MMS Interworking for CDMA Operators

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Multimedia Messaging Service (MMS): Market Overview
Mobile Messaging: A Great Market Success

- **SMS: a driving force of global mobile data market**
  - 366B messages sent globally in 2002, generating $25B revenue
    (Source: Analysis, Cellular Online)
  - US SMS market doubled in 2002; annual growth 28% (CAGR) through 2007
    - Mobile-originated SMS from 2.5 billion in 2002 to 31 billion in 2007
    (Source: IDC)

- **MMS: follow SMS success**
  - MMS has the potential to reach 380 million users, generating $22B revenue by 2008
    (Source: Strategy Analytics)
  - Over 160 operators have already launched MMS services globally

*Source: ARC*
Korea and Japan CDMA Operators Lead Global MMS Market

Korea MMS services first launched as early as Q3’01
- Six months ahead of GSM
- Evolved from early still image to today’s streaming video
- Over 10% SKT users currently using MMS handsets
  - Ranging from JPEG to MPEG4

Most of KDDI’s handsets now support phone and video messaging
- 14 of 15 au handsets support video today
- MMS enabled new services to effectively differentiate brand
  - Ring Song, GPS, Movie Mail, DRM

Example: Korean Operator MMS Traffic Growth

(Source: Aicent)
US CDMA Operators First To Offer Multimedia Messaging Service in North America

◆ Sprint: Picture Mail service
  ▪ Launched in Q3’02
  ▪ Photo mailed from handset
  ▪ In Q2’03, Vision customers uploaded over 10.5 million photos
    (Source: Sprint)

◆ Verizon: get Flix & get Pix
  ▪ Picture Messaging and Video
  ▪ 3.3 million pictures sent and received during Q3’03
    (Source: Verizon)
China Unicom: Impressive ISP MMS Contents

- “彩e” MMS service was launched in late 2002 as a key CDMA2000 service
  - Focus on web download and user MMS exchange
MMS Interworking:
Status and Standards
Define “Operator MMS Inter-operability”: 

”The capability of delivering an MMS message from one mobile network to another, and vice versa.”

As proven in SMS, operator interoperability is a key catalyst to mobile messaging volume take-off

Source: MDA (UK SMS Volume Growth)
MMS Inter-operability (MMS-I0): Connect your MMS server with other operator’s MMS server

Enable your customers to exchange messages with their friends and colleagues that are served by other operators
MMS Interworking
MMS message sent by Home User A1 to Home User B across their home networks

Message flow: User A1 → MMSC(A) -> Inter-operator Network → MMSC(B) → User B

MMS Service Roaming
MMS message sent by Roaming User A2 from VPLMN B to Home User A1

Message flow: User A2 → Inter-Operator Network → MMSC(A) → User A1
**Market Needs**

- Users need to send MMS to external networks
  - Often represent significant percentage of traffic
  - A major catalyst to volume take-off

- Global MMS coverage
  - Global enterprises, business users, and travelers
  - Operator market advantage
  - With premium revenues

**Operator Challenges**

- Connect with 100-200 operators

- Global number addressing resolution
  - Especially for MNP countries

- Interface inter-operability
  - Protocol differences
  - Cross technologies
    - CDMA, GPRS, W-CDMA

- Service quality guarantee and support

- Charging and settlement
CDMA MMS-1O Status

- CDMA operator multimedia messaging services are often based on email protocol
  - Upgrading to standard based MMS

- Inter-operability: Early stage progress
  - Korea domestic IO partially complete in mid-2003
    - Collective efforts from 3 operators
  - US MMS inter-operability in testing stage
    - Require CDMA-GPRS interoperability
  - Others actively seeking and testing solutions
  - International MMS-1O: Few cases so far, ready for rollout

- CDG leads the MMS-1O effort as a high priority
  - MMS Team formalized in mid-2003 to focus on MMS-1O
    - Follow 3GPP2 standard to use MM4 as MMS-1O protocol
      - Ensure global MMS compatibility
CDMA MMS Standards: 3GPP2

Based on 3GPP TS 23.140 architecture

- Base protocols published (X.S0016-200, same MM4)
- Optional protocols ongoing (M-IMAP MM1 recently approved)

Source: 3GPP TS 23.140
Industry standard bodies start to collaborate for global compatibility

- 3GPP and 3GPP2 submit requirements to OMA on behalf of GSM and CDMA communities
- OMA develops single Stage-1 requirements
  - Content of the message
  - Elements and attributes of the presentation language
  - Media content format
MMS-IO Implementation:
Lessons Learned
Lessons Learned: GPRS MMS-Io

- GPRS operators follow GSMA MMS-Io Guidelines
  - PRD 52 defines high level implementation principles

