Agenda

- Introduction
  - Voice vs. Non-Voice Services
  - Revenue Leakage
- Charging Concepts
  - Subscription Models
  - Charging Terminology
  - Post Paid vs. Prepaid Charging
- Current Schemes & Future Challenge
  - Flat Rate Charging
  - External Rating Engine
  - Ad-hoc Charging Protocol
- Conclusion
What is Mobile Content?

Mobile Content: something that can be delivered via the mobile Internet and that has a measurable value to the end recipient.
Mobile Content?
Voice vs. Non-Voice Services

Western European mobile service revenue from voice services, content and entertainment, and other non-voice services

Source: Analysys Consulting
Revenue Leakage
Initial pre-paid systems were crude, allowing a customer with a zero balance to still make a call (or send SMS) and only debiting the balance once the call had finished (or SMS had received).

Loss 6 - 20% of pre-paid messaging revenue due to accounts with no balance sending texts.
Inbox Stuffing

Content Provider received payment for 20,000 from 100,000 video downloads.
Charging Concepts
Subscription Models

- **Fixed subscription**: “all you can eat”

- **Limited subscription**: Fixed amount of content consumption

- **Event / Transaction-based charging**: Charge depends on the type or size of the content

- **Session-based charging**: Charge depends on the session duration
Subscription Models (cont)

- **Sponsorship:**
  company pays 45% of WAP usage

- **Loyalty Schemes:**
  loyalty point, air mile award

<table>
<thead>
<tr>
<th>Recommended method</th>
<th>Time</th>
<th>Event</th>
<th>Subscription&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>Traffic Volume</th>
<th>Free of charge</th>
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<tbody>
<tr>
<td>Operator Controlled Services</td>
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<td>Person-to-person, real-time (voice, video)</td>
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<tr>
<td>Content-to-person &amp; person-to-person streaming&lt;sup&gt;3)&lt;/sup&gt;</td>
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<td>Business connectivity, corporate intranet access</td>
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<td>Non-operator controlled services</td>
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<tr>
<td>Internet access (used for mobile browsing, e-mail, streaming, intranet access, and so on)</td>
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</table>

<sup>1</sup> Subscription may also be free

<sup>2</sup> It is assumed that operator portal browsing is a discovery method for chargeable downloadable content such as ring tones, logos and games. Hence, to maximize usage the browsing itself is not charged for.

<sup>3</sup> Depending on the type of streaming, time based for a continuous stream or event based for a clip

Source: Nokia
Charging Terminology

- **Mediation**
  transfer between incompatible entities

- **Correlation**
  consolidation of charging data

- **Charging Rules**
  charging behaviour for user or service

- **Rating**
  a way to derive the charge for a service
Charging Terminology (cont)

- **Call Data Records**
  Usage data records (voice and non-voices services)

- **Warm Billing**
  happens periodically in time

- **Hot Billing**
  happens only once, after usage
Source of Charging Records

- SGSN, GGSN
- SMSC, MMSC
- WAP Gateway
- Origin Server
- Delivery Server
CDRs

- **Vodafone Italy**
  - 24M Subscribers
  - 450M CDRs/day average, 620M CDRs/day peak

- **T-Mobile Germany, iBMD**
  - 5 country operators consolidated into one mediation system
  - Germany, UK, Czech, Netherlands, Austria
  - 56M Subscribers
  - 500M CDRs/day

- **T-Mobile USA**
  - 19M subscribers
  - 150M CDRs/day

- **02 Group**
  - UK, Ireland, Germany
  - 20M Subscribers
  - 250M CDRs/day

- **AIS Thailand**
  - 14M Subscribers
  - 140M CDRs/day

Source: Comptel Corp.
Post Paid vs. Pre Paid

- **Post Paid**: customer is sent an invoice at regular intervals
- **Pre Paid**: customer pays in advance and the balance is deducted for using the service
- **Online Charging**: real-time charging
- **Offline Charging**: non real-time charging
Post Paid Charging

- User mobile
- Content Delivery Server
- Charging Mediation
- Rating & Billing

- Content delivery
- Usage Data (CDR)
- Mediated CDR
Pre Paid Charging

A Sample Billing and Delivery Transaction

Source: Mobile 365, Inc.
Flow-Based Charging

- Classify traffic according to different services or content types
- Virtual access points

<table>
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<th>Layers 5-7</th>
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<td>URL</td>
<td><a href="http://www.contentshop.com/downloads">www.contentshop.com/downloads</a></td>
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<td>Destination port</td>
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Current Schemes &
Future Challenge
Flat Rate Charging

- Unlimited access for a fixed monthly charge
- Flat-rate billing for data communication has encouraged the growth in the mobile content market
- In June 2004, NTT DoCoMo and KDDI have introduced flat-rate billing plan for packet communication
- 1m NTT subscribers and 0.45m KDDI subscribers have switched to flat-rate billing
Service differentiation is a key driver for operators and service providers.

Flexible and open rating/charging mechanisms are needed to take new business models.

Rate for any number of events and in any combination (SMS, MMS, GPRS, etc.)
Case Study (AIS Thailand)

Evolution of Content Charging

- **SMSC**
  10005xx => ringtone => $4
  10006xx => logo => $2

- **SMS Application Gateway**
  1000
  
  ![Image of SMS Application Gateway]

  - ringtone no.1 => $4
  - logo no.2 => $2

- **External Rating Engine**
  Keep usage counter / user
  - First 3 ringtone downloads => $4 / ringtone
  - From 4th ringtone download => $2.5
  - Download 2 ringtones => send 1 MMS free!!
Flat Rate vs. External Rating

**Flat Rate**

*Pros*
- simple billing system

*Cons*
- hard to cater for all subscribers

**External Rating**

*Pros*
- provide unconstrained pricing flexibility

*Cons*
- complex and computation overhead
- not transparent to user
Ad-hoc Charging Protocol

**AC4 Server** – handles all authorization, authentication, and charging issues

**PKI Server** – provides key management to encrypt traffic traverse through ad-hoc nodes
Conclusion

- Popularity of mobile content and services is growing
- Different systems are used to ease the charging process, such as Rating Engines
- Flat rates might become a universal, but not definite solution
- Future challenges – charging in ad-hoc environments
References

- Nokia, Service Charging in Mobile Internet
- Sudhir Dixit, Tao Wu, Content Networking in the Mobile Internet
- Analysys, Charging and Revenue Sharing for Mobile Content
- Mobile 365, Operator Charging Gateway
- Mentura Group, Rating Engine
- Comptel Corp., Convergent Mediation
- Philip Garner, Ian Mullins, Reuben Edwards, Paul Coulton, Mobile Terminated SMS Billing – Exploits and Security Analysis
- Japanese Economy Division, Japan’s Mobile Content Industry
..Thank You..