Accelerating Innovation and Collaboration for the Next Stage

NTT

November 8, 2013

Smart Life & Smart Work in the Next Stage
- ICT as an Enabler

NTT

Transportation
Intelligent Transportation Systems, Quick Charging

Environment
Smart Housing / Smart Buildings, Demand Response

Health Care
Telemedicine, Regional Medical Collaboration

Home Entertainment
4K / 8K, Ultra High Definition Video on Demand

Tourism
Multilingualization, Barrier-free

Stadiums
Highly Realistic / Ultra High Definition Video, Public Viewing

－1－

Infrastructure Supporting ICT Utilization

NTT ⦿

Optimal Navigation

Traffic congestion mitigation (Best route guidance), Multilingualization, Barrier-free

Highly Realistic / Ultra High Definition Video

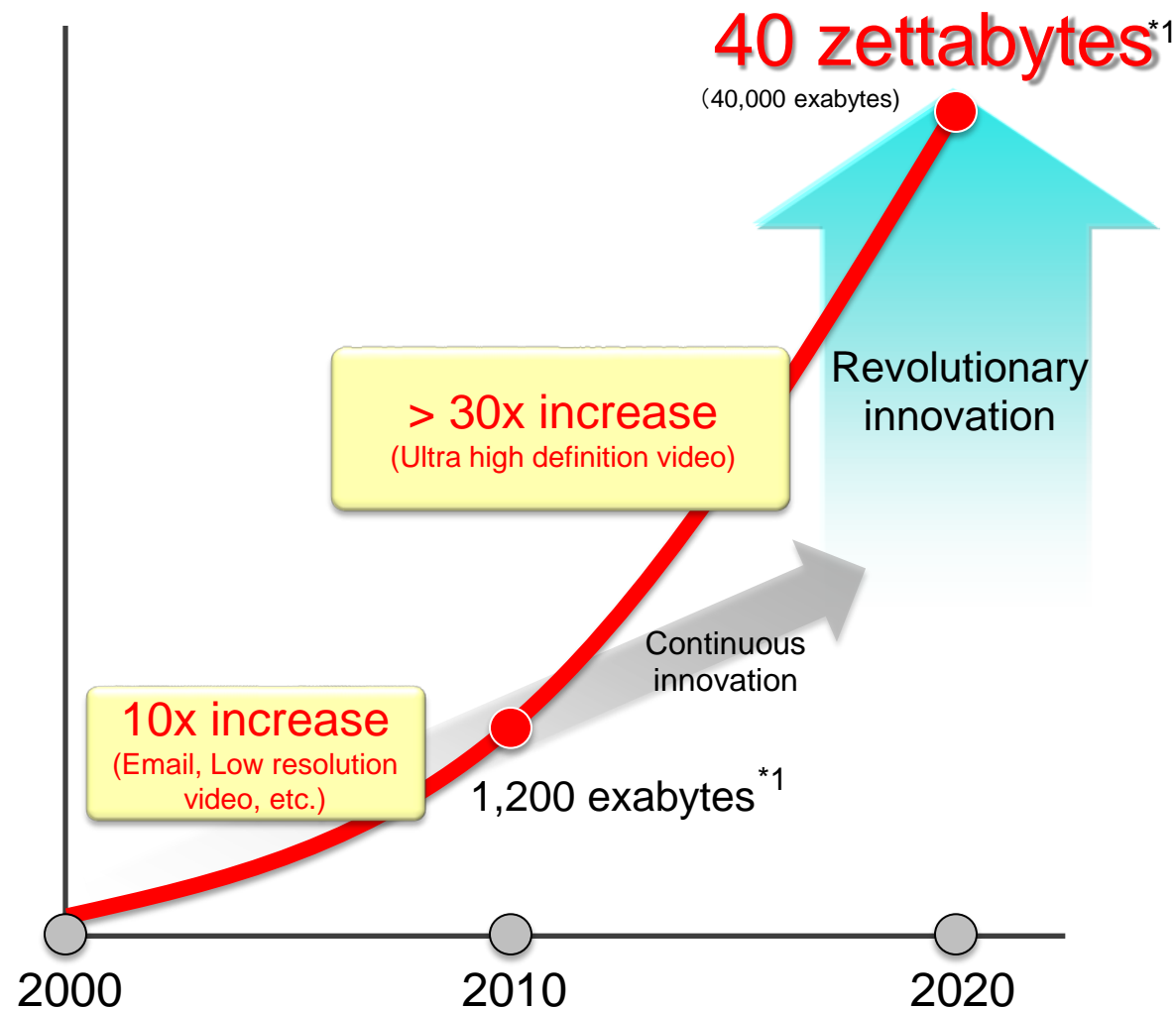Multi-angle / Multi-view, Time shift

Energy Control

