

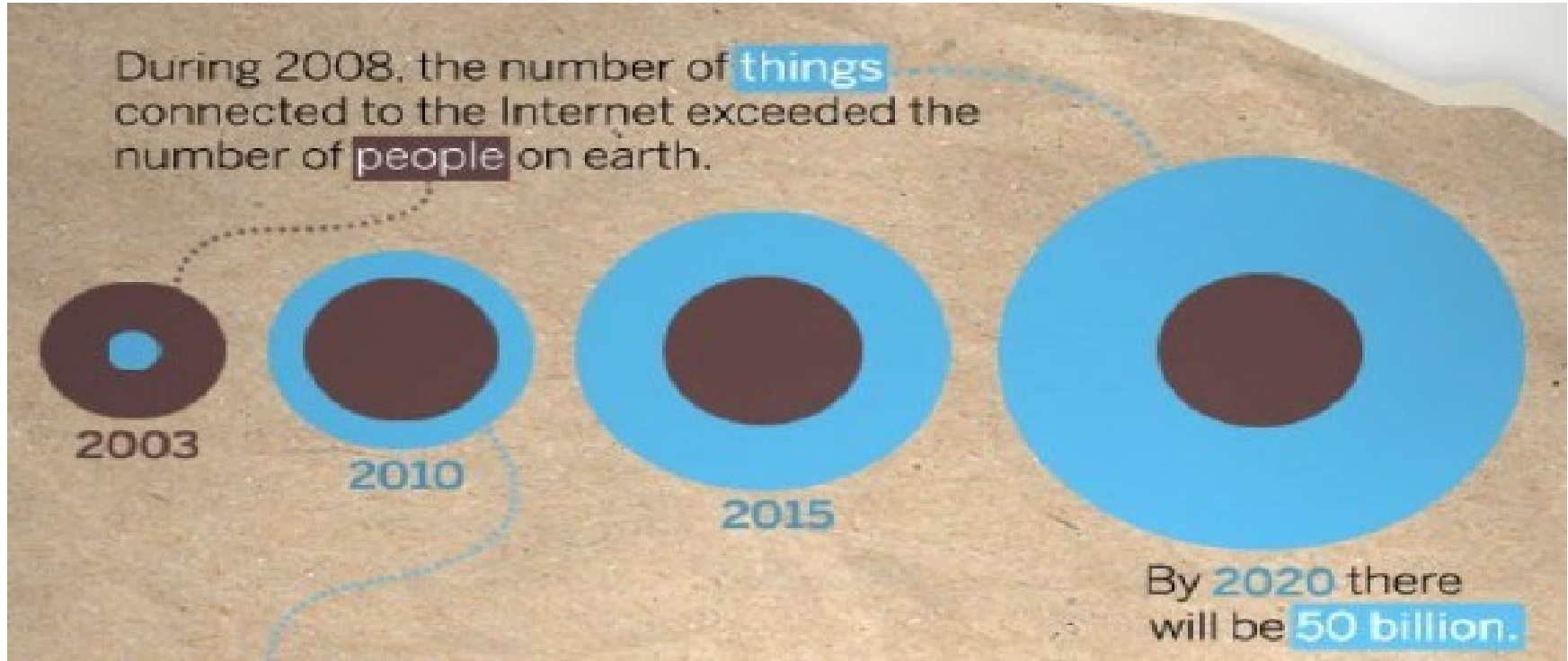
**ITU COE training program
on
“IoT Technologies & Application for Smart Cities”**

IoT/M2M Policy Roadmap

**Reena Malhotra
Dir (Networks & Technologies), DoT HQ**

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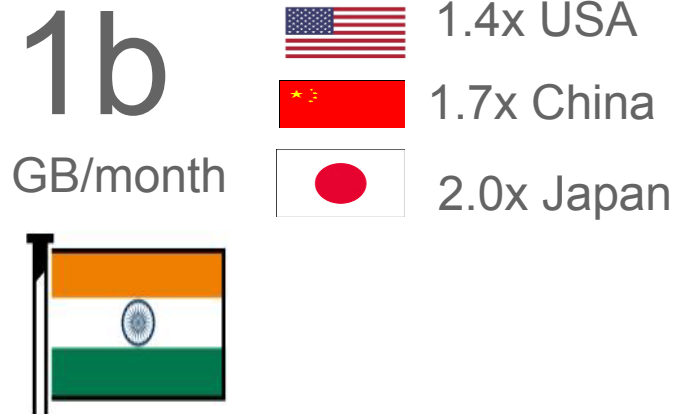
IoT Projections



