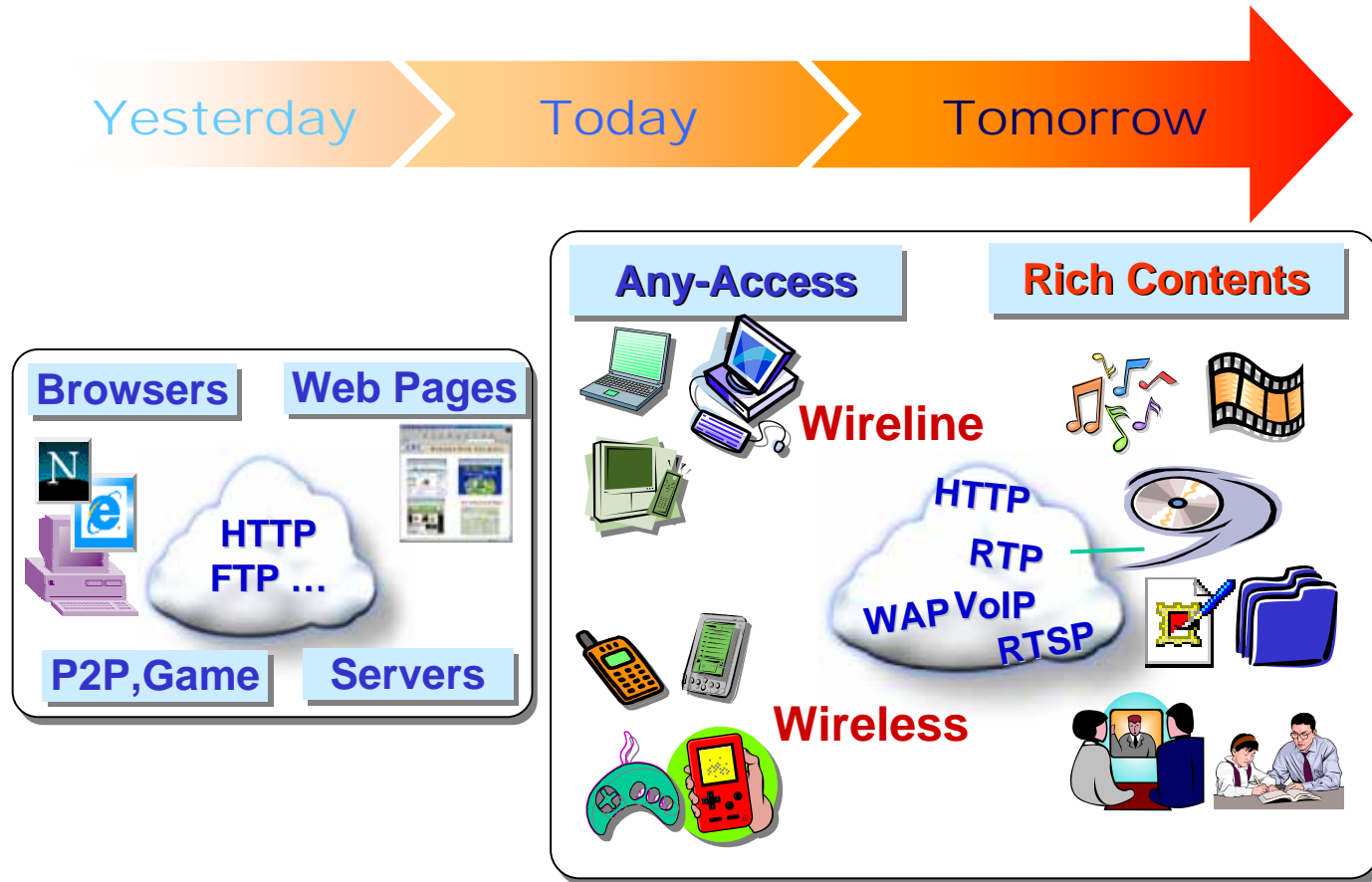


➔ Mainly used for best-effort, data/control/file-oriented, store-&-forward applications