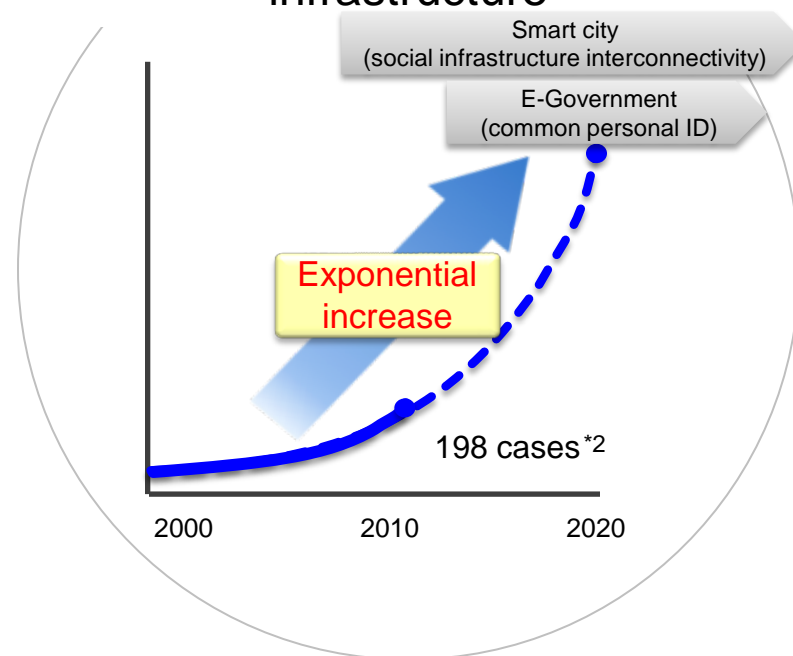Heat island mitigation, Electric energy projections

Most advanced Internet access infrastructure in the world by the best mix of wireless (including Wi-Fi) and fiber-based communications

Changes in ICT Environment

NTT ⊙

Rapid increase in the global amount of information data

40 zettabytes[1]
（40,000 exabytes）

Revolutionary innovation

> 30x increase
(Ultra high definition video)

Continuous innovation

10x increase
(Email, Low resolution video, etc.)

1,200 exabytes[1]

2000　　2010　　2020

Cyber attacks on social infrastructure

Smart city
(social infrastructure interconnectivity)

E-Government
(common personal ID)

Exponential increase

198 cases[2]

2000　　2010　　2020

Key Challenges – Network Control (1)

NTT ⊙

■ From reactive controls based on actual situation to proactive controls based on big data analysis

