NTT DOCOMO’s LTE/EPC expansion
toward shaping ‘a Smart Life’

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Core Network Development Department
1. Xi (LTE) Deployment Status

“Xi = Crossy”

The “X” denotes both “connection” and “infinite possibility,” and the “i” both “individual user” and “innovation.” The logo, which resembles the infinity symbol, aligns the letters in a single stream to embody the bonds that organically link people, goods and information, and lead to new innovation.
1–1. Corporate Background

- NTT DOCOMO is the largest mobile operator in Japan (subscriber: approx. 58.8 million)
- Smooth 2G to 3G migration: 99% are 3G subscriber

Mobile Market 122.4 Million subscriptions

- KDDI: 22%
- SoftBank: 27%
- NTT DOCOMO: 48%
- Others: 3%

<as of 31, August 2011>
1–2. Dec. 24, 2010 Xi (LTE) Service Launch

- Commercial service launched on Dec. 24, 2010
1-3. LTE Enables Advanced Service for Xi

- Advanced Capabilities of LTE which support Xi Services

- **High-Speed**: 10 times
  Richer content such as large-volume video

- **Large capacity**: 3 times
  Capacity to cope with increasing users and traffic volume

- **Low Latency**: 1/4
  More advanced services through network/terminal collaboration

LTE brings into reality advanced the services

Provide the service with an entirely new brand

"Advanced Capabilities of LTE which support Xi Services"
1–4. Growth of Xi Subscriptions

- The Number of Xi Subscriber Increased Steadily to 1.46 million, as of Jan. 31, 2012

Subscriptions Growth

<table>
<thead>
<tr>
<th>(Million subs)</th>
<th>Xi subscriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/Mar</td>
<td>0.03</td>
</tr>
<tr>
<td>11/Jun</td>
<td>0.12</td>
</tr>
<tr>
<td>2011/Sep</td>
<td>0.39</td>
</tr>
<tr>
<td>2012/Jan</td>
<td>1.46</td>
</tr>
</tbody>
</table>

Enrichment of Xi Devices

- **Smartphone**
  - GALAXY S LTE SC-03D: Released Nov. 24
  - OPTIMUS LTE L-01D: Released Dec. 15
  - ARROWS X LTE F-05D: Released Dec. 17
  - MEDIAS LTE N-04D: Released Feb. 15

- **Tablet**
  - GALAXY Tab: Released Oct. 15
  - F-01D: Released Oct. 19

- **Data Devices**
  - Mobile Wi-Fi router L-09C: Released Jun. 30
  - Mobile Wi-Fi router L-03D: Released Apr. 30

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1–5. Xi Area Expansion Plans

- Achieved POP coverage of approx. 24% as of Dec. 31, 2011.
- Aim to further expand POP coverage to approx. 70% by Mar. 31, 2013.

<table>
<thead>
<tr>
<th>FY2010</th>
<th>FY2011</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of BTS: Approx. 7,000</td>
<td>No. of BTS: Approx. 5,000</td>
<td>No. of BTS: Approx. 21,000</td>
<td>No. of BTS: Approx. 50,000</td>
<td></td>
</tr>
<tr>
<td>POP coverage: Approx. 25%</td>
<td>POP coverage: Approx. 24%</td>
<td>POP coverage: Approx. 70%</td>
<td>POP coverage: Approx. 98%</td>
<td></td>
</tr>
<tr>
<td>&lt;Dec. 31, 2011&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of BTS: approx. 1,100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POP coverage: approx. 8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Focus of expansion efforts:
  - Prefectural capital-size cities across Japan
  - Areas near major stations (restaurants, downtowns, hotels, etc.)
  - Areas near local city stations (restaurants, downtowns, hotels, etc.)
  - Areas near suburban stations

- Max. throughput:
  - 75Mbps
  - 100Mbps
Xi Area Map in Tokyo as of 2012 March

RED= 2012 Jan
YEL= 2012 April
1-6. Voice over LTE (VoLTE)

- Voice services on Handset-Xi devices are provided using CS Fallback, now in service.
- Deployment of VoLTE is currently being planned to provide voice service over LTE.

[Current] CSFB (CS Fallback)

While connected on LTE, data connectivity on Xi(LTE) will be handed-over to 3G upon incoming call.

Switch LTEÆ3G

For voice service

CSFB UE since Nov 2011

[Future] VoLTE (Voice over LTE)

Simultaneous data connectivity and voice over LTE.

SRVCC=>

Allows broadband data connectivity while user is on the voice call sessions.

Stand-by or Connected on LTE

Incoming Call

VolTE

Voice services Provisioned over LTE data connectivity

3G

Incoming Call

Switch LTEÆ3G

For voice service

CSFB UE since Nov 2011

Stand-by or Connected on LTE

3G
1–7. Ensured Voice Quality in VoLTE

More stable voice experience compared with OTT VoIP services

• VoLTE
  - NW guarantees quality of service by packet scheduling to prioritize voice
  - Efficient transmission, as the NW shapes data only with necessary information

• Over-the-Top (OTT) VoIP applications
  - Treated as normal packet (no priority), thus delayed transmission under congestion
  - Inefficient transmission as data contains overhead information
2. Expansion of the Smartphone
2-1. Expansion of the Smartphone

- Number of smartphone units sold in FY2011/1-3Q (cumulative): 5.53 million
- Target sales: 8.50 million devices in the end of FY2011
2–2. Strategy for the era of Smartphone

