International Telecommunication Union

**ITU Workshop on
Spectrum Management for
Internet of Things Deployment
(Geneva, 22 November 2016)**

High Rate Close Proximity Communication Technology for IoT

Hiroyuki Matsumura
Senior Managing Director
HRCP Research and Development Partnership

ITU WORKSHOP ON SPECTRUM MANAGEMENT FOR INTERNET OF THINGS DEPLOYMENT

GENEVA, SWITZERLAND
22 NOVEMBER 2016

www.itu.int/go/ITU-R/RSG1SG5-IoT-16

Organised by:

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SRD and HRCP device

Touch and Get solution by HRCP Device

Summary

Internet

W-LAN

3G/4G/5G

Mobile Traffic Jam

53% CAGR 2015–2020
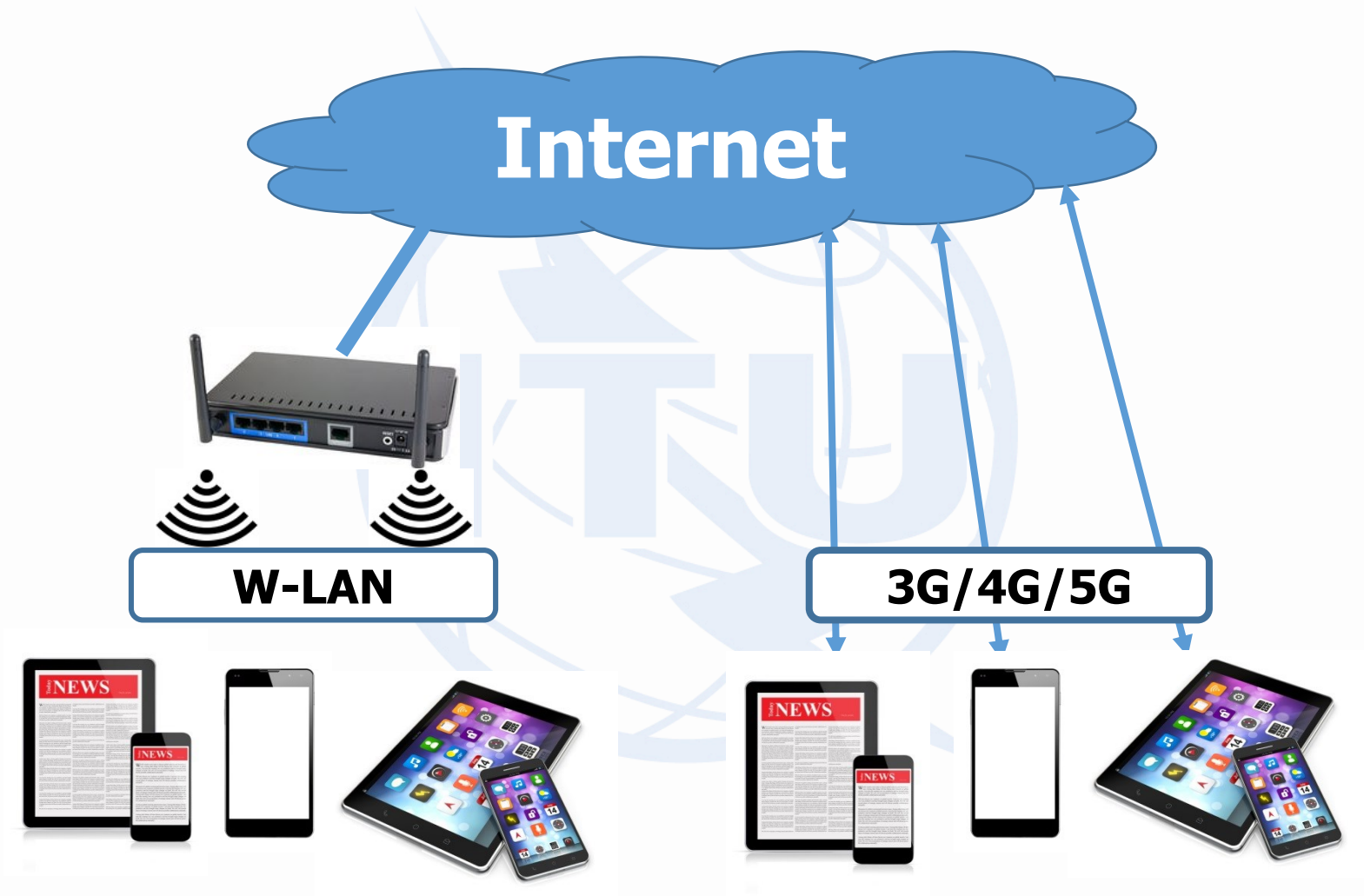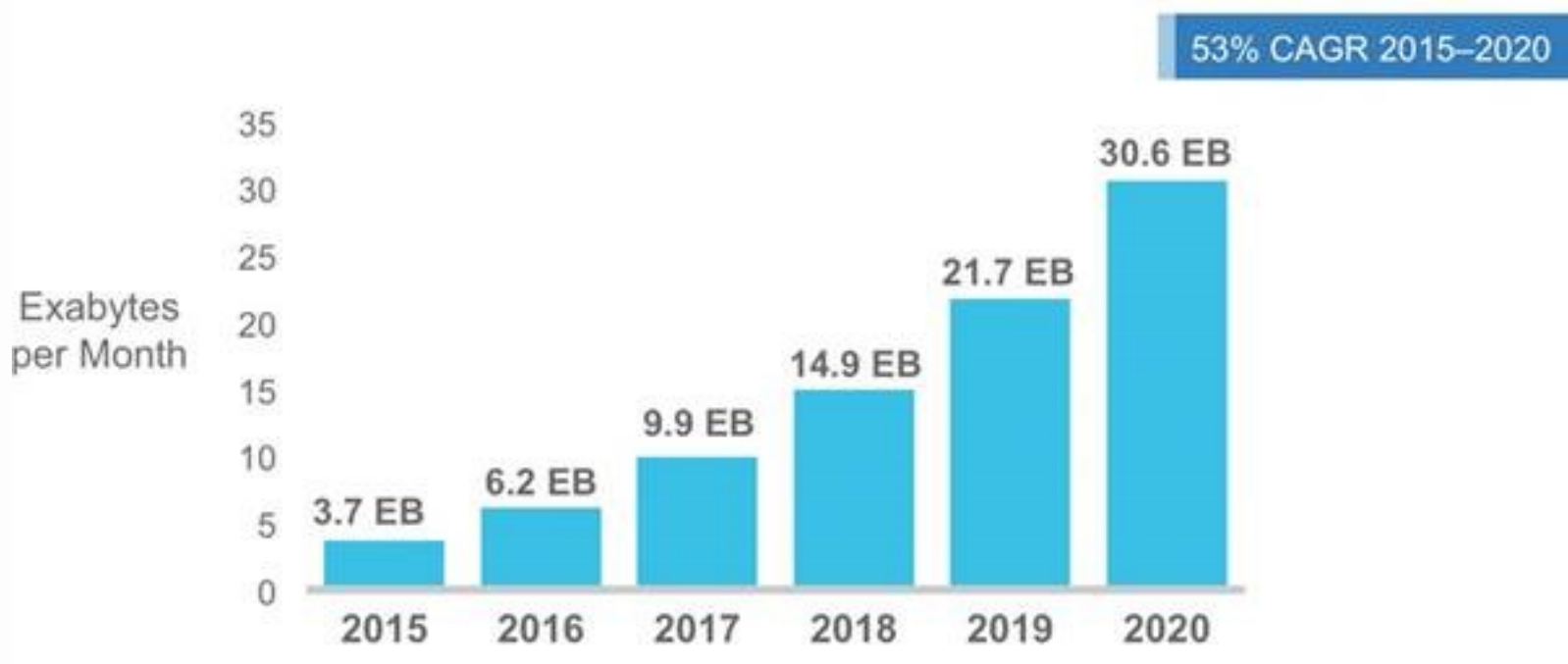
Source: Cisco VNI Mobile, 2016

- Overall mobile data traffic is expected to grow to 30.6 exabytes per month by 2020.
- Data of streaming video and audio is rapidly increasing.
- Individual packet payment is also increasing.

✓ *Solution for inhibiting mobile data traffic is desirable.*
✓ *Offloading system is necessary for solving this situation.*

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SRD and HRCP Spec.

