3G and Roaming

Moses Zheng
Director of CDMA Marketing, ZTE
Why Do We Need Roaming

What is roaming
- National & International
- Inbound & Outbound

Roaming for the Customer
- Stay connected

Roaming for the Operator
- Revenue generation
- Customer loyalty
- Seamless coverage
Why Do We Need Roaming

*International Roaming for African and Middle East Operators*

- 44 Operators, 2 Countries
- 45 Operators, 23 Countries
- 38 Operators, 24 Countries
- 56 Operators, 10 Countries
- 67 Operators, 32 Countries

**North America**: 123,380,000
**Europe & Russia**: 8,498,000
**Caribbean & Latin America**: 71,600,000
**Asia Pacific**: 170,025,000

*Subscribers as of 4th Quarter 2006*

CDMA Surpasses 373 Million Global Subscribers
193 Operators Commercially Deployed on 6 Continents
41 Operators Scheduled to Deploy in the Next Year

(Resource: www.CDG.org)
Why Do We Need Roaming

*International Roaming for African and Middle East Operators*

Resource: GSM Association
CDMA World-wide Roaming

259 Operators Commercially Deployed on 6 Continents
38 Operators Scheduled to Deploy in the Next Year
## Roaming case- Bell Mobility

### C-C Roaming

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Operator</th>
<th>Country/Region</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>APBW Communications Inc</td>
<td>Bermuda</td>
<td>Bermuda Digital Communications</td>
</tr>
<tr>
<td>China</td>
<td>China Unicom</td>
<td>Puerto Rico</td>
<td>Centennial de Puerto Rico</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Hutchison Telecom (HK) Ltd.</td>
<td>Puerto Rico</td>
<td>Sprint Puerto Rico</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Telecom New Zealand</td>
<td>Virgin Islands</td>
<td>Sprint US Virgin Islands</td>
</tr>
<tr>
<td>Israel</td>
<td>Pelephone Communications Ltd</td>
<td>Mexico</td>
<td>Telefonica Moviles Mexico</td>
</tr>
<tr>
<td>Guam</td>
<td>Guamcell</td>
<td>Dominicana</td>
<td>Verizon Dominicana</td>
</tr>
<tr>
<td>Jamaica</td>
<td>Movilnet Oceanic Digital Jamaica</td>
<td>Puerto Rico</td>
<td>Verizon Wireless Puerto Rico</td>
</tr>
<tr>
<td>Dominicana</td>
<td>Centennial Dominicana</td>
<td>Brazil</td>
<td>VIVO</td>
</tr>
</tbody>
</table>
Desirable Roaming Scenario for Africa

CDMA Operator 1

CDMA Operator 2

CDMA Operator 3

CDMA Operator n

C-C Roaming

C-G Roaming

Global Roaming

cdmaOne

CDMA2000 1X

CDMA2000 1xEV-DO
# Roaming Solutions

<table>
<thead>
<tr>
<th>C&amp;C</th>
<th>Direct Connection</th>
<th>Connection via Signaling Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need complicated compatibility test between every two carriers’ network</td>
<td>Syniverse, VeriSign, and Aicent provide the signaling gateway between carrier’s CDMA network, screening the details of different networks.</td>
<td></td>
</tr>
<tr>
<td><em>Eg: Some carriers in USA, such as CVW</em></td>
<td><strong>Eg: China Unicom, KDDI, SK</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C&amp;G</th>
<th>Direct Connection</th>
<th>Connection via Signaling Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA</td>
<td>In House IIF Solution: Install IIF and use GSM sponsor to provide roaming coverage[1]</td>
<td>Hosted Solution: Third party provides IIF function; second third party provides GSM sponsor capability</td>
</tr>
<tr>
<td></td>
<td><em>Eg: China Unicom, Israel Pelephone, Vivo</em></td>
<td><em>Eg: WorldCell, Verizon Wireless, Telecom New Zealand</em></td>
</tr>
</tbody>
</table>
Roaming Solutions

C-C Roaming

CDMA Operator

CIBER Records

Clearing House

CIBER Records

CDMA Operator

Directly Connection

Signaling Gateway
(Roaming Service Provider)
Roaming Solutions

Inter-standard C-G Roaming

- CDMA Operator
- GSM Sponsor
- Inter-standard and Inter-working Function (IIF)
- In house solution
- Hosted solution
- Clearing House
- TAP Records
- TAP or SP Records
- GSM World
- CDMA Mobile Phone
- GSM or Dual Mode Mobile Phone
- SIM or R-UIM

Roaming + CDMA/TDMA to GSM Roaming
Roaming case- China Unicom

GSM World

CDMA World

Clearing House

GSM World

CDMA World

GGG

GSM1X (IIF)

