IoT Business & Partnership Opportunities in Japan

Japan IoT Seminar by JETRO
October, 2016
NTT DOCOMO USA, Inc.
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The NTT Group - Companies

The NTT group is one of the world’s largest information and communications technology companies. DOCOMO is the mobile communication division within the NTT group.

Consolidated Total Assets: US $175.3 billion (JPY21,035.9 billion)*
Consolidated Operating Revenues: US $96.2 billion (JPY11,541 billion)*
Number of Employees: 241,450
Consolidated Subsidiaries: 907

*1USD = 120JPY

As of March, 2016

NTT EAST
Local fixed line communications
100% voting shares

NTT WEST
Long-distance, international communications and data center
100% voting shares

docomo
Mobile communications
66.6% voting shares

NTT DATA
IT solutions
54.2% voting shares

Other
Miscellaneous (real estate, finance, construction, power, etc.)

NTT Group
NTT DOCOMO and NTT DOCOMO USA

DOCOMO is the largest mobile company in Japan, with more than 70 million subscribers.

### Overview

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Headquarters</td>
<td>Tokyo, Japan</td>
</tr>
<tr>
<td>Year Founded</td>
<td>1992</td>
</tr>
<tr>
<td>Management</td>
<td>Kazuhiro Yoshizawa, President &amp; CEO</td>
</tr>
<tr>
<td>Employees</td>
<td>7,344 (DOCOMO Group 25,680)</td>
</tr>
<tr>
<td>Revenue</td>
<td>$37.7 billion (JPY4,527 billion FY15)*</td>
</tr>
<tr>
<td>Net Income</td>
<td>$5.3 billion (JPY639 billion FY15)*</td>
</tr>
</tbody>
</table>
| History        | 1999 Launched “i-mode”  
                 | 2001 Launched 3G service  
                             “FOMA”  
                 | 2005 Launched mobile Credit card service “iD”  
                 | 2010 Launched LTE service “Xi” |

*1USD = 120 JPY

### Market Share of Subscribers

As of Sep 30, 2015

- docomo: 44.8%
- au: 29.2%
- SoftBank: 26.0%

### NTT DOCOMO USA

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<table>
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<tbody>
<tr>
<td>Headquarters</td>
<td>New York, NY</td>
</tr>
<tr>
<td>Year Founded</td>
<td>Nov 1, 1999</td>
</tr>
<tr>
<td>President &amp; CEO</td>
<td>Michiya Shinagawa</td>
</tr>
<tr>
<td>Business Areas</td>
<td>Enterprise Mobility Service, Research on IT &amp; Telecom, etc.</td>
</tr>
<tr>
<td>Branch offices</td>
<td>Washington DC, Silicon Valley</td>
</tr>
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DOCOMO’s Mid-term Strategy: Value Co-Creation with Partners
Generating New Value through Co-Creation: “+d” (Plus d)
Co-Creation of New Businesses through Expanded Adoption of IoT

Contribute to building business framework in a wide array of sectors

Deployment in various business domains

Value creation leveraging IoT

Partner

Business asset

DOCOMO

Business asset

Co-creation
<table>
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<tr>
<th>Industry</th>
<th>Implementation Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Equipment Manufacturing</td>
<td>Remote monitoring/control of equipment/facilities</td>
</tr>
<tr>
<td>Automobile</td>
<td>Infotainment systems</td>
</tr>
<tr>
<td>Distribution</td>
<td>Improve efficiency in cargo/delivery services</td>
</tr>
<tr>
<td>Retail</td>
<td>Sales/inventory management, Sales data used for marketing</td>
</tr>
<tr>
<td>Insurance</td>
<td>Provide insurance estimates and advice based on driver habits</td>
</tr>
<tr>
<td>Medical/Healthcare</td>
<td>Preventative healthcare/telemedicine using vital signs data</td>
</tr>
<tr>
<td>Energy</td>
<td>Power supply adjustments of virtual power plants, Control/optimization of electricity consumption</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Optimize productivity based on sensor data, Maintain health of livestock based on vital signs data</td>
</tr>
<tr>
<td>Public Infrastructure</td>
<td>Detect signs of potential disasters using sensors, Remote monitoring using security cameras</td>
</tr>
</tbody>
</table>
IoT Use Cases
Drowsiness Detection System Trial Tests

Improve accuracy of ability to detect signs of drowsiness and stress based on heart rate data of drivers

【Collaborators】
- NTT DATA MSE
- Kyoto University
- Kumamoto University
- NTT DOCOMO

Press Release (May 10, 2016)
Safe Driving Support Initiatives

Efforts to provide initiatives to support safe driving that combines biometrics and vehicle data

Vehicle Data
(Driving conditions, etc.)

Biometrics data
(Heart rate, ECG, etc.)

On-board Device

Biometrics measuring tool
“hitoe®” wearable

Driver’s Smartphone/
Wearable Device

Driver Data Analysis

Driving Behavior

Drowsiness Detection

Stress Detection

Alert Notification
(Safety, Health)

Safety support
Health support

Vehicle Business Operator

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Taxi Ridership Demand Prediction AI Trial Tests

Testing AI demand prediction technology that combines DOCOMO’s real-time demographic statistics with ridership data

**Demand Prediction Results and Taxi Dispatch**
- Low Demand
- Medium Demand
- High Demand

**Impact ①**
Minimize discrepancy in skills between drivers

Area predicted to have high demand in the next 30 mins

**Impact ①**
Respond to non-routine situations such as train delays

- Alternative means of transport
- Excellent Driver
- Average Driver
- Ridership Rate
- Raise the standard (Efficiency)
- Move based on prediction
- More based on prediction

Press release (May 31, 2016)

**Collaborators**
- Tokyo Radio Cooperative
- Fujitsu
- Fujitsu Ten
- NTT DOCOMO

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Overview of Real-time Taxi Demand Prediction Technology

- Constructed using structure of cellular network
- Demographics
- Event Data
- Weather, Facilities, Other Data

Leverage AI/Machine learning to build models
DOCOMO’s IoT Service
Based on IoT usage structure of enterprise customers, we can provide multiple cloud services with secure connections.
Global Offerings: DOCOMO M2M Platform

- Consolidated management of global IoT/M2M connections
- Remote updating of profiles (eSIM)
DOCOMO IoT Solutions

Collaborate with partners (+d) to provide a total IoT solution at a global scale
Partnership Cases
Case 1. PTC (Thingworx): IoT Cloud Service

IoT cloud service that allows users to easily build applications that provides data visualizations collected from various devices and sensors.

Benefits

- Ability to use without preliminary development of application
- Simple, low cost, quick deployment
- Ability for clients to build their own control dashboard

(Ex.) Device Monitoring Screen Creation

Choose from preset components

Change Logo/Title

Equipment Type

Values

Timeline

Map

Control Dashboard・CSV Output

Graphs

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Case 2. Jasper: Global IoT Platform

IoT World Alliance members (9 companies)  
(36 operators using IoT Service Platform (Cisco Jasper))

International Roaming providers (220 countries)

※ Currently partnered in separate agreements in IoT field

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Case 3. GE: Industrial Router (MDS-Orbit)

By installing GE “Orbit”, which is embedded with a DOCOMO communication module, into infrastructure, able to remotely monitor facility temperature, vibrations, and other operation data in real time.

Manage operation data of infrastructure using smartphone and tablet devices to prevent mechanical failure through diagnostic methods and maintain aging facilities.