	W-LAN		NFC			HRCP
	ac	ad	TYPE A	TYPE B	TYPE F	
Carrier Frequency	5GHz	60GHz	13.56MHz	13.56MHz	13.56MHz	60GHz
Topology	Point to N		Point to Point			
Effective Speed	240Mbps*1	1.0Gbps*2	106kbps	106kbps	212/424kbps	6.1Gbps
Connection Time	a few seconds	a few seconds				<2ms
Communication Range	<100m	<10m	<100mm			
Standardization	IEEE802.11ac	IEEE802.11ad	ISO/IEC 14443/18092	ISO/IEC 14443	ISO/IEC 18092	IEEE802.15.3e under discussion

*1: MAC efficiency is assumed to be 85%
*2: N = 3, MAC efficiency is assumed to be 85%
*HRCP: High Rate Close Proximity

Time for Transferring Contents

	Data Size (Mbytes)	HRCP Effective Throughput 6.1Gbps (sec)	ad Effective Throughput 1.0Gbps over (sec)*3
Book	1	0.001	0.008
Comic	30	0.039	0.24
Magazine	150	0.2	1.2
Music (1hour) *1	60	0.08	0.48
Movie (1hour) *2	450	0.59	3.6
Movie (2hour) *2	900	1.18	7.2
Short 4K Video (1 min)	263	0.35	2.1
Short 4K Video (5 min)	1,313	1.72	10.5

*1:   MP3 (Bitrate = 128 kbps)

*2:   H.265 (Hi-definition, Bitrate = 1 Mbps)

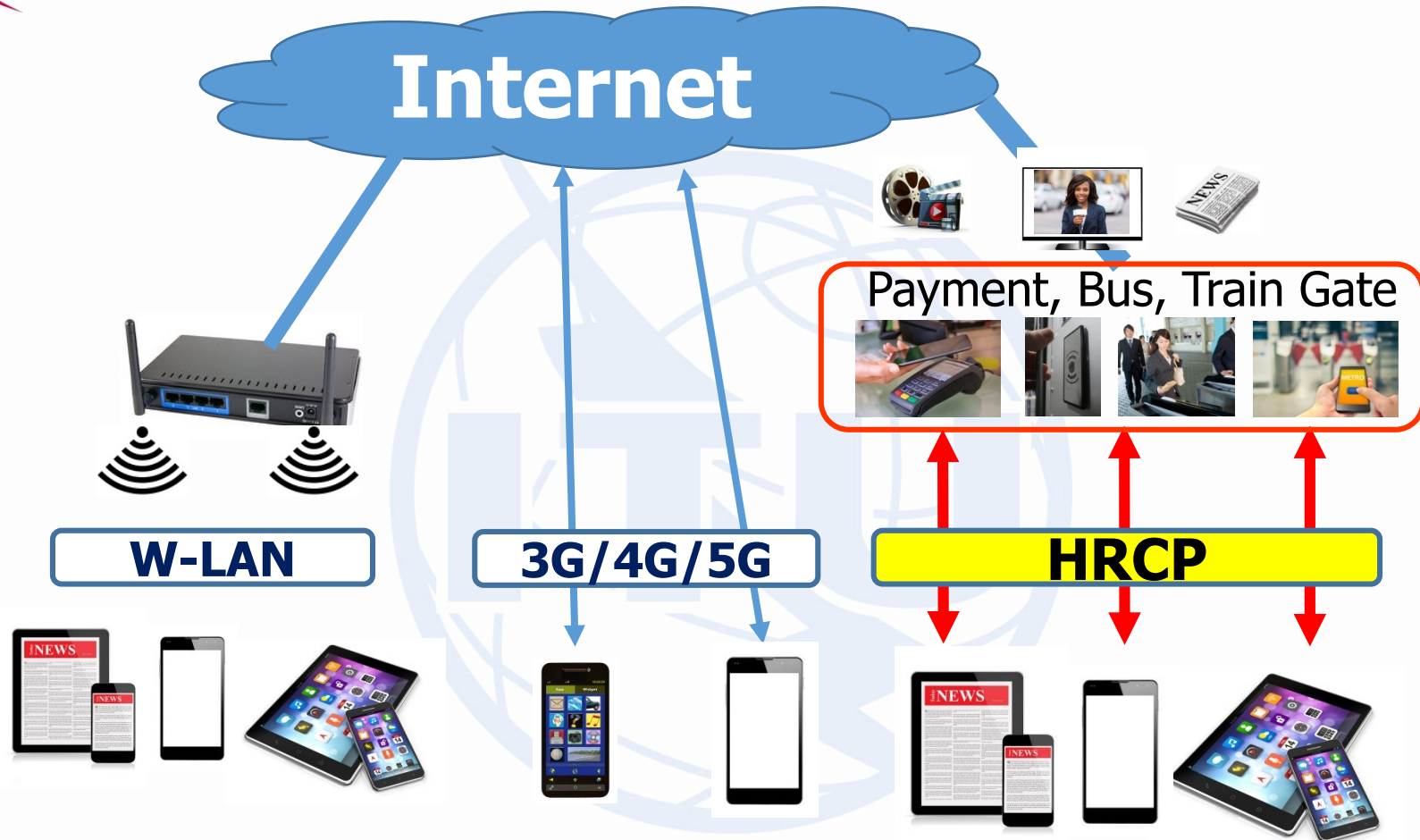*3:   N=3, MAC efficiency is assumed to be 85%

