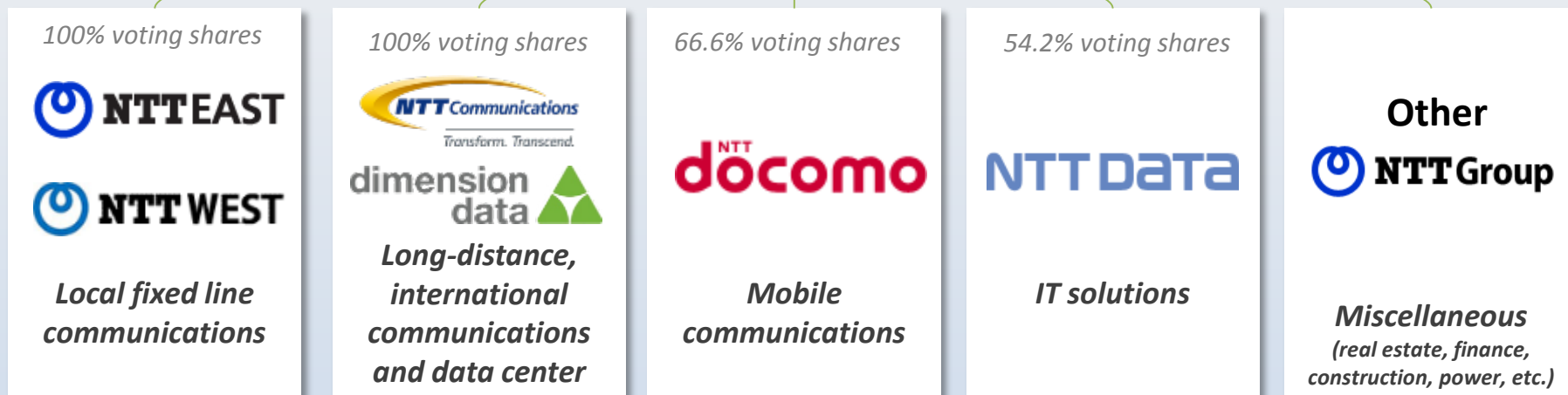# IoT Business & Partnership Opportunities in Japan

Japan IoT Seminar by JETRO
October, 2016
NTT DOCOMO USA, Inc.

Contents

1. Introduction of NTT Group and NTT DOCOMO

2. IoT Market in Japan

3. NTT DOCOMO's Mid-Term Strategy

4. IoT Use Cases

5. DOCOMO's IoT Service

6. Partnership Cases

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.

NTT Group

100% voting shares	*100% voting shares*	*66.6% voting shares*	*54.2% voting shares*	
NTT EAST / NTT WEST	NTT Communications *Transform. Transcend.* / dimension data	docomo	NTT DATA	**Other** NTT Group
Local fixed line communications	***Long-distance, international communications and data center***	***Mobile communications***	***IT solutions***	***Miscellaneous*** *(real estate, finance, construction, power, etc.)*

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 DOCOMO and NTT DOCOMO USA

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

Overview

Headquarters	Tokyo, Japan
Year Founded	1992
Management	Kazuhiro Yoshizawa, President & CEO
Employees	7,344 (DOCOMO Group 25,680)
Revenue	$37.7 billion (JPY4,527 billion FY15)*
Net Income	$5.3 billion (JPY639 billion FY15)*
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

*As of Mar 31, 2016*

Market Share of Subscribers

SoftBank 26.0%
docomo 44.8%
au 29.2%
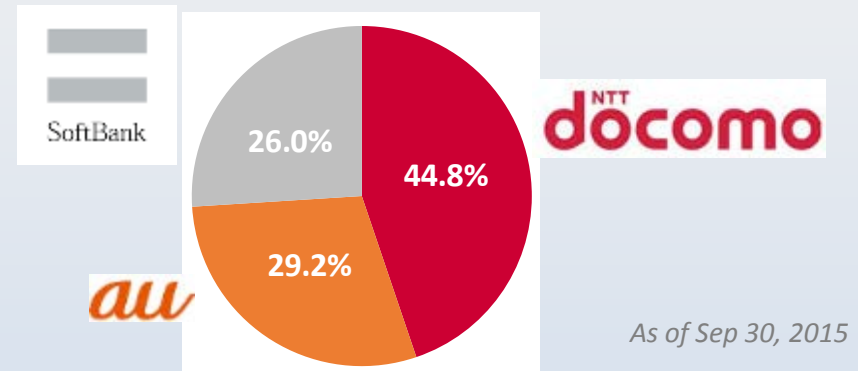
As of Sep 30, 2015

