End User Applications for the Next Generation Networks

Speaker: Bekay (Byung Keun) Lim
bklim@lge.com

LG Electronics/Network R&D Lab.
Contents

1. What is the NGN ?
2. Enhanced Legacy Call Applications
3. Broadband Applications
4. Ubiquitous Applications
5. Personalized Applications
6. Converged Applications
7. Summary
Telecommunication technologies were evolving from analog to digital, and are evolving from circuit to packet, connection oriented packet to connectionless packet, and from narrow band application to broadband application.

→ broadband converged IP based services network.

**Technology Evolution**

**Application**
- Voice
- Voice+Data
- Voice+Data + Multimedia

**Signaling**
- R2 (PSTN)
- SS7 / IN (ISDN/B-ISDN)
- SIGTRAN/Megaco (VoIP)

**Transport**
- TDM switching
- TDM/ATM switching
- IP / ATM routing

**Transmission**
- SDH
- SONET / SDH / WDM/OXC/GbE

**Access link**
- 2W loop
- 2W loop / dial-up FLC
- 2W loop / xDSL Cable / Ethernet / PON / FLC

**NGN**
- All IP Signaling (MEGACO/SIP/H.323)
- IP / MPLS (Routing, LDP)
- WDM / OXC / NgSDH
- All kind of access types

**1. What is the NGN?**
1. What is the NGN?

NGN provides a converged services based on the open common service platform, common IP core network combines various access networks and user services.

Legacy service networks were dedicated and isolated network with service specific signaling and routing for service connection.

NGN service networks will have common IP core network and provide a nomadically accessible common IP application regardless of a specific access link and user devices.
1. What is the NGN?

**NGN Service Network Configurations**

- Common IP core transport network will be logically separated depend on the QoS and Services.
- Various heterogeneous access network will provide a connection for various types of application traffic over the same homogeneous IP packet network protocol.
- AG will terminate the access specific link interface protocol for terminals.

**Diagram Description**:
- Fixed network connection
- Cellular network connection
- WLAN network connection
- VoP/LS NGN
- Best Effort Internet
- Premium Multi-media network
- VoD Server
- AAA
- SIP server
- MRF
- Content
- OSA
- Other Carriers
- BG
1. What is the NGN?

Common core network will be IP network over the various types of transmission link layers. All user and signaling traffic will be transported and routed by the same IP data packets form.

Services and Control layer
- Provides user contents, connection service depend on each services
- Provides session control, AAA etc.
- Provides network QoS, bandwidth control

Transport and Network Layer
- Services dependent transport/network layer
- Differential services network
- Provides routing and switching services for the user/signal IP datagram

Link/physical Layers
- Services Independent link layer
- Inter-connect network layer nodes
- Provides point to point virtual/physical circuit to network layer nodes

Layered Open IP Network

Service and control
QoS and network control
Network Layer
IP routing/MPLS switching/
Transmission Link layer
ATM/SDH/WDM or
GbE/WDM/OXC or
SDH/WDM/OXC
1. What is the NGN?

- All Network Equipment support the same IP network layer protocol suites independence from the lower link layer protocol types.
- All the upper protocol layers over IP layer interact only with the destination peer entity without any interaction of the intermediate node entity.

→ Easy implementations and installations of user services and applications
2. Enhanced Legacy call Application

PSTN Voice call

- PSTN migration based services – Voice call and supplemental services
  - MG, Softswitch and IP network replace the legacy class 4,5 switches
  - NGN provides flexible services creation and reduces OPEX, CAPEX
  - legacy user equipment can be used without change
2. Enhanced Legacy call Application

- PSTN migration based services – Network configuration and Protocol Stack

- The access network terminating node should have access specific link termination protocol depend on the access link technologies and services.
2. Enhanced Legacy call Application

- Broadband IP access Network devices call services
  - Video call and voice call service between IP phone
  - Voice call between IP phone and legacy PSTN phone
2. Enhanced Legacy call Application

- Legacy WCDMA and CDMA system provides video call only between the homogeneous type phones
- IMS core network supports flexible applications and independence from the access technologies.
- This is accomplished in part via the separation of access, transport and control
MSC server and MGW support the efficient radio spectrum usage for voice comm.
- No packet header overhead compared to end-to-end VoIP

Support an harmonized solution for the PSTN evolution to IP network
- MSC server directly signals with the MGC in the PSTN using MEGACO
- MS talks with the residential subscriber through the BSC/SDU and RGW over the IP network
2. Enhanced Legacy call Application

- Broadband Internet /3GPP/3GPP2 subscriber communicate over the common IP core IMS and VoIP server
3. Broadband Applications

IP-TV based VOD, Video Clip, such as Music Video and Sports Events, news, and Video call & messaging will be the popular broadband application services.