➔ **What about quality-based, interactive/distributive media service?**

The Way Broadband will be Used Tomorrow

- From simple Internet access to quality life/work services



Next Generation Broadband Services

● Service example

| Category | Services | Features |
|---------------|--|---|
| Communication | <ul style="list-style-type: none"> • Multimedia telephony/conference • Unified multimedia messaging | <ul style="list-style-type: none"> ▪ High quality and security ▪ Network support for quality and security ▪ Fixed-wireless integration |
| Contents | <ul style="list-style-type: none"> • Broadcasting/Narrowcasting • On-demand contents (VoD, AoD, EoD, GoD) | <ul style="list-style-type: none"> ▪ Multicast support for broadcast ▪ Content delivery infrastructure supporting quality and security (upto HD grade) ▪ Terminal-dependent content adaptation |
| Computing | <ul style="list-style-type: none"> • Network storage • Virtual PC, workspace | <ul style="list-style-type: none"> ▪ Network bandwidth comparable to local storage access ▪ Computing facility & logic in the network ▪ Efficient virtual interface |
| Control | <ul style="list-style-type: none"> • Remote PC & appliance control • Home/office automation • Home/office monitoring & security | <ul style="list-style-type: none"> ▪ Strict end-to-end security & quality |
| Connectivity | <ul style="list-style-type: none"> • Premium access VPN • Premium IP VPN | <ul style="list-style-type: none"> ▪ Strict end-to-end security & quality |

Beyond Broadband Business

● Different business

- **From access service to end-to-end service**
 - Terminal-to-terminal, Network-to-contents/applications
- **Both best-effort & quality service**
 - Binding applications with network capability
- **From network service to solution/application services**
 - Collaboration among related players
- **Applications: from niche market to mass revenue market**
 - Revenue generating applications
 - Services as key parts of daily life & work

Beyond Broadband Business

● Different network

- **Bandwidth**
 - Internet access → enhanced services (e.g., media service)
- **Controllability**
 - Best effort delivery → network support for QoS & security
- **Intelligence**
 - User, device, location, application-aware
 - Logic in the terminal → in the network (e.g., voice/image recognition)
- **Ubiquity**
 - Wireless/mobile access with seamless mobility
- **Integration**
 - Service/network/terminal integration

Bandwidth

Requirements

Wired

- 3 SD/HD streams (1M~20Mbps down)
 - 1 Internet connection or VPN (1M~10Mbps down)
 - Home control (512K~2Mbps up/down)
 - 2 video telephony sessions (384K~6Mbps up/down)
- Required bandwidth per site
downstream: ~6M to 80Mbps
upstream: ~1.5M to 6.5Mbps



| | |
|-----------|----------------------|
| Near-Term | 6Mbps/1.5M (down/up) |
| Mid-Term | 50M/10M (down/up) |
| Long-Term | 100M/10M (down/up) |