- India is fast catching up with the adoption of IoT devices. As per recent estimates, IoT market in India stands at \$5.6 billion with 200 million connected units in 2016; this is expected to grow to \$15 billion with 2.7 billion units by 2020

Data Explosion in India

Highest Data consumption



Rise of Digital Indian

70% Smartphone time on social platforms

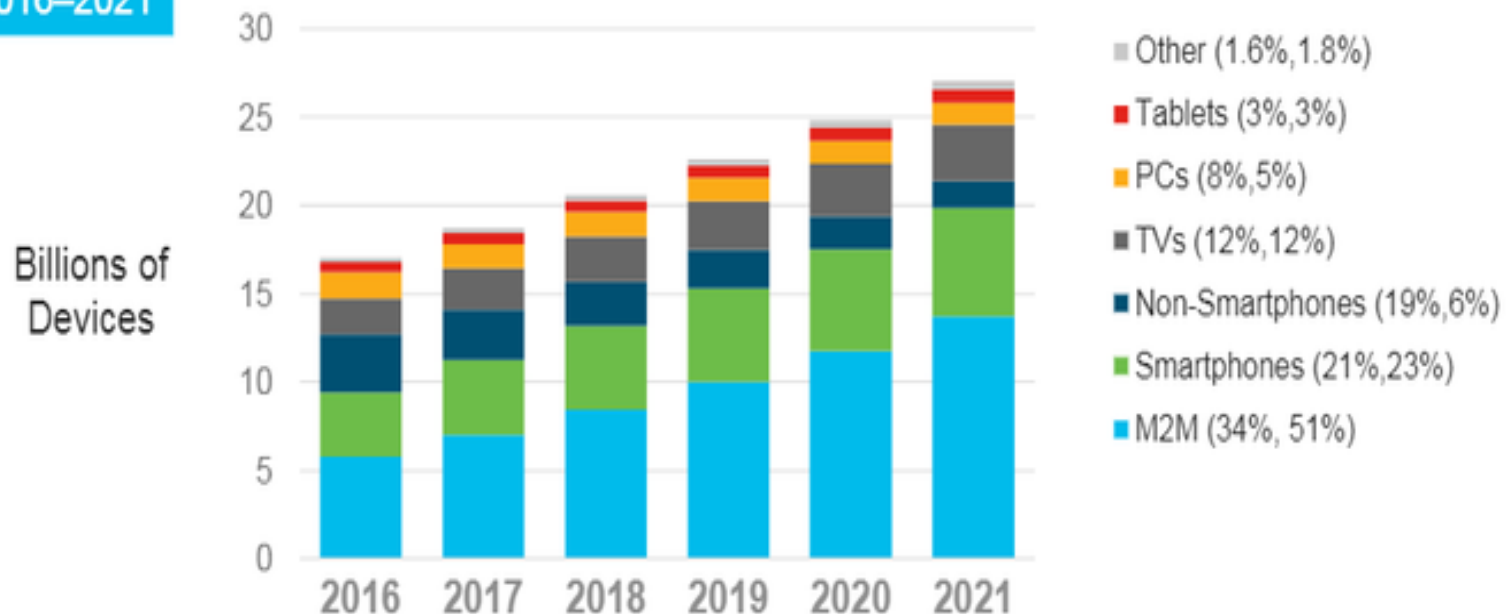
Time spent on mobile apps **200 Minutes** per day



Global Device/Connection Growth by Type

By 2021, M2M connections will be more than half of total connections

10% CAGR
2016–2021



* Figures (n) refer to 2015, 2021 device share

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global IoT Deployment

Canada:

- Started in 2010: i-CANADA
- Healthcare, TeleWork, e-commerce, education & government
- Public Sector
- Smart City

Europe:

- Started in 2011
- Smart Cities & Community
- Cognitive IoT
- Smart objects
- Smart transportation

Europe & Japan:

- Started in 2013
- ClouT: Joint European-Japanese ICT project for smart cities

Russia:

- 2020 target: US\$980M
- Vehicles, smart parking, smart cities' payment terminals, devices and sensors

Korea:

- Started in 2003
- Smart city & smart government
- 2014: 5G network technology (intelligent networks)

Japan:

- Started in 2010
- Home energy management: Yokohama city, Kansai Science City & Kitakyushu city
- Transport: Toyota City
- Applications: Vending machines, transportation management, surveillance & e-wallet services

USA:

- Started in 2010: SmartAmerica
- Areas: Manufacturing, healthcare, energy, transportation & disaster response, government, aeronautics & social media

South Africa:

- Started in 2010
- IoTEG (IoT Engineering Group), CSIR Meraka
- Applications: Connected devices, energy efficiency, enabling smart environments

India:

- Started in 2010
- Areas: Water, energy & waste resource efficiencies, environmental governance

Singapore:

- Started in 2013
- Areas: Wireless technology, smart products & smart nation

China:

- Started in 2005
- Traffic systems & IoT
- 2011: Food safety & healthcare in remote & rural areas

Australia:

- Started in 2010
- Renewable energy & electric vehicles
- Healthcare, government & infrastructure

IoT opportunities are enormous with a global economic value projection ranging from US\$1.9 trillion to US\$7.1 trillion by 2020.

