GTI Open Platform Project Introduction

GTI 2.0 Initiatives on IoT

Kicked off GTI in 2011
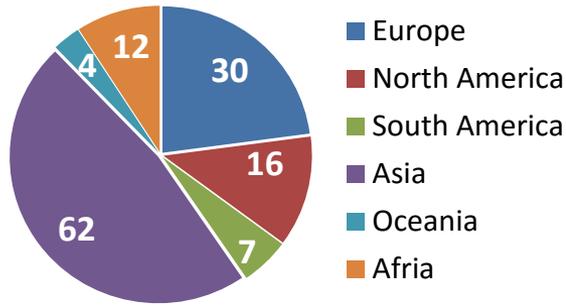
Kicked off GTI 2.0 in 2016

GTI 1.0
2011 ~ 2015

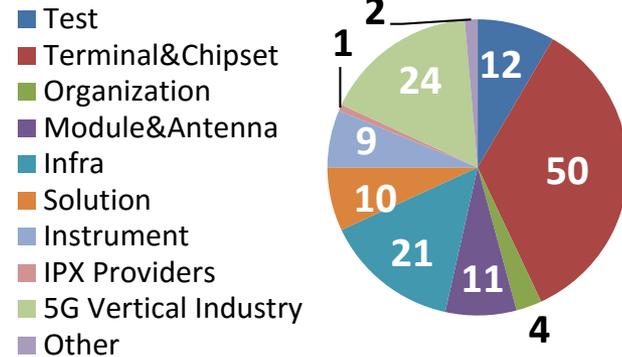**GTI 2.0**
2016 ~
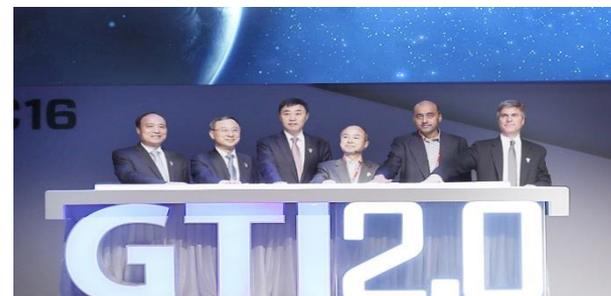
We become

Move forward

◆ **Influential player across the mobile community**
◆ **Global presence with operators and key vendors**

◆ **4G Development**
◆ **5G R&D and Commercial Preparation**
◆ **Cross-industry Opportunity**

131 *operators have joined GTI*

144 *vendors have joined GTI Partner Forum*

Operators pie chart legend:
- Europe — 30
- North America — 16
- South America — 7
- Asia — 62
- Oceania — 4
- Afria — 12

Vendors pie chart legend:
- Test — 12
- Terminal&Chipset — 50
- Organization — 4
- Module&Antenna — 11
- Infra — 21
- Solution — 10
- Instrument — 9
- IPX Providers — 1
- 5G Vertical Industry — 24
- Other — 2

7 MEMBERS ARE IN PROCESS

➤ **23 Vertical Industry Partners**

Including IoT, IoV, Communication Capability, Industrial Internet, Cloud Robot, VR/AR

✔ BAIC	✔ Changhong	✔ CloudMinds	✔ EVE Energy	✔ Feitian
✔ GAEI	✔ Goertek	✔ Haier	✔ Hisense	✔ IESLab
✔ Jinan Towngas	✔ LeAutolink	✔ Neusoft	✔ Oviphone	✔ Canny Robot
✔ Philips Lighting B.V.	✔ SAFT SA	✔ Shougang Automation Information		✔ iStaging
✔ Taiyo Yuden	✔ WapWag	✔ Wireless Car	✔ Xiaomi	