Wireless/Mobile

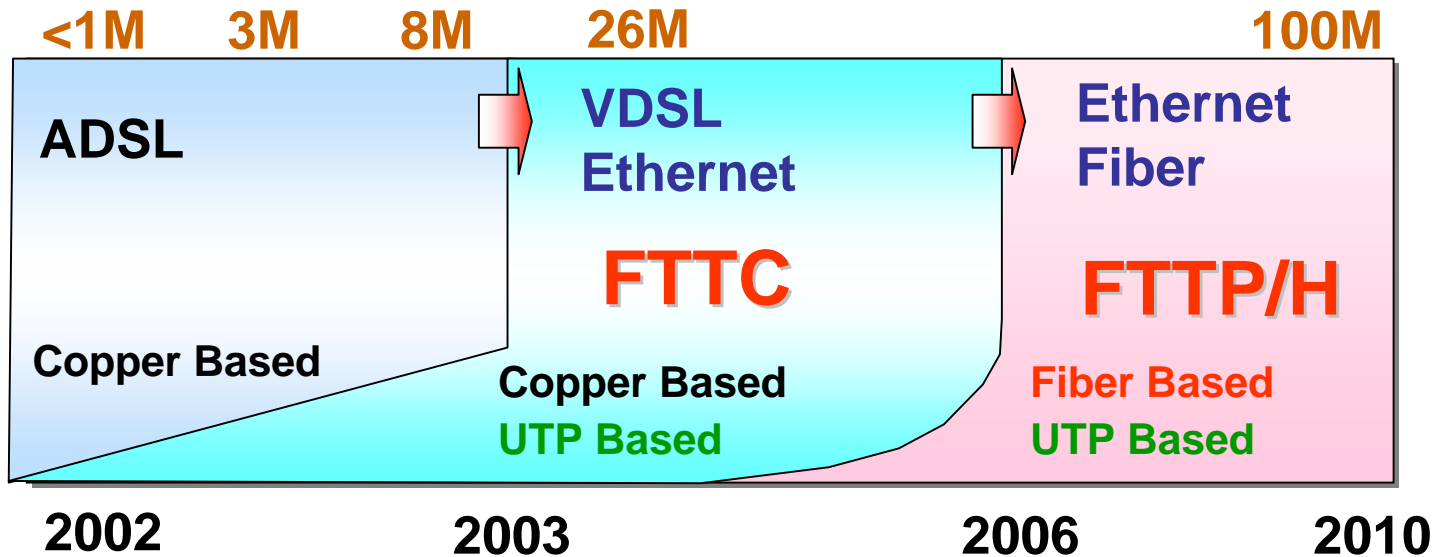
- 1 video telephony session (384k~1Mbps up/down)
 - 1 Internet connection (384k~1Mbps down)
 - 1 media stream (384k~1Mbps down)
- Required bandwidth per terminal
downstream: ~1M to 3Mbps
upstream: ~512k to 1Mbps



| | |
|-----------|---------------------|
| Near-Term | 384k/384k (down/up) |
| Mid-Term | 1M/512k (down/up) |
| Long-Term | 3M/1M (down/up) |