<Figure 1> Reactive vs. Proactive control
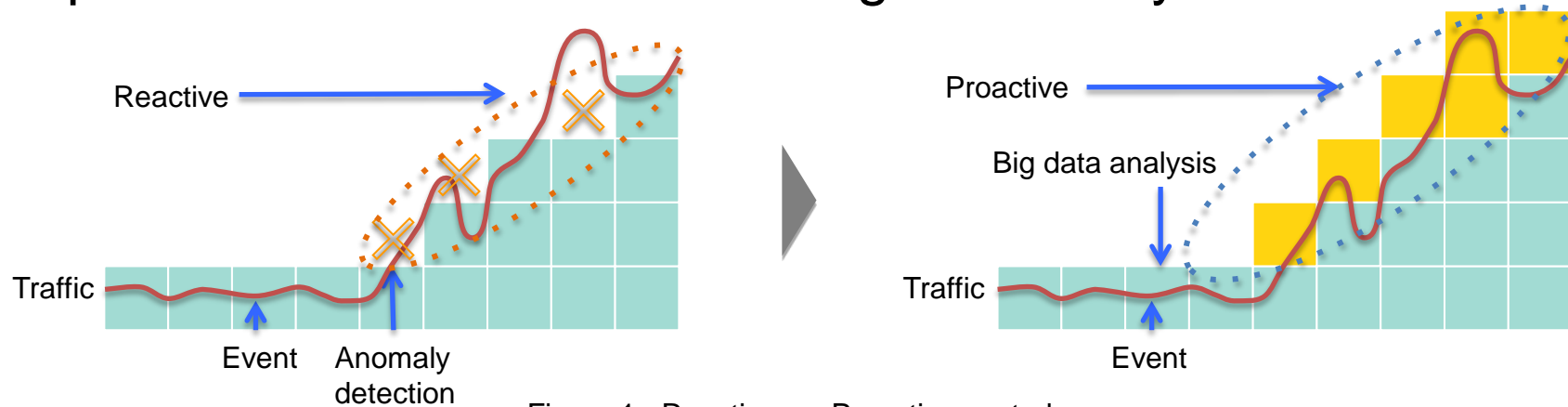
Issues

● Explosive increase in the number of data sessions caused by rapid traffic increase (sensors etc.)

- Congestion of backbone traffic caused by massive, individual processing   (possibility of connectivity loss)

● Unexpected bursts of traffic during emergencies

- Ineffectiveness with reactive resource controls

(possibility of connectivity loss)

Challenges

● Proactively controllable cloud services (Software-Defined Everything) <Figure 1>

- APM *1 utilizing big data
- Global SDN*2

● Edge computing

- Wide-area and real-time big data processing
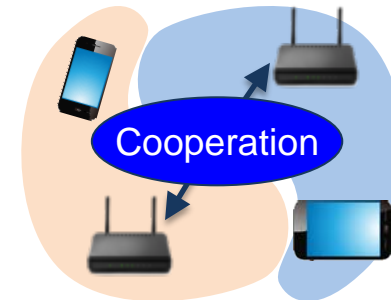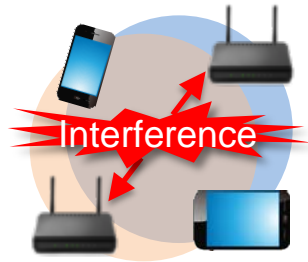- Device's CPU offload

*1 ： Application Performance Management   *2 ： Software Defined Network

Key Challenges – Network Control (2)

NTT ◎

■ From hardware-intensive
to software-defined efficient network controls
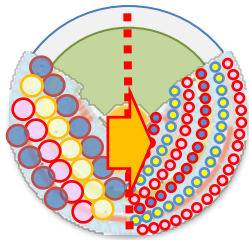
Interference

<Figure 1> Increased density of Wi-Fi base stations

Cooperation

<Figure 2> Dynamic cells

Issues

● **Increase in connected device users at stadiums etc.**
   - Wi-Fi frequency interference caused by increase in the number of access points <Figure 1> (lower speed)

● **Simultaneous massive access to high-definition videos**
   - Resource shortage of delivery servers and backbone network (difficulty in viewing)

Challenges

● **Interference evasion using dynamic cell based on software controls** <Figure 2>
   - Cooperative wireless LAN[*1]
   - Simultaneous transmission for high efficiency wireless LAN

● **Improvement in data transmission efficiency with reliable multicast[*2] etc.**
   - Next generation high compression technology (HEVC[*3])
   - Interactive panorama video delivery system

*1 : Technology that prevents throughput loss by the collaboration of multiple access points *2 : High quality simultaneous broadcasting technology that prevents packet loss. *3 : High Efficiency Video Coding

Key Challenges – Integrated Security

NTT ⟳

🟧 Realization of integrated security (Applications x Clouds x Devices) through world-leading Technology x Operation (global collaboration)

Issues

🔸 **Explosive increase and sophistication of global-scale cyber attacks**
- Difficulty in individual responses by carriers / ISPs
- Limitations to reactive security countermeasures