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>▪ Leveraging existing GRX for MMS-Io IP transport</th>
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<tbody>
<tr>
<td>Security</td>
<td>▪ Inherited GRX end-to-end security</td>
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<tr>
<td>Scalability</td>
<td>▪ Reaching all GPRS operators via GRX infrastructure</td>
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<td></td>
<td>BG, DNS, GRX peering, etc.</td>
</tr>
<tr>
<td>MM4 Addressing</td>
<td>▪ mms.mncxxx.mccxxx.gprs</td>
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<tr>
<td>Addressing</td>
<td>Static table: +E.164 → MMSC domain</td>
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<tr>
<td>Resolution</td>
<td>IMSI: +E.164 → IMSI → MMSC domain</td>
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<tr>
<td></td>
<td>Private ENUM:</td>
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<tr>
<td></td>
<td>TLD=e164.gprs within GPRS/ GRX</td>
</tr>
<tr>
<td></td>
<td>1.2...e164.gprs → NAPTR→MMSC Domain</td>
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- GSMA mandate: minimum 5 MMS-Io partners by Oct’03
- Despite a good start, many issues remain...
Compatibility Issues

 Compatibility is still a challenge for operator MMS-Io rollout due to different operator approaches

<table>
<thead>
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<th>IP Transit:</th>
<th>Internet and GRX</th>
</tr>
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<tbody>
<tr>
<td>MMS Domain Definition:</td>
<td>.com and .gprs</td>
</tr>
<tr>
<td>Number Addressing:</td>
<td>fragmented pre-fix, IMSI, ENUM...</td>
</tr>
</tbody>
</table>

Evolving MM4 standard creates legacy problems due to inconsistent vendor implementations

| MM4 Versions in Commercial Use: | v4.3, v4.4, v4.6, v5.2, v5.5, v5.8... |
| MM4 Header:                   | field definition and value variations |
| SMTP Protocol:                | SMTP and ESMTP           |
| Confirmation Messages:        | Ack, Del-Rpt, R-R, Fwd_Req, etc. |
Implementation Models

- **Model 1 - Bilateral**: Connecting to peer operators one-by-one
- **Model 2 - Broker Hub**: Connecting to broker MMS Gateway

Two models are complementary and will co-exist.
# Why Use 3rd Party Broker Hub?

<table>
<thead>
<tr>
<th>Operator Interface</th>
<th>Standard MM4</th>
<th>Proprietary extended MM4</th>
<th>Email (SMTP) interface only, no MM4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits of using MMS-IO Hub</td>
<td>General Benefits</td>
<td>All General Benefits, PLUS:</td>
<td>All General Benefits, PLUS:</td>
</tr>
</tbody>
</table>
| | ◆ One-time network connection setup  
- Including firewall configuration and protocol testing | ◆ Hub ensures operator interoperability with other systems, while preserves specially developed MM4 extension | ◆ Hub MMS Gateway behaves as a virtual email server to the operator; while as a virtual MM4 operator to other operators |
| | ◆ Fast and cost efficient coverage roll out  
- Reaching operator partners even without roaming relationship | | ◆ No need to upgrade system immediately, while still be able to roll out global MMS service |
| | ◆ No need to worry about partner’s protocol incompatibility | | |
| | ◆ No need to maintain global number addressing tables | | |
| | ◆ Leverage Hub MNP capabilities | | |
| | ◆ Commercial SLA, reliable technical support | | |
CDMA MMS-IO Requirements

- Global MM4 compatibility
  - Capable of handling incompatible implementation variations
  - Interconnect with CDMA, GPRS, and W-CDMA operators

- Cost effective coverage rollout
  - Time-to-market, scalability, efficiency

- Security
  - Dedicated interconnection network
  - Preventing public access

- Number addressing resolution
  - Route IP message based on phone number globally
CDMA MMS-I O Implementation

CDMA Operator

CDMA Operator Partner

CDMA Inter-Operator Network

GPRS Operator Partner

W-CDMA Operator Partner

MMS Hub

GRX

BG

MMSC

MMSC

MMSC

MMSC
Summary

- Operator must implement MMS interworking to stimulate market take-off and strengthen market position.

- MMS interworking is enabled by interconnection between MMSCs; while MMS roaming is enabled by the data roaming infrastructure.

- MM4 is the common standard for global MMS-IO. However, operator must be prepared to handle implementation variations from vendors and MMS-IO partners.

- Both bilateral connection and MMS Hub are being used for MMS-IO, due to unique benefits offered by each model.

- CDMA operators can leverage existing dedicated inter-operator IP networks and hub solutions to accelerate MMS-IO rollout.
Thank You!

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