- Increasing smartphones might cause a tendency operators to become ‘bit-pipe’
- Service differentiation is important by provisioning services that only operators can create

Until now (i-mode as main service)
- DOCOMO services on NW + Devices
- Contents Provider (CP) can run services without charging system, as DOCOMO charge users on behalf of them.
- Subscribers can use various DOCOMO / Contents Provide (CP) services

Future (Smartphones) Tendency
- OTT players to run services by making use of user data on the device
- OTT players can setup charging schemes without involving operators
- Subscribers is not restricted to use only services provided by operators

*User Data: Schedule, Location Info., Device Info. etc.
## 2-3. Service Migration to Smartphone Platform

**High-quality i-mode content to become accessible via Smartphone.**

### Transplant Service Assets onto Smartphone Platform

<table>
<thead>
<tr>
<th>Past actions</th>
<th>2011 Summer</th>
<th>2011 Winter &amp; beyond</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-mode phones</td>
<td><img src="image1" alt="Content" /> <img src="image2" alt="Music" /> <img src="image3" alt="Video" /> <img src="image4" alt="Game" /> <img src="image5" alt="Book" /></td>
<td>i-chi</td>
</tr>
<tr>
<td><strong>Smartphones</strong></td>
<td>“sp mode”/“Osaife-Keitai” e-wallet</td>
<td>“Melody Call”</td>
</tr>
<tr>
<td></td>
<td>“BeeTV”/Rakuten auction</td>
<td>“i-channel”</td>
</tr>
<tr>
<td></td>
<td>“Disaster Message Board”/“docomo Map Navi”…etc.</td>
<td>G-guide</td>
</tr>
<tr>
<td></td>
<td>Content billing/authentication</td>
<td>TV program guide</td>
</tr>
</tbody>
</table>
To allow a broad range of customers to use our smartphones with greater fun and convenience, we will **offer services and ecosystems that can only be made available by DOCOMO** and continually work on their advancements.
3. Shaping ‘a Smart Life’
3-1. Corporate Vision “HEART” =Pursuing smart innovation=

Past decade: Pursued the possibilities of mobile

This decade: Transform into an “Integrated Service Company” placing mobile at the core

2020 Corporate Vision “Pursuing Smart Innovation”

HEART

HARMONIZE
Social contribution beyond borders, across generations

EVOLE
Evolution of service and network

ADVANCE
Advance industries through convergence of services

RELATED
Creating joy through connections

TRUST
Support for safe, secure and comfortable living

“Personal Life Agent”
2011-2020
3-2. Shaping ‘a Smart Life’

- Aim to bring smart life into reality by propelling the evolution of mobile services and new value creation through convergence of industries/services leveraging DOCOMO’s clouds

Help each and every customer lead a smart life
《Personal life agent》

Convenience/fulfillment/efficiency
Safety/security
Enjoyment/pleasure

DOCOMO’s clouds

“Personal” cloud
Platform underpinning a wide range of services for consumers

“Business” cloud
Solutions platform for provision of new business styles

Network cloud
Platform that adds value through sophisticated information and communication processing performed on the network

Initiatives for evolution of mobile services

Initiatives for new value creation through convergence of industries/services

Initiatives for customer satisfaction improvement
3-3. Network Cloud enables New Communication Style & Service

- Offers various added value by performing **sophisticated** information/communication processing with the **network cloud**

**Network cloud**

- Voice recognition
- Voice synthesis
- Location data
- Voice storage
- Translator phone
- Information analysis
- Photo conversion
- Content sharing

**Collaboration of network and devices**

- Efficiently realize wide variety of services by optimally splitting functions and processing between the network and devices

**Translator phone**

Automatic simultaneous translation service for voice calls
(Trial service to commence in Nov. 2011)

- Voice recognition
- Japanese text
- Translate
- Foreign language text
- Voice synthesis

- Konnichiwa

**“Communication Agent”**

Provides real-time recommendation in response to voice commands

- Any good restaurants nearby?
- Agent algorithm
- Analysis/Info. collection
- Voice recognition
- Voice synthesis

- Good Italian in 5-minutes walk!

**“Kaki Communication”**

A service that allows users to view or operate the same data content while talking to each other

- Content sharing
- Voice call
3–4. Translator phone service

- Network translates conversation when each party talk in different language.
- Both parties can talk and listen in their mother language.

**Translator phone functionalities**

- Translation: Japanese ⇔ English
- Voice recording (voice to text)
- Automatic translation (text to text)
- Voice synthesis (text to voice)
- Voice playing

**DOCOMO Network Cloud**

- Recording
- Recognition
- Translation
- Synthesis
- Playing

She talks and listens in Japanese

They talk and listen in English
Users will feel as if a communication agent were in the NW and supporting their conversation.

Need to achieve the following:
- Intelligent NW realized by a communication agent.
- Convergence of telecommunication and internet service.

1. Identifies user’s needs through communication
2. Platforms different roles on behalf of users
3. Brings in rich knowledge from the internet
3-7. *Kaki* Communication

- Sharing pictures, maps and videos during a telephone call.
- Users can communicate each other more conveniently and precisely.
- Users can share pictures/maps/videos easily by dial-number and securely through telecom-network.

![Diagram showing sharing of pictures, maps, and videos during telephone calls.](image)
Thank you for Listening

New Smartphone series

**User-friendly &**
**brings more fun to life**

**Innovative &**
**broadens your potential**

FY2011 winter-spring models

Tablets