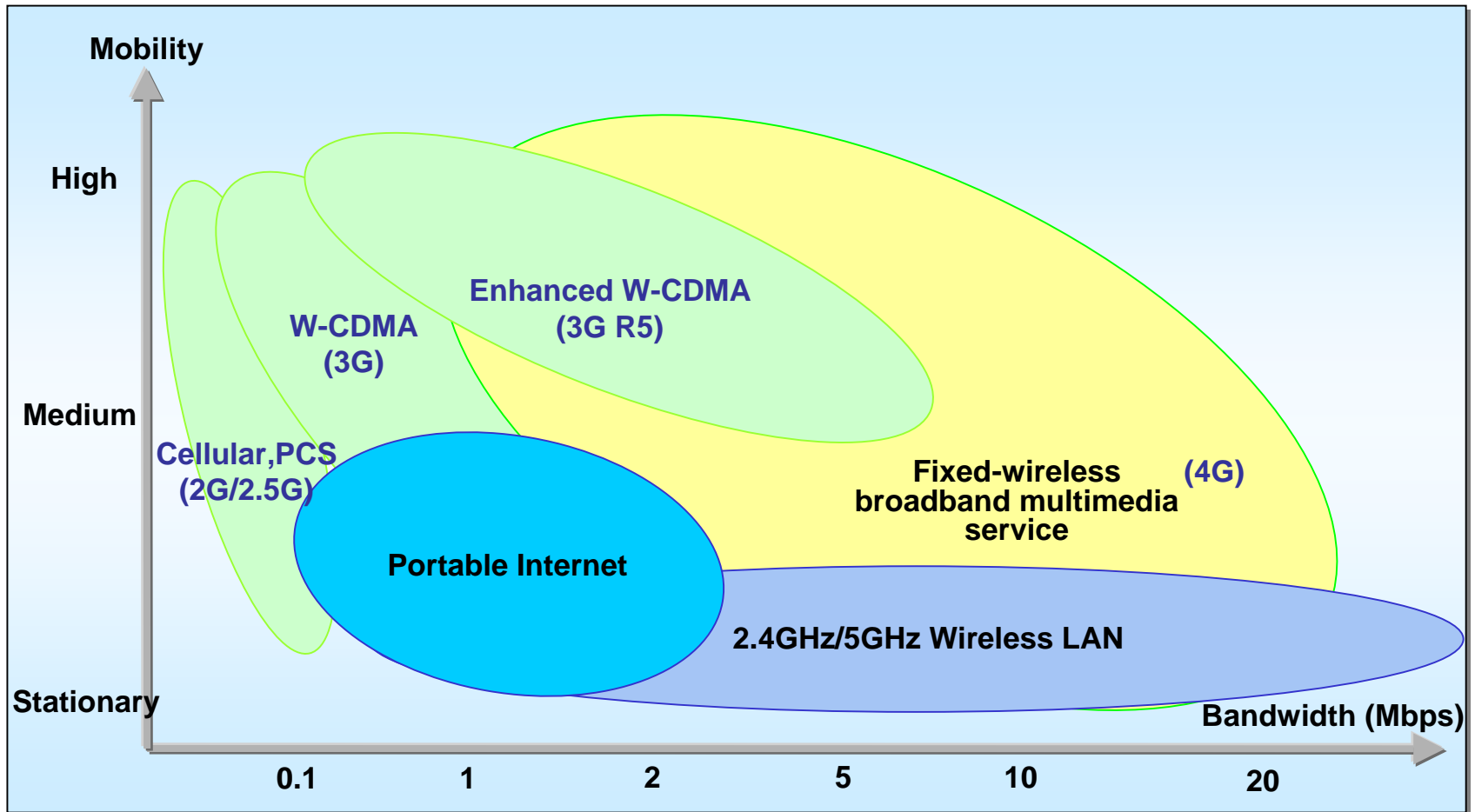
Bandwidth: Access Network Evolution

● Wired access network



Bandwidth: Access Network Evolution

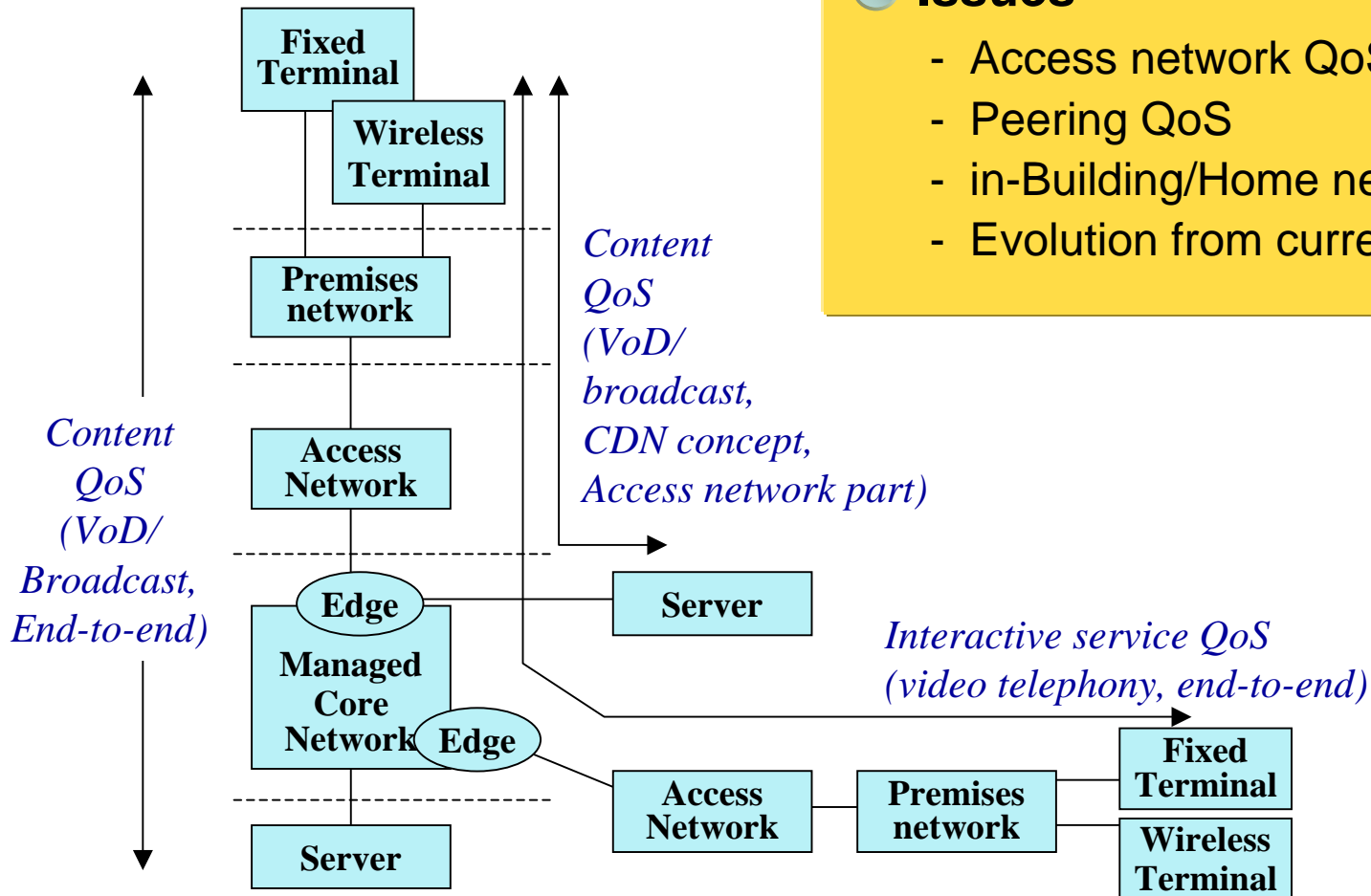
● Wireless access network



Enhanced W-CDMA : HSDPA(High Speed Downlink Packet Access)

Controllability: QoS

● End-to-end QoS



● Issues

- Access network QoS
- Peering QoS
- in-Building/Home network QoS
- Evolution from current network

Controllability: Security

● Security areas