Achievements of GTI

01 Successfully built global end-to-end TD-LTE ecosystem

Successful global commercialization of TD-LTE

02

03 Successful convergence of TDD/FDD and initiation of joint operation

99 TD-LTE commercial networks in *52* countries, and *92* TD-LTE commercial networks in progress

35 converged TDD/FDD networks

1.579 million TD-LTE base stations

850 million TD-LTE subscribers
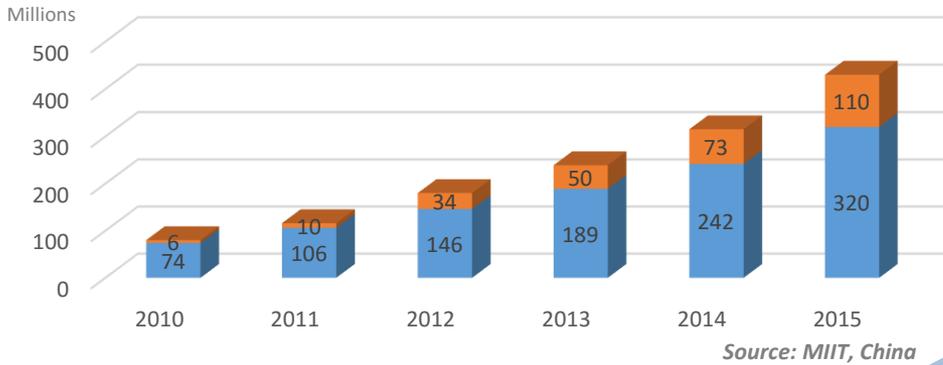
4717 TD-LTE terminals, *52.6%* supporting TDD/FDD

Source: GTI and GSA
By the end of 2016

GTI 2.0 Technical Work

GTI established 5 Programs to continuously promote 4G evolution and 5G development with concrete deliverables

GTI 2.0 Technical Work

Program	Objective	Projects	
4G &Evolution	Facing the rapid development of data requirements on new service & applications, efficient utilizing LTE to enhance performance and service capability	Massive-MIMO Uplink Enhancement Smooth Evolution	Innovative Business & Service eMBMS …
5G eMBB	Defining 5G eMBB requirements/use case, validating system solution, defining product requirement and promoting commercial deployment among GTI partners and with wider industry partners	Sub 6GHz New Device Architecture	Test Equipment …
IoT	Promoting development of cellular IOT technology and its commercialization	Pilot and Trial Wireless Solution Network Architecture Chipset and Module	Device Certification Open Platform Market & Business …
IoV	Cooperation with other international organizations, like 5GAA, and automotive industry to better promote the development of V2X		
Cloud Robot	Enabling the development of Cloud Robot and jointly exploring the market	Whitepaper Prototype demo 5G integration	Pre-5G demo …

Cellular Internet of Thing Status

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Cellular IoT Connections Statistics

- Global
- China

Millions

Year	Global	China
2010	74	6
2011	106	10
2012	146	34
2013	189	50
2014	242	73
2015	320	110

Source: MIIT, China

100+ millions

中国移动通信 CHINA MOBILE

2016

- Collaborative Manufacture
- Modern Agriculture
- Smart Energy
- Inclusive Finance
- Mass Service
- Efficient Logistical
- e-Commerce
- Transportation Efficiency
- Green Ecology

Smart Metering
Unmanned Factory Polling
Smart Shopping
Intelligent Logistics **Environment Monitoring**
Smart Wearables
Intelligent Parking

- **Low Data Rate (< 100kbps)**
- **Low Power（10 Years）**
- **Extended Coverage（20dB Enhanced）**

Intelligent UAV Irrigating
Smart Wearables
Video Surveillance
Smart Home

- **Middle Data Rate (100kbps -10Mbps)**
- **Power Consumption Insensitive**
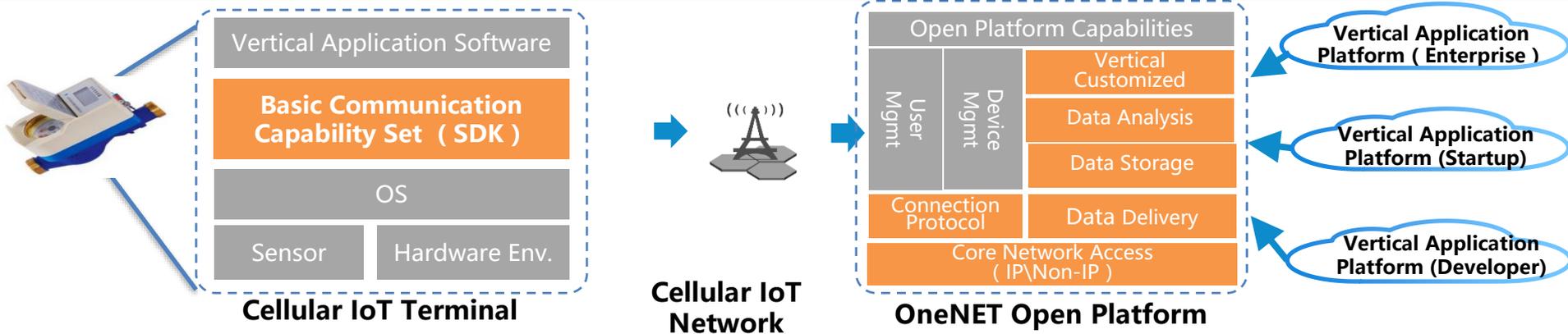- **Require for Voice**