NTT DOCOMO USA

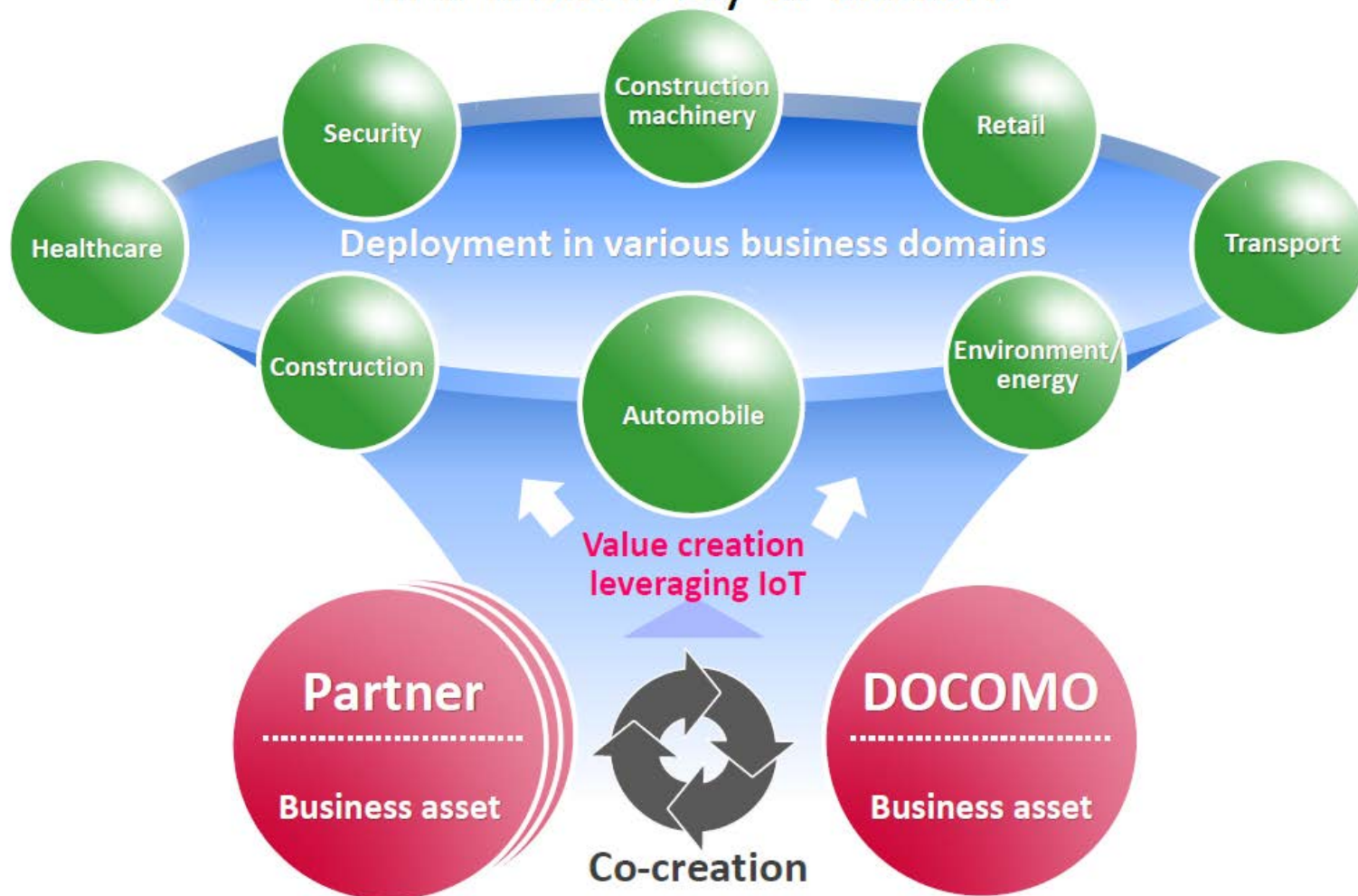|	
Headquarters	New York, NY
Year Founded	Nov 1, 1999
President & CEO	Michiya Shinagawa
Business Areas	Enterprise Mobility Service, Research on IT & Telecom, etc.
Branch offices	Washington DC, Silicon Valley

4

DOCOMO's Mid-term Strategy: Value Co-Creation with Partners

Generating New Value though Co-Creation: "+d" (Plus d)
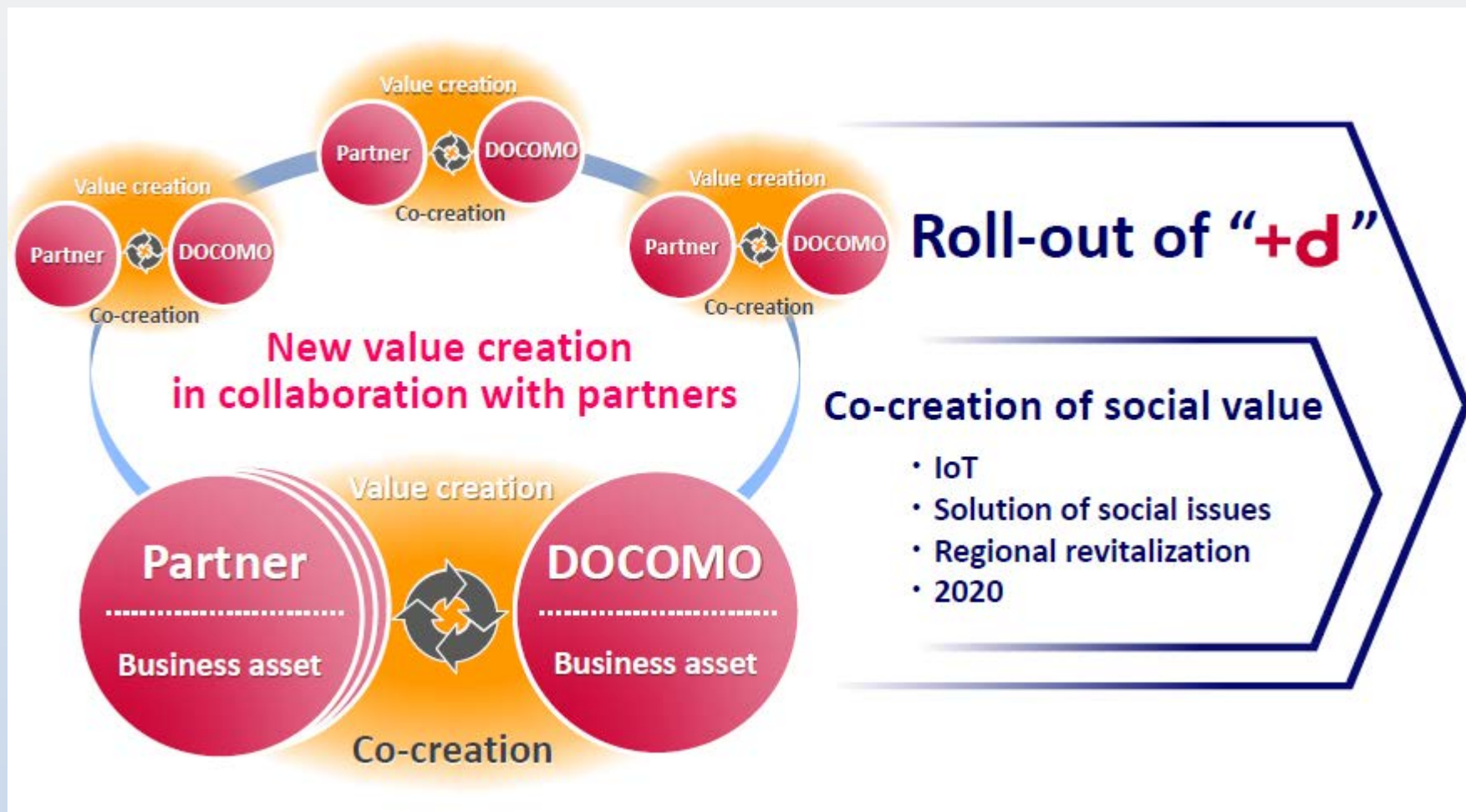
Co-Creation of New Businesses through Expanded Adoption of IoT