- Home networks for the multiple PCs and SIP phones networking
- Digital TV, DAV Home Theater and Video Game server networking
- Digital Appliance and Home Automation applications networking
- Multiple IP address will be allocated to the always on device such as SIP phone, appliance products and security devices etc.

In Home

IP-TV based VOD, Video Clip, such as Music Video and Sports Events, news, and Video call & messaging will be the popular broadband application services.

- Home networks for the multiple PCs and SIP phones networking
- Digital TV, DAV Home Theater and Video Game server networking
- Digital Appliance and Home Automation applications networking
- Multiple IP address will be allocated to the always on device such as SIP phone, appliance products and security devices etc.
3. Broadband Applications

Mobile Phone and Mobile PC based Video on Demand, and communications on the Common IP packet applications will be available broadband applications, by the support of various broadband wireless access solutions such as PAN, LAN, MAN, and WAN.

IEEE 802.15* Bluetooth
IEEE 802.16* WirelessMAN
IEEE 802.11* WirelessLAN
IEEE 802.20* (proposed)
IEEE 802.21 Vertical Handoff

WAN
3GPP WCDMA, 3GPP2 1x, EV-Do, EV-DV, EDGE, TD-CDMA, SCDMA,

MAN
ETSI HiperMAN* & HIPERACCESS*

LAN
ETSI HiperLAN*

PAN
ETSI HiperPAN*

SIP/IMS Interactive Comm.
3GPP and 3GPP2 provides a common broadband IMS applications independent from the access technologies, using the same transparent IP applications.
Mobile Personal device will have a broadband public connectivity link and also ISM band private connectivity link for high speed data connection
- In private territory zone use ISM band link for WPAN/WLAN communication
- In non-private public territory use public telecom operators radio link
Everywhere, one can reach to a communication access point, at least one of the various wireless and wireline communication networks. The seamless coverage provides and guarantees an ubiquitous applications environment.
4. Ubiquitous Applications

Real Mobile Office: using the portable notebook PC

- Transparent e-biz application access, without application converter such as WAP GW, based on the high speed access and wide screen PC.

- Secured VPN connection via anchored GGSN using Intranet IP address
4. Ubiquitous Applications

Infrastructure for the ITS and RFID

Transport network for the ITS (Intelligent Transportation System) and RFID reader application data traffic
- Cellular/PCS/3G provides seamless coverage and connectivity
- Supplementary location based information can be collected
4. Ubiquitous Applications

Location based service application –

- Driving MAP service
- Searching for something
- Advertising and Promotion
5. Personalized Applications

Application services driven by a personalization of the communication and Computer devices.

⇒ Specialized customer services for specific individual customer needs.

Personalization of the Communication Device –
Phone (shared with family or colleagues) ⇒ Mobile Phone
Legacy Phone ⇒ Intelligent phone with VOIP/SIP/ENUM features

- Caller ID, color ring, bank ON, etc.

Personalization of the Computer and Phone
Desktop PC (shared with family) ⇒ Notebook PC

- Secured E-Biz, personal web page (blog) associated applications
5. Personalized Applications

Application level mobility – device independent application access, user triggered → unlimited accessibility using user ID on the Internet, messenger, web mail, SIP based VoIP call, and etc.
6. Converged Applications

- Various Service features are integrated on the mobile device such as MS, PC
- Combining specific function and feature on the device is creating application

User Device Convergence
- Communications,
- Broadcasting,
- Utility Applications,
- Media players with big storage

Mobile Devices
- MS,
- PDA,
- PC, portable TV,
- PMP,
- Camera, VideoCam
- Cassette Player
6. Converged Applications

Mobile PC will be the popular personal edutainment device in the broadband NGN world in the sense that the PC will be the popular personal mobile device.
7. Summary

- NGN network protocol and address should be the IP
- The IP protocol suite gives an ultimate flexibility for the application development independence from the access technologies

- NGN access technologies will give an broadband high speed data connectivity
- NGN will combine all the access network by common core IP network

These features drive the user applications as follows;
- Enhanced high speed multimedia call service and application
- Broadband Applications
- Ubiquitous Applications
- Personalized Applications
- Converged Applications
Thank You !!