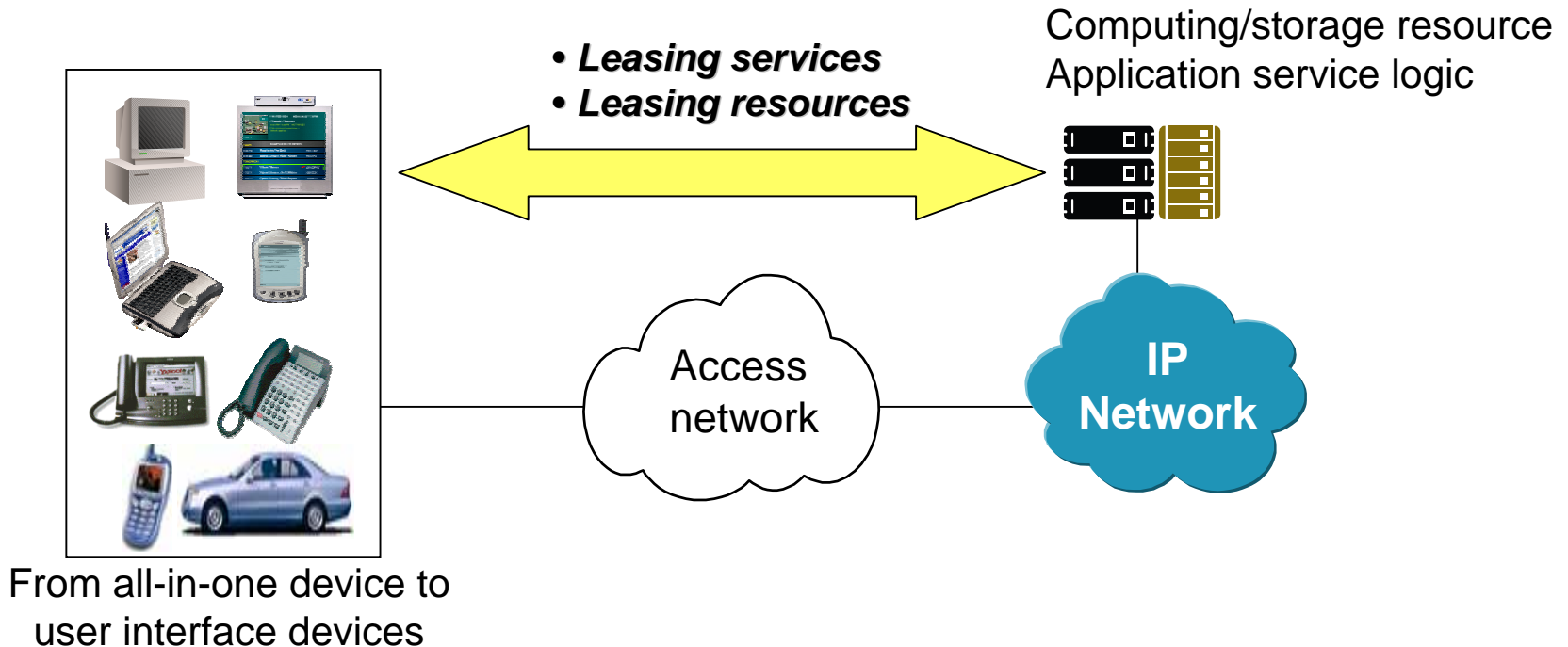
| Group | Target | Security Function | Technology |
|--------------------|------------------------------------|---|---|
| Shared Network | Network security | Network-based VPN | IPSec and/or MPLS + Access L/L |
| | | Access VPN | IPSec- or SSL-access |
| | | Access network security | VLAN, Sniffing-free |
| | Service system security | Network server security (e.g., DNS, AAA server) | Firewall, IDS, Virus scanning DDOS handler, Reverse cache, SSL/IPSec handler |
| | | Service system security (e.g., web server, SIP server, SSW) | |
| Shared Information | Content Security | Content copy/distribution security | DRM, Watermarking, CAS |
| | Session Security | End-to-end info. security (Confidentiality, Integrity) | Encryption (SSL, IPSec) |
| Open system | In-Building/home net., IP terminal | In-Building/Home network security Terminal security | Firewall/IDS/Virus scanning (terminal- and/or network-based) |