Contribute to building business framework in a wide array of sectors

- Security
- Construction machinery
- Retail
- Healthcare
- Transport

Deployment in various business domains

- Construction
- Automobile
- Environment/energy

Value creation leveraging IoT

Partner — Business asset

DOCOMO — Business asset

Co-creation

DOCOMO IoT Implementation Cases by Industry

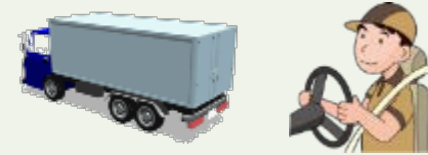## Industrial Equipment Manufacturing

- Remote monitoring/control of equipment/facilities

Automobile

- Infotainment systems
- Safe driving support

Distribution

- Improve efficiency in cargo/delivery services
- Assist driver safety

Retail

- Sales/inventory management
- Sales data used for marketing

Insurance

- Provide insurance estimates and advice based on driver habits

Medical/Healthcare

- Preventative healthcare/ telemedicine using vital signs data

Energy

- Power supply adjustments of virtual power plants
- Control/optimization of electricity consumption

Agriculture

- Optimize productivity based on sensor data
- Maintain health of livestock based on vital signs data

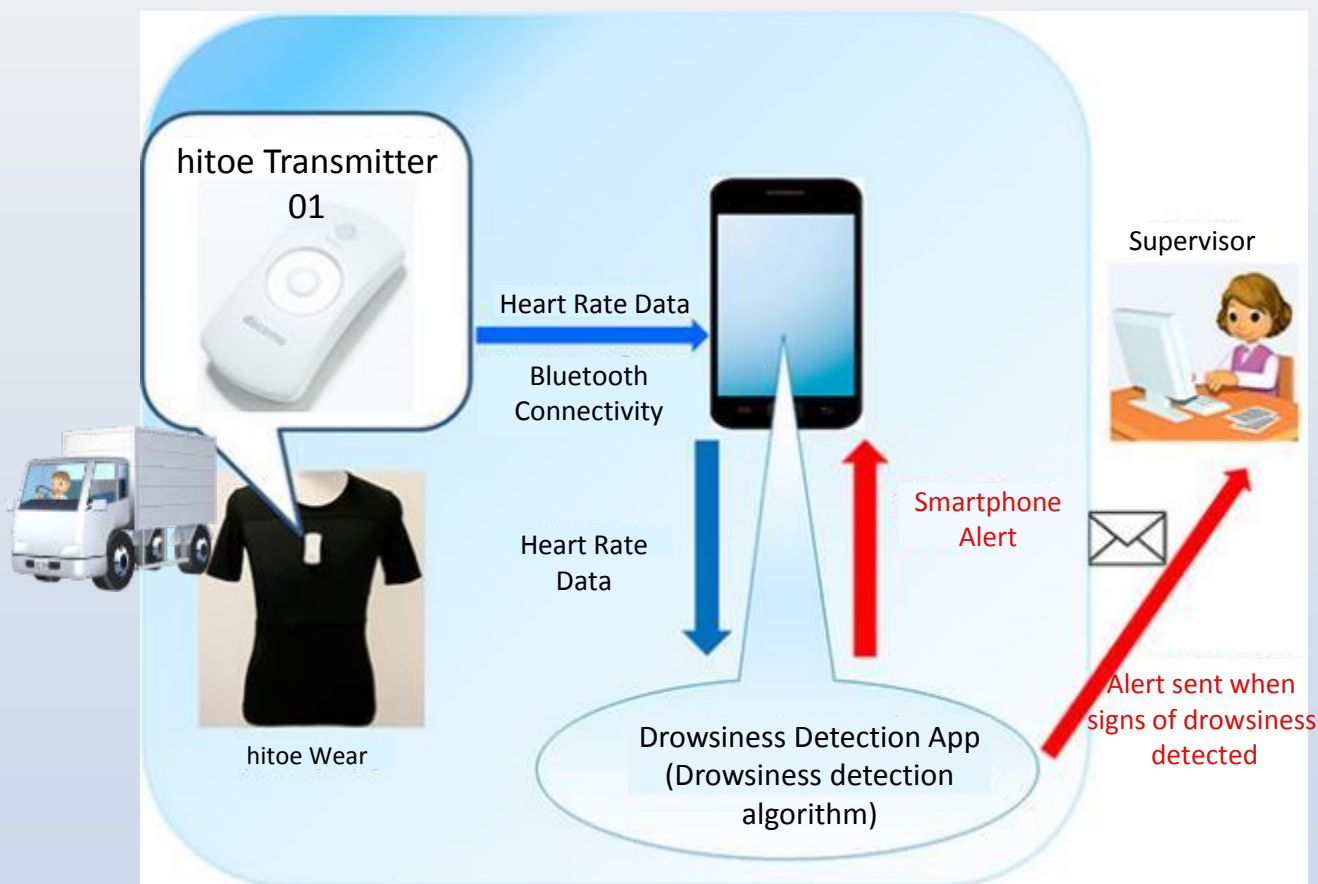## Public Infrastructure

- Detect signs of potential disasters using sensors
- Remote monitoring using security cameras