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Touch and Get Solution

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Payment, Bus, Train Gate

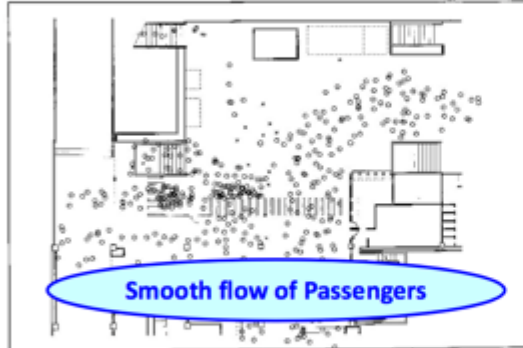**W-LAN**

3G/4G/5G

HRCP

Offloading Mobile Traffic provides two major benefits.
① Solve Mobile Traffic Jam
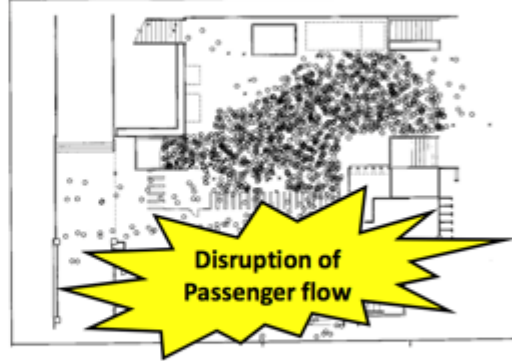**② Reduce individual's packet expense and enjoy downloaded contents**

Toll Gate solution for train
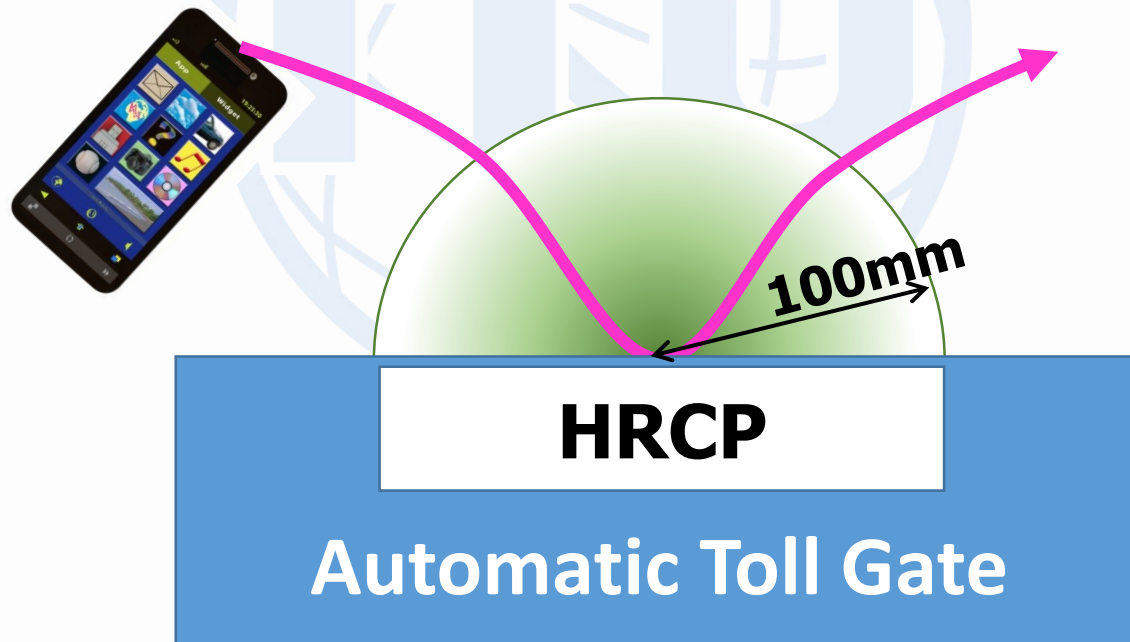
Passenger Flow Simulation