Intelligence

- **User, device, location, application-awareness**
 - **User-awareness**
 - Site authentication → personal authentication
 - SSO between network login and application login
 - Customer profile-based network setup
 - **Device-awareness**
 - Device-dependent content transformation/delivery
 - **Location-awareness**
 - Wired network: Authentication-based location information
 - Wireless network: AP, Base-station, GPS-based location information
 - **Application-awareness**
 - Application-dependent policy enforcement (shaping, routing, etc.)

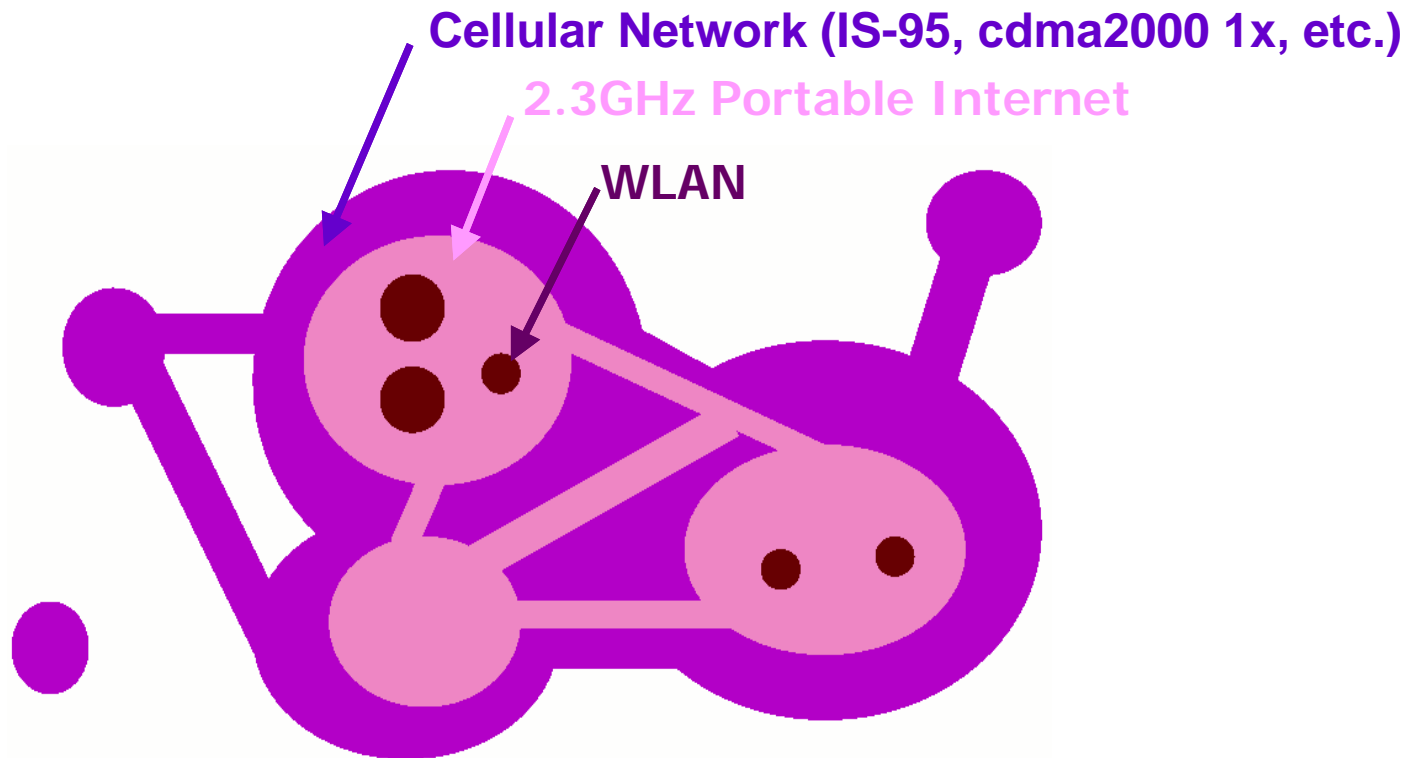
Intelligence

- Logic in network (e.g., voice/image recognition)



Ubiquity

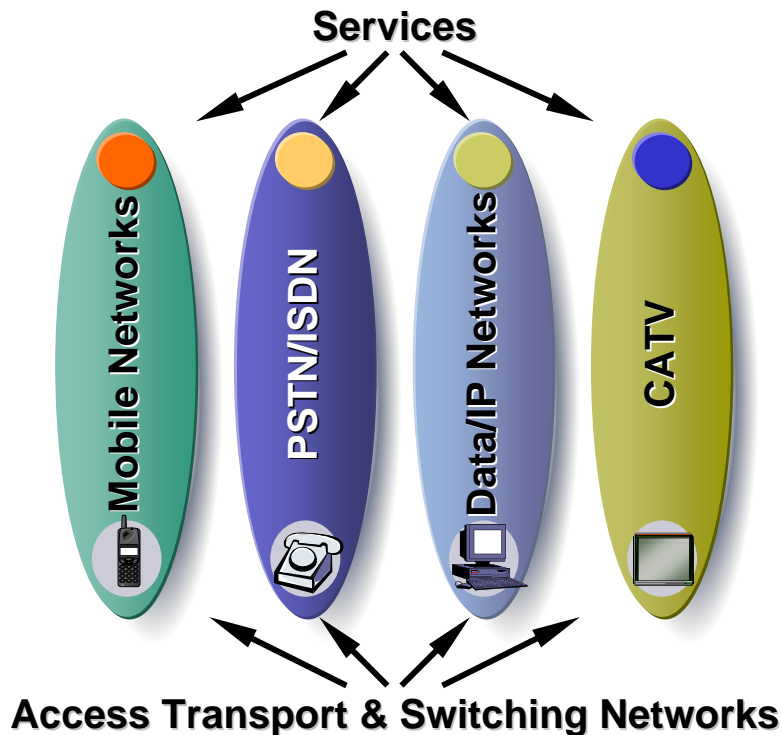
- Ubiquitous network connectivity
 - Integrated connectivity with seamless mobility