🔸 **Increase in security threats to clouds and new devices such as smartphones and sensors**
- Ineffectiveness with on-premise countermeasures centered on PCs and servers

Challenges

🔸 **Proactive security countermeasures**
- SIEM engine (for large-scale and/or unknown cyber attacks)
- Data security optimized for cloud environment (Secure dispersion/computation, intelligent encryption)

🔸 **Security operations enhancement**
- Global security cooperation with telecom-carriers, ISPs and security vendors
- Security for smartphones, sensors and wearable devices etc.
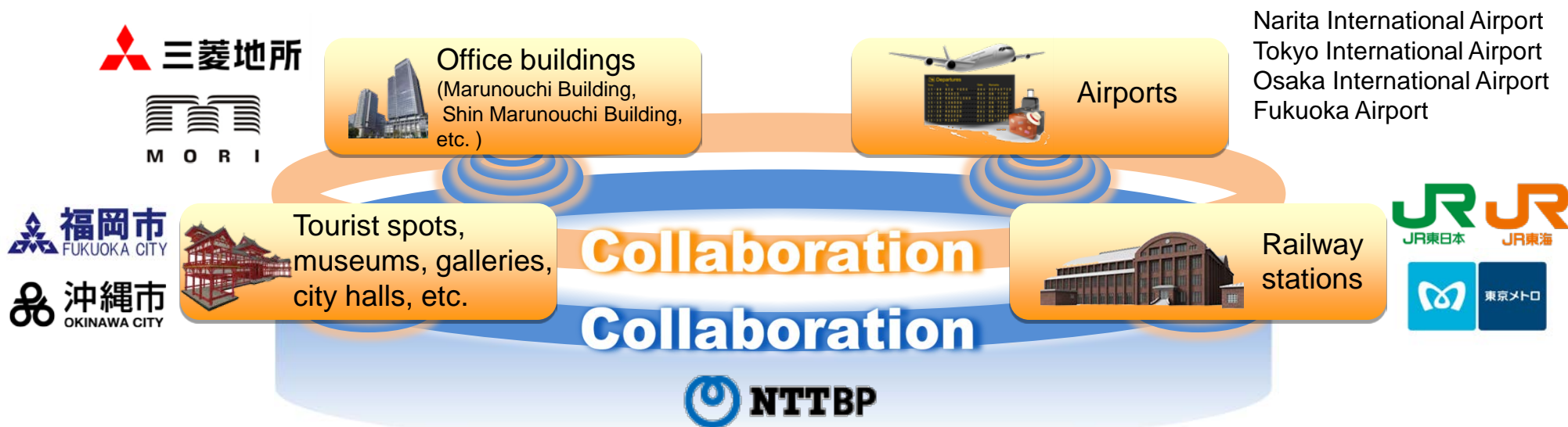
Collaboration for Smart Life & Smart Work

NTT

Environment

Transportation

Health Care

Stadiums

Home Entertainment

Tourism

Collaboration

ICT Providers

ICT Providers

Collaboration

NTT Group

Value Partner

Japan Connected-free Wi-Fi

NTT ◉

🟧 Launch of "Japan Connected-free Wi-Fi"
- interworking the open Wi-Fi services provided by corporations and local governments

三菱地所
MORI

福岡市 FUKUOKA CITY
沖縄市 OKINAWA CITY

Office buildings
(Marunouchi Building,
Shin Marunouchi Building,
etc.)

**Tourist spots,
museums, galleries,
city halls, etc.**

Collaboration
Collaboration

◉ **NTTBP**

Airports

Narita International Airport
Tokyo International Airport
Osaka International Airport
Fukuoka Airport

**Railway
stations**

JR東日本 JR東海
東京メトロ

Conventional Way

Registration
at each location

Airport

Japan Connected-free Wi-Fi

Available with
single registration

Airport

Japan
Connected-free
Wi-Fi

—8—

Next **V**alue **P**artner

for

Transformation

of Business models and Lifestyle

by

Trusted **S**olutions

of Global, Secure, End-to-end,
and Full-line ICT services