47 people/min   **32 people/min**
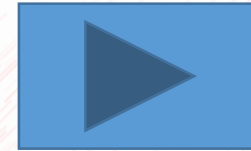
Smooth flow of Passengers

Disruption of Passenger flow

If the performance is poor, passengers are piled up on the platforms. Dangerous!

⇒ **High performance is mandatory.**

60 people go through the gate in a minute

Source: East Japan Railways Co.
http://japanese.engadget.com/2016/05/07/apple-pay-suica/

Solutions 1-2 for Toll Gate

- **60 people go through the gate in one minute.**
- **HRCP devices can communicate in 200m sec. and transfer over 150Mbytes.**
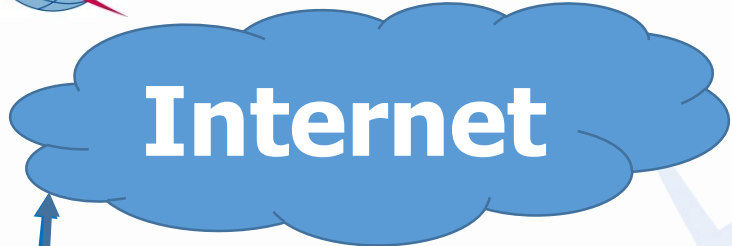- It is difficult for W-LAN device to communicate during going through the gate.

100mm

HRCP

Automatic Toll Gate

Solutions 1-3 for Toll Gate

Internet

Reservation to get Video and/or others at Station

Data down load to Toll Gate

Down Loading Request
①Newspaper
②TV News
③Animation
④Magazine

"Touch and Get"

METRO
PAY

Solutions 2 for NFC R/W

Internet

When you touch, contents Up/Down load are executed.

KIOSK

Cache Server

Payment

Cache Server

HRCP
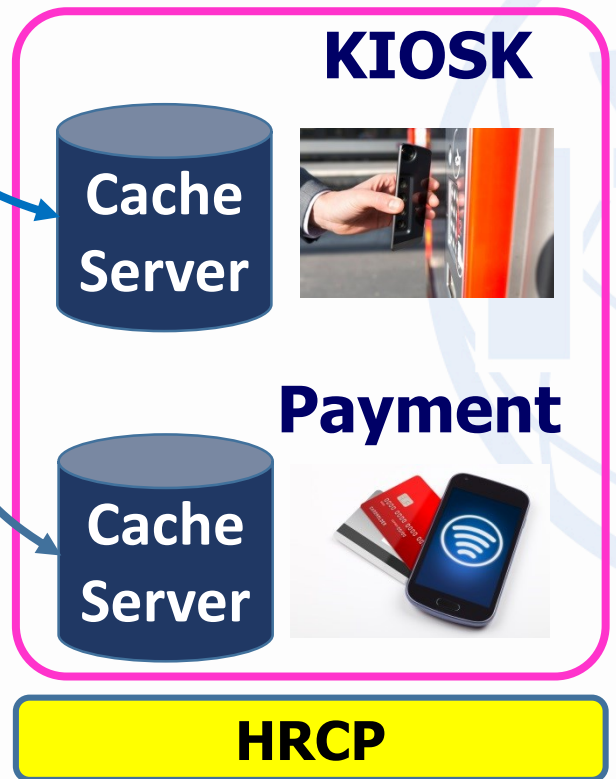
- Down load
  - ✓ Video
  - ✓ Audio
  - ✓ Newspaper, Magazine
  - ✓ Business data(PPT and etc.)
  - ✓ Advertisement

- Up Load
  - ✓ Video
  - ✓ Audio
  - ✓ Photo
  - ✓ Business Data(PPT and etc.)

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◆ **In general, it is desirable circumstance for IoT to improve Mobile Traffic Jam.**

◆ **HRCP device and application contribute for inhibiting mobile data traffic in the future.**

◆ **Global technical standard for HRCP is required to maximize HRCP's utilization.**

Anybody could use this "Touch and Get" solution at anywhere and anytime.