Tele-Medicine
Intelligent Machine Production
Smart Grid

- **Higher Data Rate (>10Mbps)**
- **Power Consumption Insensitive**
- **Low Latency**

IoT Is More Than Connections

Rely on the CMCC Superior Cellular Network, Leverage IoT Platform +SDK to Provide E2E Data Service

OneNET 中移物联网开放平台

Cellular IoT Terminal

- Vertical Application Software
- **Basic Communication Capability Set（SDK）**
- OS
- Sensor
- Hardware Env.

Cellular IoT Network

OneNET Open Platform

Open Platform Capabilities
- User Mgmt
- Device Mgmt
- Vertical Customized
- Data Analysis
- Data Storage
- Connection Protocol
- Data Delivery
- Core Network Access（IP\Non-IP）

Vertical Application Platform（Enterprise）

Vertical Application Platform (Startup)

Vertical Application Platform (Developer)
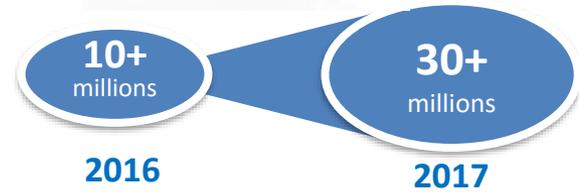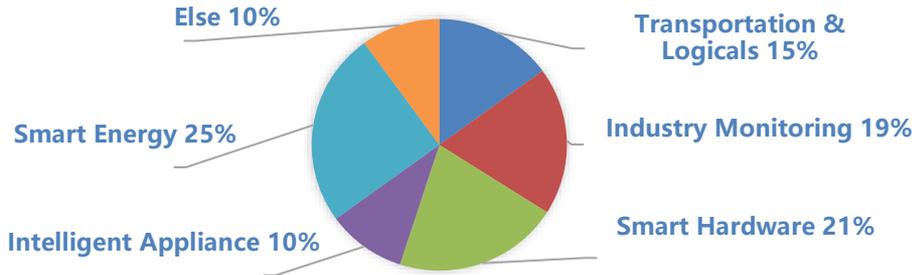
Terminal

SDK deployment , first hand data collection

- **Deployment Strategy:** to promote Chipset vendor integration, and strength cooperation with module vendor
- **Protocol:** adoption of light transport protocols, to reduce IoT terminal power consumption, to optimize the network resource consumption
- **Semitics:** to standardize the semantics and improve data recognition

Platform

Comprehensive Data Service Professional Vertical Customization

- To match the Cellular IoT characteristics, enhance the data service capability:
  - Data Access: To support NB-IoT IP/Non-IP data transmission
  - Data Storage: Improve the storage capability, extended structure data store
  - Data Analysis: Support vertical industry data analysis and data exchange
  - Support data forwarding and delivery
- Improve vertical customization capability to meet company wide development vision

IoT Platform to Booming Cellular IoT

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OneNET Platform Industry Users Distribution

Pie chart:
- Transportation & Logicals 15%
- Industry Monitoring 19%
- Smart Hardware 21%
- Intelligent Appliance 10%
- Smart Energy 25%
- Else 10%