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

Press Release (May 10, 2016)

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

Safe Driving Support Initiatives

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

On-board Device

Vehicle Data
(Driving conditions, etc.)

Driver Data Analysis

Driving Behavior

Drowsiness Detection

Stress Detection

dococar

Biometrics measuring tool "hitoe®" wearable

Biometrics data
(Heart rate, ECG, etc.)

Safety support
Health support

Driver's Smartphone/ Wearable Device

Alert Notification
（Safety, Health）

Vehicle Business Operator
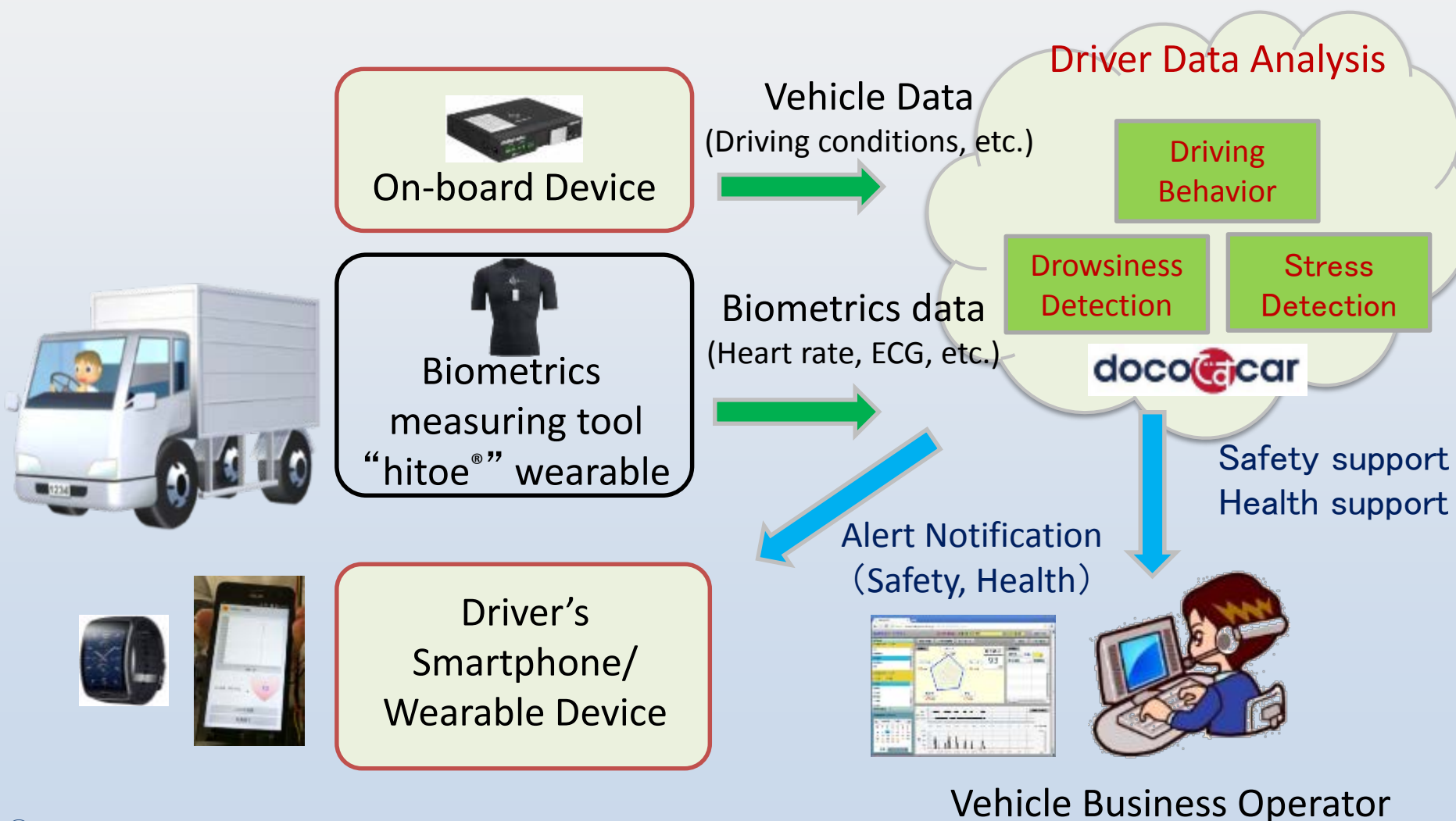
Taxi Ridership Demand Prediction AI Trial Tests

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

Area predicted to have high demand in the next 30 mins

Move based on prediction

corevc

【Impact ①】

Minimize discrepancy in skills between drivers

Ridership Rate

Raise the standard (Efficiency)

