Architecture and Business Model of Open Heterogeneous Mobile Network

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Purpose (1/2)

- How to continuously develop the mobile communication business?
  - Create **new markets** and raise them.
  - Add an **open market model** to the vertical integration model for more competition.
  - Develop a flexible mobile network which is suited for an open market model.
Purpose (2/2)

Open Heterogeneous Mobile Network OHMN

- OHMN business model
- OHMN network architecture
Requirements for OHMN

Mobile Business Revitalization Plan by MIC
- Reconsider the sales model used for mobile terminals.
- Promote the entry of new mobile virtual network operators (MVNOs).
- Prepare a market environment to protect consumers: an authoritative for fee comparison and advice, etc.

Additional proposals
- The charging business should be separated from other service provision businesses to open up all layers to new business models.
- Each user should be able to connect his or her mobile terminal to a multiple access network, regardless of the network provider and radio system, depending on the user’s current circumstances. Cognitive Wireless Cloud
Cognitive Wireless Cloud

- Choosing an operator and a base station for each communication based on a user’s policy
- Terminal initiative connection control
- Spectrum efficiency
MIC Mobile Business Layer Model

Business model 1.0

Content and Applications Layer
Platform Layer
Connection Service Layer
Network Layer
Terminal Layer

Mobile Terminal
Users

Mobile Communication Services
Vertical Integration Model

Contents and Applications

Business model 2.0

Contents and Applications

Mobile Communication Services
Open Market Model

Fixed Communication Services

Various ubiquitous terminals
Various Usage

Broadband All-IP

Ubiquitous network

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## Problems to realize an OHMN (1/2)

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who keeps confidence of newcomers?</td>
<td>Some supervising entity</td>
</tr>
<tr>
<td>Who keeps service quality of businesses?</td>
<td></td>
</tr>
<tr>
<td>Who and how manages the location of each terminal?</td>
<td></td>
</tr>
<tr>
<td>Who provides a node gathering and storing information regarding open</td>
<td></td>
</tr>
<tr>
<td>radio channels, available QoS, etc.?</td>
<td></td>
</tr>
</tbody>
</table>

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Problems to realize an OHMN(2/2)

- Who assigns a terminal ID to establish a session?
- Who registers each user, checks user’s credit-worthiness and charge user?

Platform layer
OHMN Business Layer Model

- Contents and Application Layer
- Platform Layer
- Connection Service Layer
- Network Layer
- Terminal Layer
- Supervising Layer
Layer Model of TISPAN-NGN

Application Servers (AS)
Session Mng. & Control
IP Network

Application Layer

Control Layer

Transport Layer

Access Network Layer

Terminal Layer

HSS
CSCF

Cable
WiFi
3GPP Radio
WiMAX
<table>
<thead>
<tr>
<th></th>
<th>OHMN layer model</th>
<th>TISPAN-NGN layer model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business model</strong></td>
<td>Open horizontal divided model</td>
<td>Vertical integrated model</td>
</tr>
<tr>
<td><strong>Authentication &amp; Session management</strong></td>
<td>Both of them are divided</td>
<td>Both of them are integrated</td>
</tr>
<tr>
<td><strong>Charging</strong></td>
<td>Integrated with the authentication entity on the platform layer</td>
<td>Out of TISPAN-NGN</td>
</tr>
<tr>
<td><strong>Information disclosing</strong></td>
<td>Disclosing</td>
<td>Depending on each operator’ manner</td>
</tr>
</tbody>
</table>
Network Structure of OHMN

Contents & App. Layer
- AP
- Ro/Rf

Platform Layer
- SIS
- CMF
- Ro/Rf

Connection Service Layer
- HLS
- S-CSCF
- I-CSCF
- P-CSCF
- P-CSCF
- P-CSCF

3rd party Organization Server (CNM)

HSS

IP Transport NW
- 3GPP Radio
- Wi-Fi
- WiMAX

Network Layer

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Control sequence how to choose a BS

Choose a communication service provider

Present NG on the terminal

Enter PW

Broadcasting Signal (BS-ID, PCSCF-URI)

SIP Register (Ki, PCSCF-URI, CMF-URI)

K_i: Individual Subscriber authentication Key
## Relationship between service providers

<table>
<thead>
<tr>
<th>Platform Layer</th>
<th>Major Communication Company</th>
<th>Small Network Carrier &amp; MVNO &amp; AS</th>
<th>Small Network Carrier &amp; AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS-1</td>
<td>Major Comm. Carrier</td>
<td>CMF</td>
<td>AS-1</td>
</tr>
<tr>
<td>Contents &amp; Application Layer</td>
<td>AS-1</td>
<td>AS-1</td>
<td>AS-1</td>
</tr>
<tr>
<td>Communication Service Layer</td>
<td>Major Comm. Carrier</td>
<td>MVNO</td>
<td>MVNO</td>
</tr>
<tr>
<td>Network Layer</td>
<td>3GPP</td>
<td>Wimax</td>
<td>W-LAN</td>
</tr>
<tr>
<td>Terminal Layer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

- **OHMN**
  - will open up the mobile market.
  - makes it easier for newcomers to develop innovative terminals and services.
  - will also encourage the creation of many new business models and services.
  - It would be easy to realize based on TISPAN-NGN.

- Users should be able to enjoy these benefits at reasonable rates.
- OHMN should generate a positive spiral of activity in the mobile market.