ZTE

RSP

China Unicom CDMA

China Unicom GSM

RSP

CDMA Mobile Phone

GSM or Dual Mode Mobile Phone

SIM or R-UIM

CDMA/TDMA to GSM Roaming
# Roaming case - China Unicom

## C-C Roaming

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<tr>
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</tr>
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<tbody>
<tr>
<td><strong>Asia-Pacific Region</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Australia</td>
<td>Telstra</td>
<td>India</td>
<td>Reliance</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Telecom Mobile</td>
<td>South Korea</td>
<td>SK Telecom</td>
</tr>
<tr>
<td>Guam</td>
<td>Guamcell</td>
<td>Thailand</td>
<td>CAT</td>
</tr>
<tr>
<td>Macao</td>
<td>China Unicom</td>
<td>Israel</td>
<td>Pelephone</td>
</tr>
<tr>
<td>Taiwan</td>
<td>APBW</td>
<td>Indonesia</td>
<td>Mobile-8</td>
</tr>
<tr>
<td>Hongkong</td>
<td>Hutchison (HK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Caribbean - Latin America</strong></td>
<td></td>
<td><strong>North - America</strong></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>VIVO</td>
<td>Canada</td>
<td>Bell Mobility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Telus Mobility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>America</td>
<td>Verizon</td>
</tr>
</tbody>
</table>
## Roaming case - China Unicom

### C-G Roaming

<table>
<thead>
<tr>
<th>Cities</th>
<th>FLR Sub.</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>192k</td>
<td>Voice, SMS, Data</td>
</tr>
<tr>
<td>Shanghai</td>
<td>110k</td>
<td>Voice, SMS, Data</td>
</tr>
<tr>
<td>Guangzhou</td>
<td>100k</td>
<td>Voice, SMS, Data</td>
</tr>
</tbody>
</table>

CDMA roaming to around 20 countries, GSM roaming to 175 countries.
Roaming Services Package

**CDMA <-> CDMA international**
- Voice call origination and termination
- SMS MO or MT or both
- Voice mail notification & retrieval
- Caller ID
- Packet data
- MMS & WAP

**CDMA <-> GSM**
- Voice call origination and termination
- SMS MO or MT or both
- Voice mail notification & retrieval
- Caller ID
- Packet data (internet access)
- MMS & WAP

**GSM/CDMA single-mode handset rental**
- Voice call origination and termination
- SMS MO or MT or both
- Voice mail notification & retrieval
- Caller ID
- Packet data (internet access)
- MMS & WAP

**Dual mode handset/ dual mode SIM card**
- Voice call origination and termination
- SMS MO or MT or both
- Voice mail notification & retrieval
- Caller ID
- Packet data (internet access)
- MMS & WAP
### Worldwide Roaming Status

#### Different Roaming Packages

<table>
<thead>
<tr>
<th>Service</th>
<th>C&amp;C</th>
<th>C&amp;G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call origination</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Call termination</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Call Origination restriction</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Call Termination restriction</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Circuit Switched Data</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Supplementary services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call forwarding: CFU,CFB,CFNA,CFD</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Call Transfer</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Call waiting</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Calling Number Identification Presentation (CNIP)</td>
<td>✓[1]</td>
<td>✓</td>
</tr>
<tr>
<td>Calling Number Identification Restriction (CNIR)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3 way calling</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Voice Mail</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voice message retrieval</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Voice message notifications</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Prepaid</td>
<td>×[2]</td>
<td>×</td>
</tr>
</tbody>
</table>

[1] Need to comply to the CDG document 139, International Roaming Caller ID
[2] Under discussion in CDG
### Worldwide Roaming Status

#### Different Roaming Packages (continued)

<table>
<thead>
<tr>
<th>Service</th>
<th>C&amp;C</th>
<th>C&amp;G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>MT</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>DATA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMS</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Packed data: Upload and Download [3]</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

[3] Aicent is the professional vendor in data roaming
Roaming Solutions & Implementation

Step 1: Launching the Business

Step 2: Launching a New Partner/Region

Step 3: Sustaining Launched Partners/Regions
## Elements of International Roaming

<table>
<thead>
<tr>
<th>CDMA Operator</th>
<th>Roaming Interoperability Issues</th>
<th>CDMA Roaming Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscriber needs &amp; coverage area</td>
<td>Roaming Agreements</td>
<td>Subscriber needs &amp; coverage area</td>
</tr>
<tr>
<td></td>
<td>Air Interface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Signaling Requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numbering Requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Need of Flexible &amp; Reliable Network</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Clearing &amp; Settlement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online Tools</td>
<td></td>
</tr>
</tbody>
</table>
ZTE in Roaming Solution

> CDMA to CDMA roaming
  - Advisory service: facilitate the whole implementation process
  - Bring expertise from partner(s)…
  - Network optimization and testing support

> CDMA – GSM roaming
  - Advisory service & technical support
  - Supply Converting Platform and technical support
    - China Unicom world phone
    - Vivo world phone
  - Total solution
    - Partnership with RSP
Thank you