Excellent Driver — Average Driver

【Impact ①】

Respond to non-routine situations such as train delays

Alternative means of transport

Delays — Traffic — Accidents

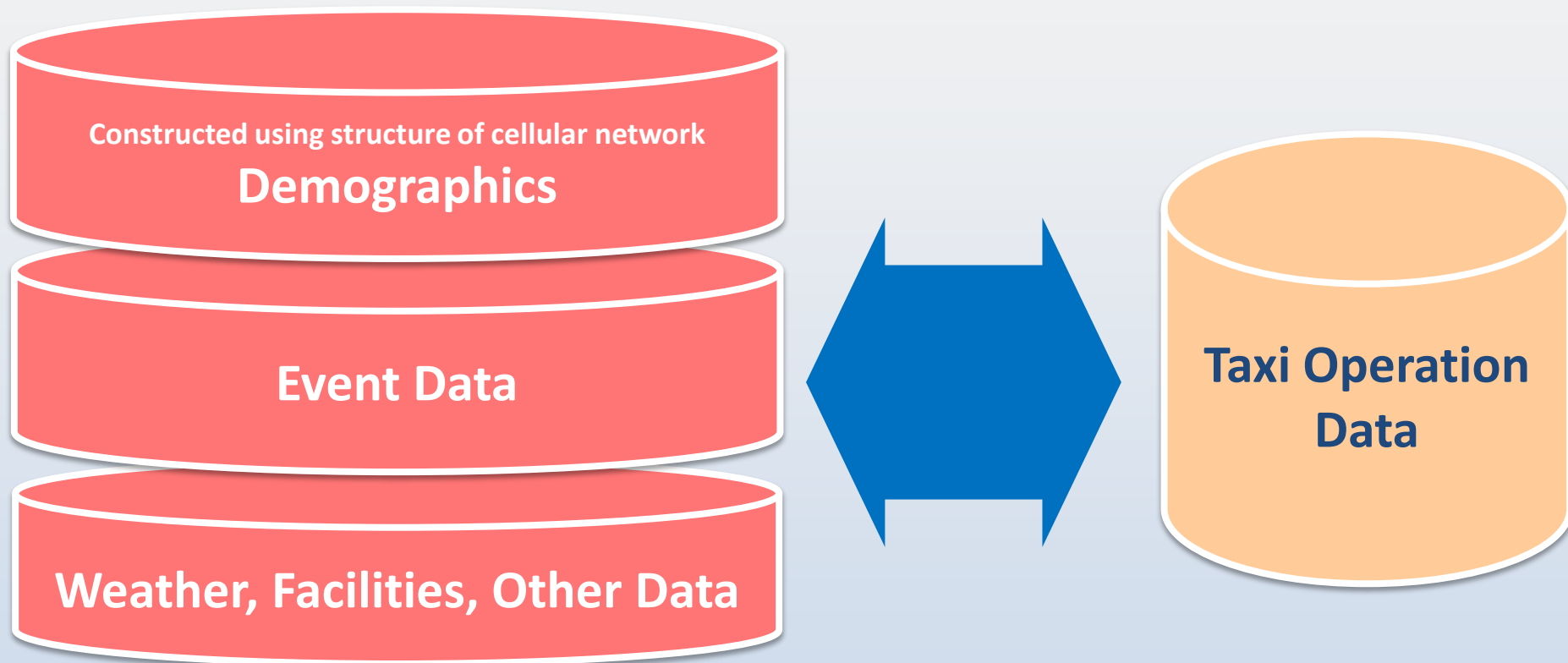Press release (May 31, 2016)

【Collaborators】
- Tokyo Radio Cooperative
- Fujitsu
- Fujitsu Ten
- NTT DOCOMO

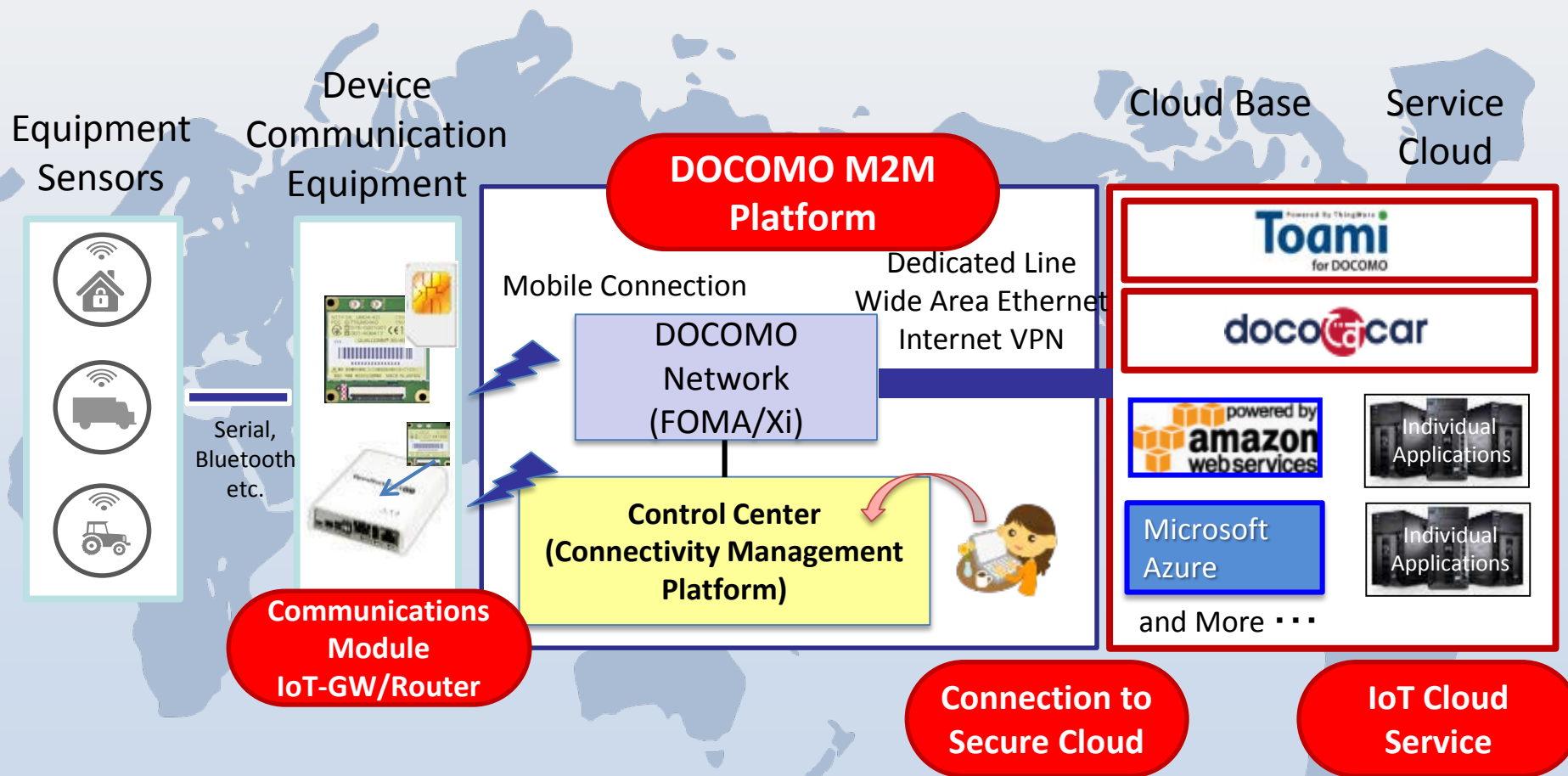# Overview of Real-time Taxi Demand Prediction Technology