IoT Connections Outlook (in billion)

	2017	2023	CAGR
Wide-area IoT	0.6	2.4	26%
Short-range IoT	6.4	17.4	18%
PC/laptop/tablet	1.6	1.7	0%
Mobile phones	7.5	8.8	3%
Fixed phones	1.4	1.3	0%
	17.5 billion	31.6 billion	

Regulatory & Policy initiative by DoT in M2M/IoT

1. Release of M2M Roadmap
2. Formation of Various committees related to M2M
3. KYC for SIM embedded M2M Devices
4. Instructions for Embedded-SIMs (e-SIMs)
5. Numbering scheme for SIM based M2M devices
6. Other Regulatory measures for M2M Communications
7. Future Challenges

1. National Telecom M2M Roadmap

- The Government of India has recognized the potential of M2M communication and emphasized the same in the National Telecom Policy (NTP)-2012.
- Envisaging potential of socio-economic benefits to consumers, businesses and governments from IoT/M2M and simultaneously recognizing challenges involved like security & privacy issues, traceability issue, etc., DoT has released “National Telecom M2M Roadmap” in May 2015
- The Roadmap outlines the broad policy and regulatory approach to facilitate the M2M ecosystem in the country.
- The Roadmap serves as a reference document for all stakeholders and focuses on communication aspects of M2M with the aim to have interoperable standards, policies and regulations for growth of M2M in the country

2. Committees related to M2M

- After the release of M2M Roadmap following committees were formed for proliferation of M2M:
 - A. APEX Committee:** As M2M will result in big projects and investment across Ministries, an Apex body has been constituted by DoT under chairmanship of Hon'ble MOC to address inter-ministerial coordination requirements. The members of the Apex body includes representative from MeitY, Ministry of Power, Ministry of Road Transport & Highways, Ministry of Health, Ministry of Agriculture, Ministry of Urban development, National Security Council Secretariat, Telecom Engineering Centre and DoT.
 - B. M2M Review Committee:** In order to support implementation of actionable points evolved from National Telecom M2M Roadmap, a M2M Review Committee consisting of officers of DoT, MeitY, C-DOT and TEC was formed
 - C. M2M Consultative Committee:** A M2M Consultative Committee consisting of industry associations like COAI, FICCI, ASSOCAM etc was formed and entrusted the task of bringing M2M related industry concerns and regulatory bottlenecks to the notice of M2M Apex body

3. KYC for SIM embedded M2M Devices

- DoT issued instructions for implementing restrictive features for SIMs used only for Machine-to-Machine (M2M) communication services (M2M SIMs) and related Know Your Customer (KYC) instructions for issuing M2M SIMs to entity/organization providing M2M Communication Services under bulk category
- M2M SIMs will be having following restrictions:
 - ✓ Outgoing/ incoming calls shall be allowed to/ from predefined set of maximum one(1) number only.
 - ✓ Likewise outgoing/ incoming SMS shall be allowed to/ from predefined set of maximum two (2) numbers only.
 - ✓ Data Communication shall be allowed on maximum two (2) numbers of predefined IP addresses with fixed APNs or equivalent technology options by Licensee
 - ✓ These restrictions are not applicable to calls made to emergency numbers like police, fire, ambulance etc.
- The existing connections issued to entity/organization providing M2M Services shall be made compliant to above instructions within six months of issue of these instructions
- For M2M services an individual user shall be permitted to have 9 M2M SIM's in addition to existing limit of 9 mobile connections

4. Instructions for Embedded-SIMs (e-SIMs)

- DoT has issued the instructions for introduction of e-SIMs in Indian telecom network.

- Salient features of the instructions are as below:
 - ✓ To cater the needs of modern technological developments in M2M/IoT, it has been decided to permit the use of e-SIMs with both single and multiple profile configurations with Over The Air(OTA) subscription update facility as per prevailing global specifications and standards(GSMA)

 - ✓ The licensees profiling e-SIMs shall take all reasonable steps to ensure that the device manufacturer embedding such SIM do not tamper the e-SIM at manufacturing stage

 - ✓ In order to facilitate mobile number portability (MNP) and to avoid Telco lock-in for all use case scenarios of e-SIM, the licensees shall be permitted for Profile updation via over the air (OTA) feature as per prevailing global specifications and standards.