NG Architecture Needed

- The following picture has been in place for more than a decade

Too costly, per-service network architecture

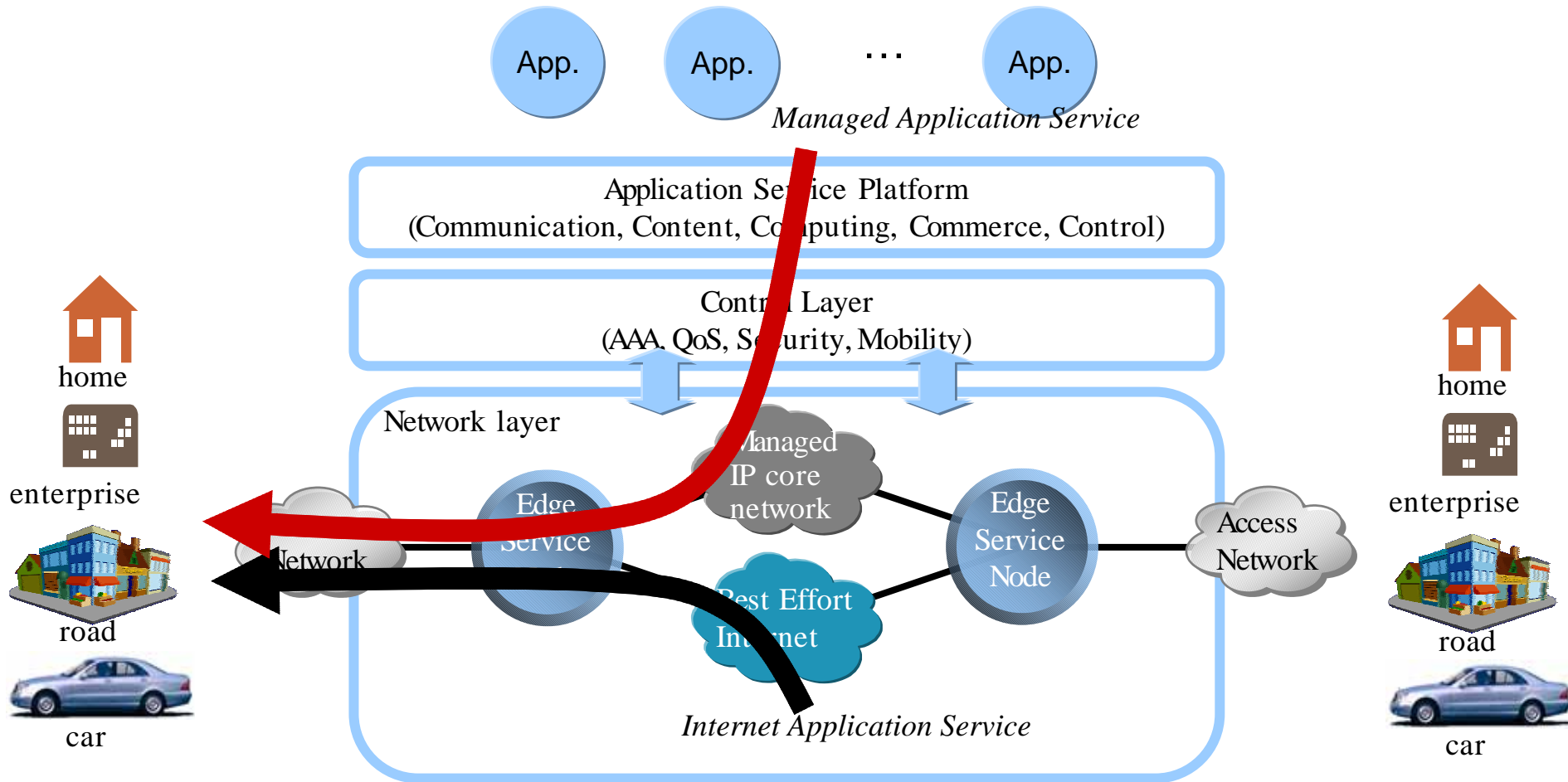


Single/simple/cost-effective network infrastructure for existing and emerging services



The Big Picture

Managed Broadband Architecture



Summary & Remarks

- **Broadband business in Korea calls for new market**
- **Next generation broadband:
different business & different network**
- **Networking capabilities for next generation services**
- **Managed Broadband Architecture as an enabler**

- **Deployment cost**
- **Services that pay off**
- **Regulatory issues**

Thank You



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