Constructed using structure of cellular network
Demographics

Event Data

Weather, Facilities, Other Data

Taxi Operation Data

Leverage AI/Machine learning to build models

DOCOMO's IoT Service

IoT Cloud/Multi-cloud Support

Based on IoT usage structure of enterprise customers, we can provide multiple cloud services with secure connections

Equipment Sensors

Device Communication Equipment

Cloud Base

Service Cloud

DOCOMO M2M Platform

Mobile Connection

Dedicated Line
Wide Area Ethernet
Internet VPN

DOCOMO Network (FOMA/Xi)

Toami
for DOCOMO

docomo car

powered by amazon web services

Individual Applications

Microsoft Azure

Individual Applications

and More ···

Serial, Bluetooth etc.

Communications Module IoT-GW/Router

Control Center (Connectivity Management Platform)

Connection to Secure Cloud

IoT Cloud Service

Global Offerings : DOCOMO M2M Platform

➢ Consolidated management of global IoT/M2M connections
➢ Remote updating of profiles (eSIM)

DOCOMO Profile
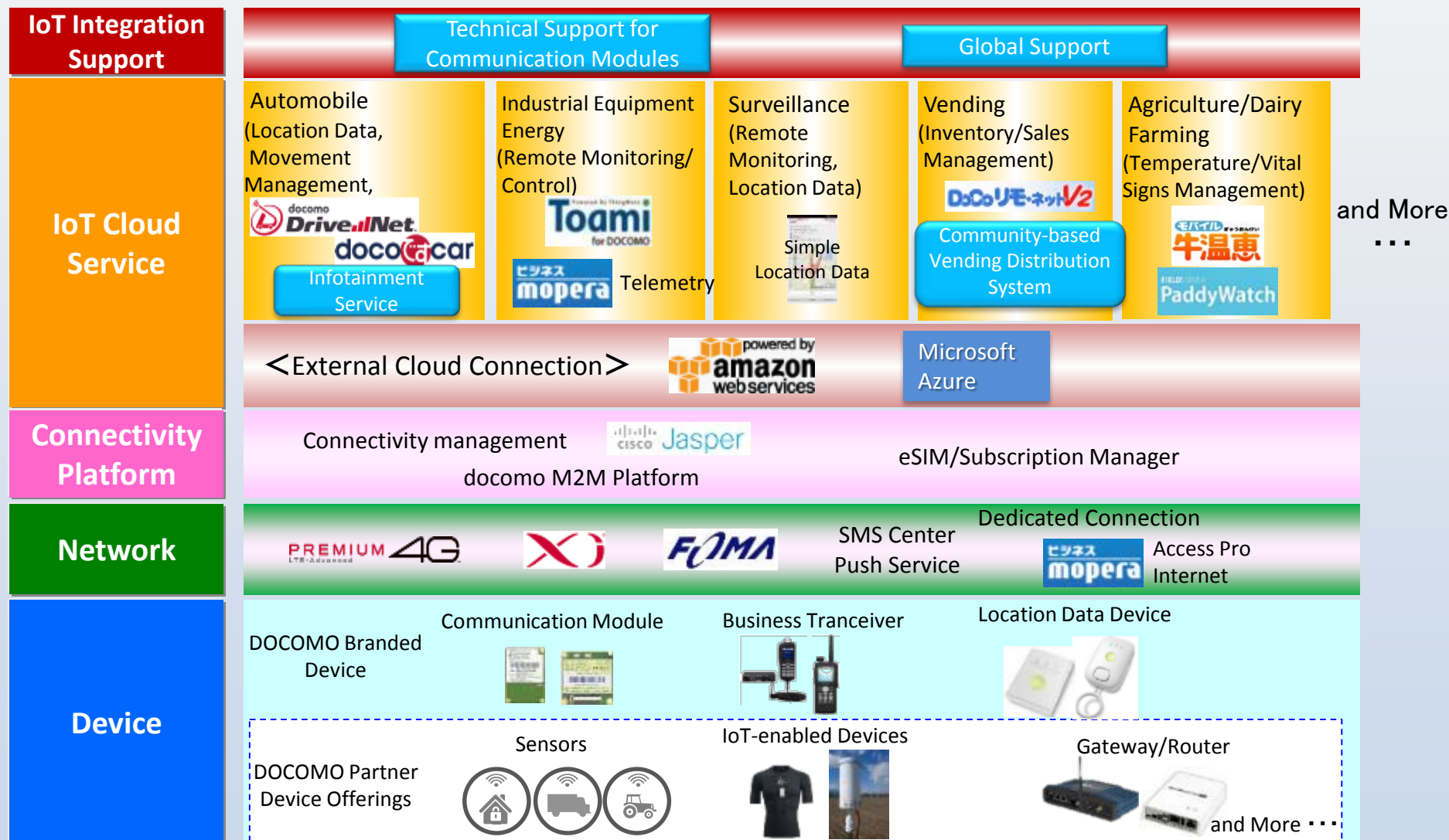
DOCOMO Profile

North American Operator Profile

docomo M2M Platform

EU Operator Profile

SM Subscription Manager

DOCOMO Profile

DOCOMO eSIM (embedded SIM)

Asia Operator Profile