 - ✓ The licensee must ensure that while allowing the use of such e-SIMs in its network, it must fulfil all the security and lawful interception & monitoring related terms & condition of license agreement.

5. 13-digit numbering scheme for SIM based M2M devices

- Seeing future requirement of numbering resources, TEC had prepared a technical report in Nov 2015 in which they have recommended the 13-digit numbering scheme for SIM based M2M devices.

- The structure of 13-digit numbering scheme is as below:

Country code 2 digit (+91)	M2M Identifier 3 digits	Licensee Identifier 4 digit (10000 blocks)	Device Number 6 digits (1 million)
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- Subsequently, DoT has finalized the 13-digit numbering scheme for SIM based M2M devices and allocated 13 digit M2M numbering series for testing purpose to telecom licensees.
- DoT has decided that 13 digit M2M numbering plan will be implemented from 1st October 2018. From this date onwards, all new M2M mobile connections will be allocated 13 digit numbers only
- Migration of existing 10 digit M2M numbers to 13 digits shall be completed by 31st March 2019

6. Other Regulatory measures for M2M Communications

- All access service providers' viz. CMTS, UASL, UL (AS) and UL holders using licensed access spectrum shall be allowed to provide M2M connectivity within the area of their existing authorizations. However, they have to register with DoT for providing M2M services.
- Connectivity provider using WPAN/WLAN technologies for providing M2M connectivity for commercial purposes, operating in unlicensed spectrum, should register with DoT
- Connectivity provider using LPWAN technologies operating in unlicensed spectrum would be covered under licensing through a new authorization under UL namely UL (M2M). Such licensees should be allowed to bid for licensed spectrum to provide exclusively M2M services, if they desire to provide M2M services in the licensed band.
- Device manufacturers will be mandated to implement “Security by design” principle in M2M device manufacturing so that end-to-end encryption can be achieved.
- A National Trust Centre (NTC) will be created for the certification of M2M devices and applications (hardware and software).

6. Other Regulatory measures for M2M Communications

- Spectrum allocation will be technology and service neutral

- For QoS purpose, in the present stage of deployment of M2M devices and services, a duty cycle of 10% both at device level and network level shall be ensured by M2MSP.

- DoT has envisaged mandating M2M Service providers (M2MSPs) to register with government under M2M service providers Registration. Salient features of proposed Draft M2MSP guidelines are as below:
 - ✓ At the time of registration, M2MSP shall provide the details of M2M services along with type of technology used in which it will be providing services
 - ✓ M2MSP shall provide the details of proposed geographical area of operations, location of their IT setup/ core network at the time of registration
 - ✓ M2MSP shall adhere to Know Your Customer (KYC) and related guidelines issued by the Authority to Telecom Licensees from time to time for all Telecom resources including SIM enabled devices
 - ✓ M2MSP shall have ownership of all SIMs taken from Telecom Licensees. The details of all the customers of M2M services i.e., physical custodian of machines fitted with SIMs, shall be maintained by M2MSP
 - ✓ The M2MSP at the time of registration shall provide details of all network elements along with routing details, network operation & control/ management Centre, equipment details, network topology/diagram and end to end connectivity

Future Challenges

➤ Identification of Critical M2M/IoT services

- ✓ Critical services do require SLAs for effective delivery of services at a certain QoS as may be intended.
- ✓ Considering the scope and breadth of this potential issue, DoT will take up a detailed consultation with all stakeholders to comprehensively examine and identify the critical M2M/IoT services

➤ Security in M2M/IoT

- ✓ Security is the key issue which need to be taken care while enabling M2M/IoT.
- ✓ Device manufacturers should be mandated to implement “Security by design” principle in M2M device manufacturing so that end-to-end encryption can be achieved.

➤ Privacy & Data Protection in M2M/IoT

- ✓ IoT devices must retain a certain amount of privacy when processing data and have security measures built in.
- ✓ Ownership of data must also be established clearly for consumers to feel comfortable with integrating IoT into their daily lives

Future Challenges

➤ e-SIM implementation issues

- ✓ Device Configuration, Roaming issues ,Profile Management and other related issues need to be addressed
- ✓ GSMA guidelines related to e-SIM shall be followed

➤ Location of Servers

- ✓ Data Storage in servers located in India and Location of Profiling servers in case of e-SIM Profile management
- ✓ Proper legal framework shall be established to address this issue

Thank You