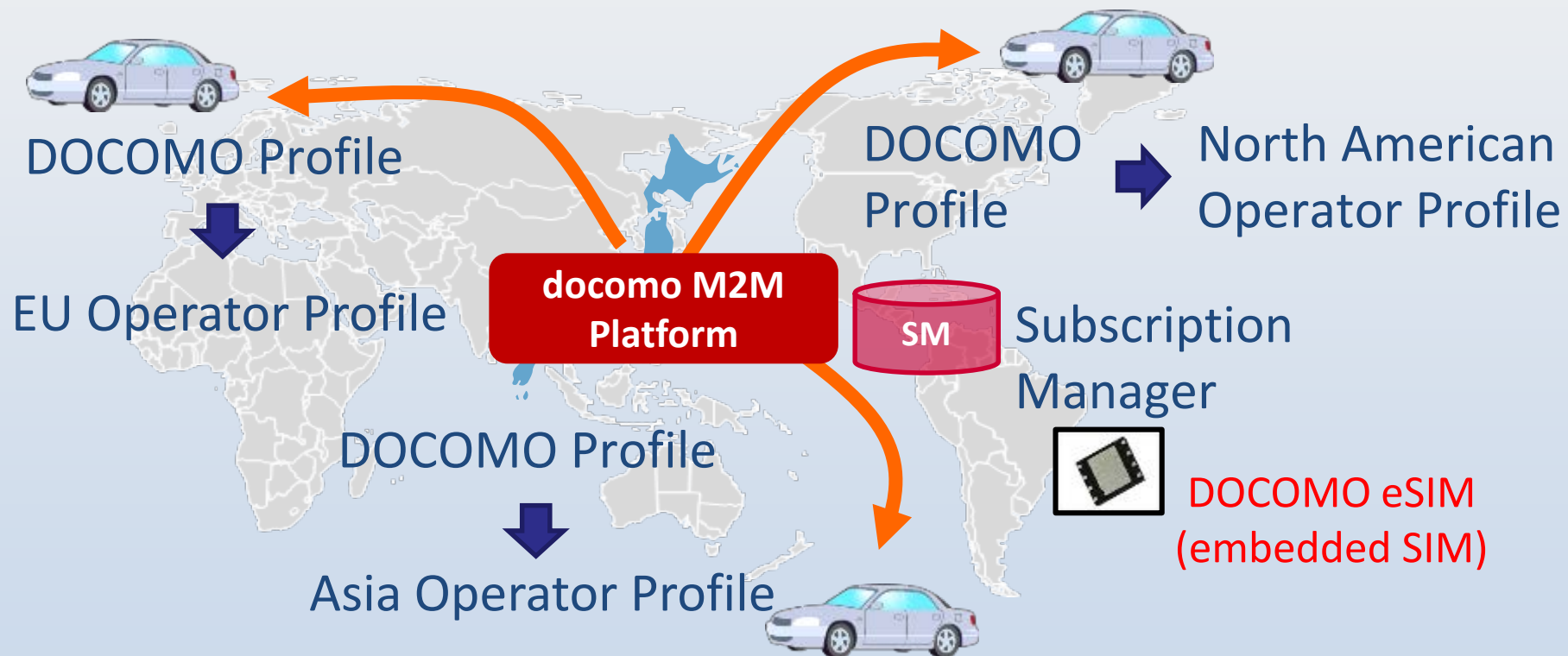
DOCOMO IoT Solutions

Collaborate with partners (+d) to provide a total IoT solution at a global scale

IoT Integration Support					
	Technical Support for Communication Modules		Global Support		

IoT Cloud Service

Automobile (Location Data, Movement Management, docomo Drive Net, dococacar, Infotainment Service)

Industrial Equipment Energy (Remote Monitoring/Control) Toami for DOCOMO, ビジネスmopera Telemetry

Surveillance (Remote Monitoring, Location Data) Simple Location Data

Vending (Inventory/Sales Management) DoCoリモ-ネットV2 Community-based Vending Distribution System

Agriculture/Dairy Farming (Temperature/Vital Signs Management) モバイル牛温恵 PaddyWatch

and More ...

<External Cloud Connection> powered by amazon web services Microsoft Azure

Connectivity Platform

Connectivity management cisco Jasper

docomo M2M Platform   eSIM/Subscription Manager

Network

PREMIUM 4G LTE-Advanced   Xi   FOMA   SMS Center Push Service   Dedicated Connection ビジネスmopera Access Pro Internet

Device

DOCOMO Branded Device

Communication Module   Business Tranceiver   Location Data Device

DOCOMO Partner Device Offerings   Sensors   IoT-enabled Devices   Gateway/Router   and More ...

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

（Ex.）Device Monitoring Screen Creation
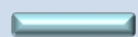
Choose from preset components

Change Logo/Title

Equipment Type

Values

Timeline

Map

Control Dashboard・CSV Output

Graphs
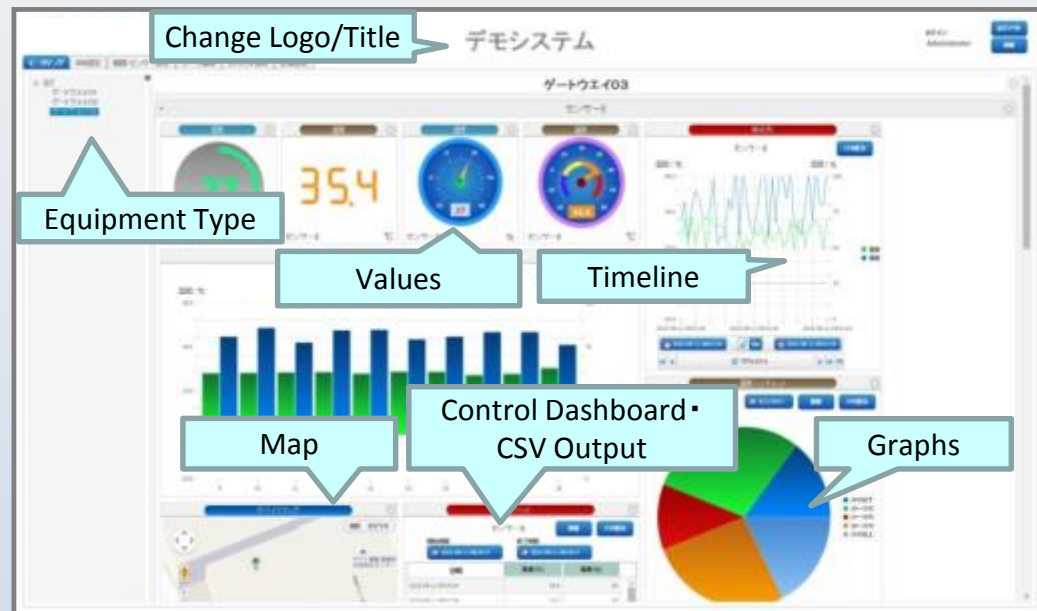
Benefits

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

Case 2. Jasper: Global IoT Platform

IoT World Alliance members（9 companies）
（36 operators using IoT Service Platform (Cisco Jasper) ）
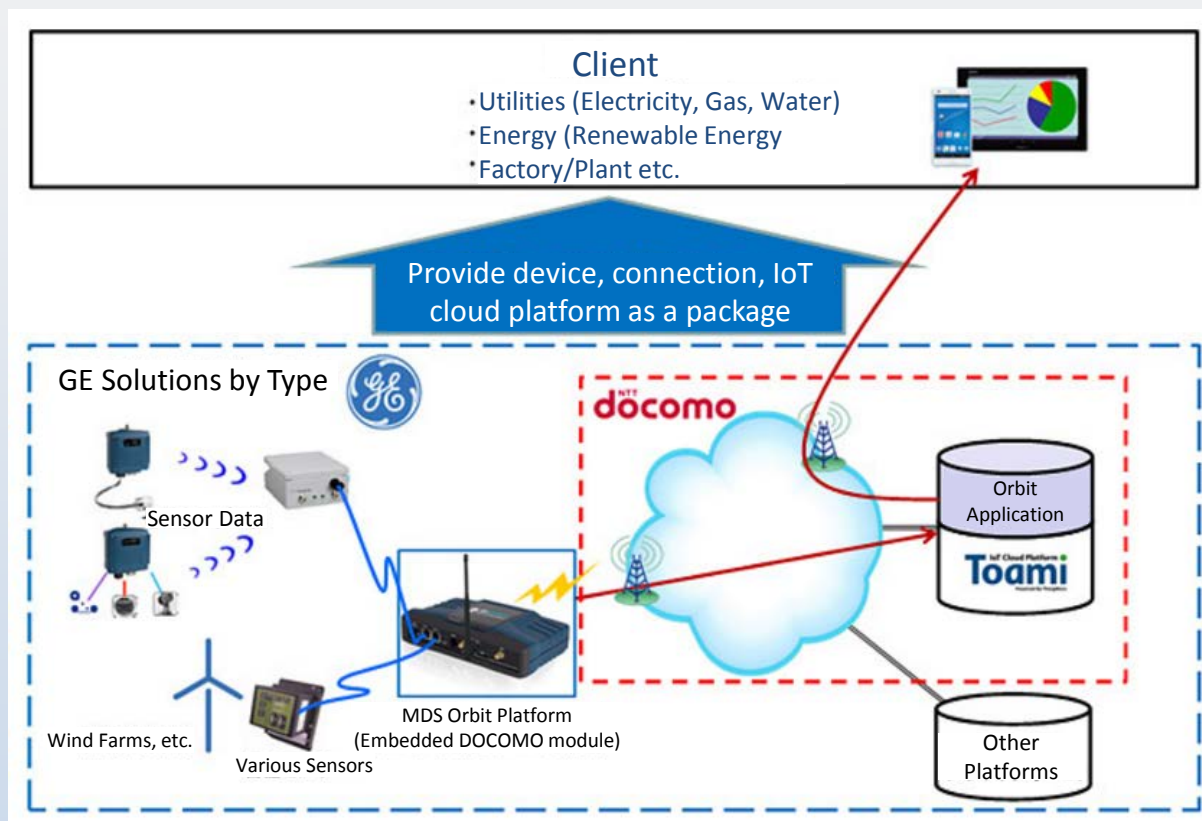
International Roaming providers (220 countries）

※　Currently partnered in separate agreements in IoT field

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