OneNET 中移物联网开放平台

10+ millions — **2016**

30+ millions — **2017**

OneNET Core Functions

9 — User Management
For different roles, provide independent function module and operation permission, to facilitate product developing and maintaince team
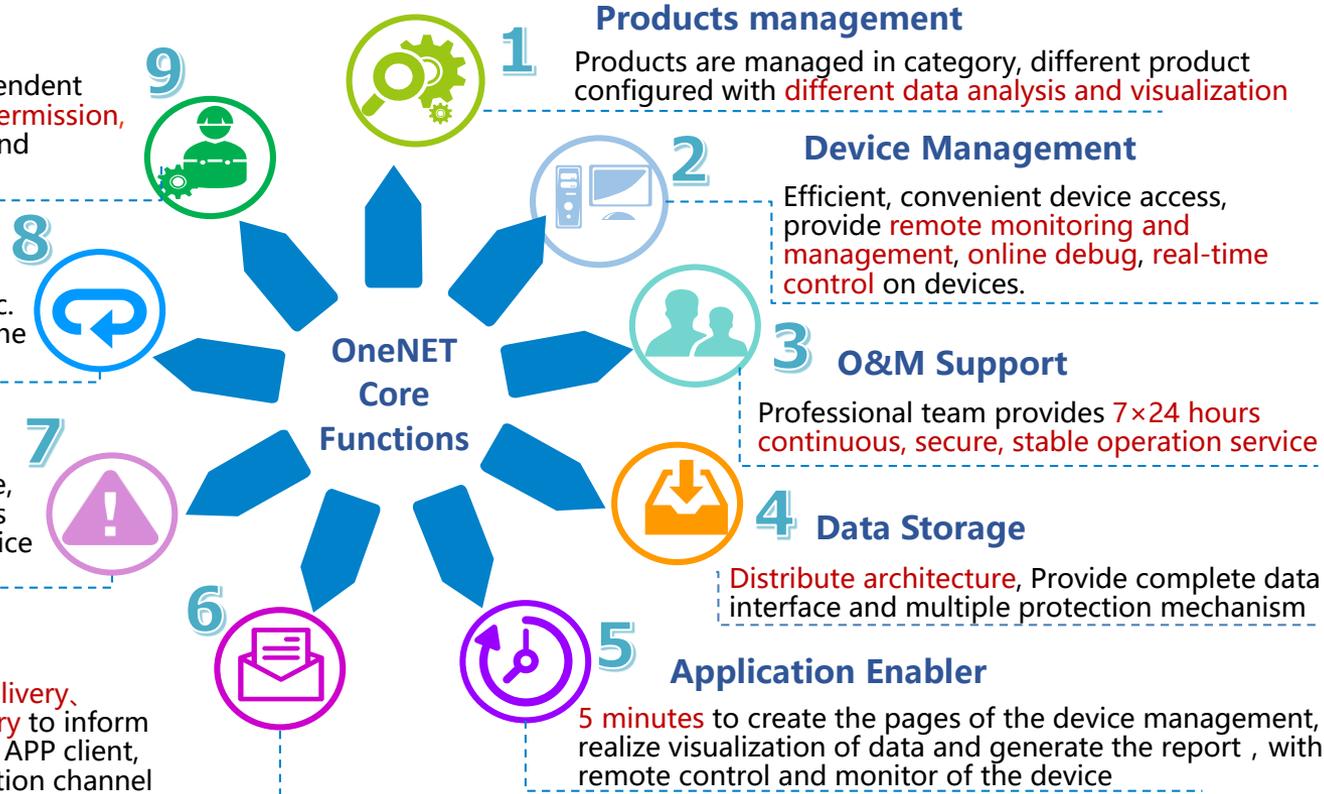
8 — Open Capability
Integrate SMS/MMS、LBS、IaaS and etc. service, leverage Open API , to reduce the terminal & application develop cycle

7 — Controlled Trigger
Event triggering engine on platform side, event can be defined by user themselves to speed up the implement specific service logical

6 — Data Delivery
Forward the data over message delivery、SMS/MMS Pushing、in APP delivery to inform the service platform, smart phone, APP client, Setup the bi-direction communication channel

1 — Products management
Products are managed in category, different product configured with different data analysis and visualization

2 — Device Management
Efficient, convenient device access, provide remote monitoring and management, online debug, real-time control on devices.

3 — O&M Support
Professional team provides 7×24 hours continuous, secure, stable operation service

4 — Data Storage
Distribute architecture, Provide complete data interface and multiple protection mechanism

5 — Application Enabler
5 minutes to create the pages of the device management, to realize visualization of data and generate the report , with remote control and monitor of the device

Necessary Improvements for Speeding Up Operator IoT Services

Support Constrained Device

Light protocols to meet the hardware requirement, minimize power consumption and etc.

High Efficiency Data Transfer

More close integration/interworking with lower layer to reduce the overhead during data transfer.

Universal Interfaces to Transfer Data

Standardized and unified interfaces are necessary to facilitate the large scale deployment.

Well Defined Semantics

Rely on well accepted semantics to enable more value added IoT data services, expecting to move forward by standardizing the semantics.

Less Complexity to Developer

To hide complexity of NW usage from apps, simple interface to developers, facilitate the end user to connect to platform easily. Provide basic communication set to reduce the developer efforts.

Objective

- To enable large scale deployment of operator IoT service and speed up cellular IoT.
- To promote universal IoT service platform and unified IoT data service interfaces.

Tasks

- Open Platform Business Model Analysis
- Architecture and Protocols of IoT System
- IoT Platform Service Layer
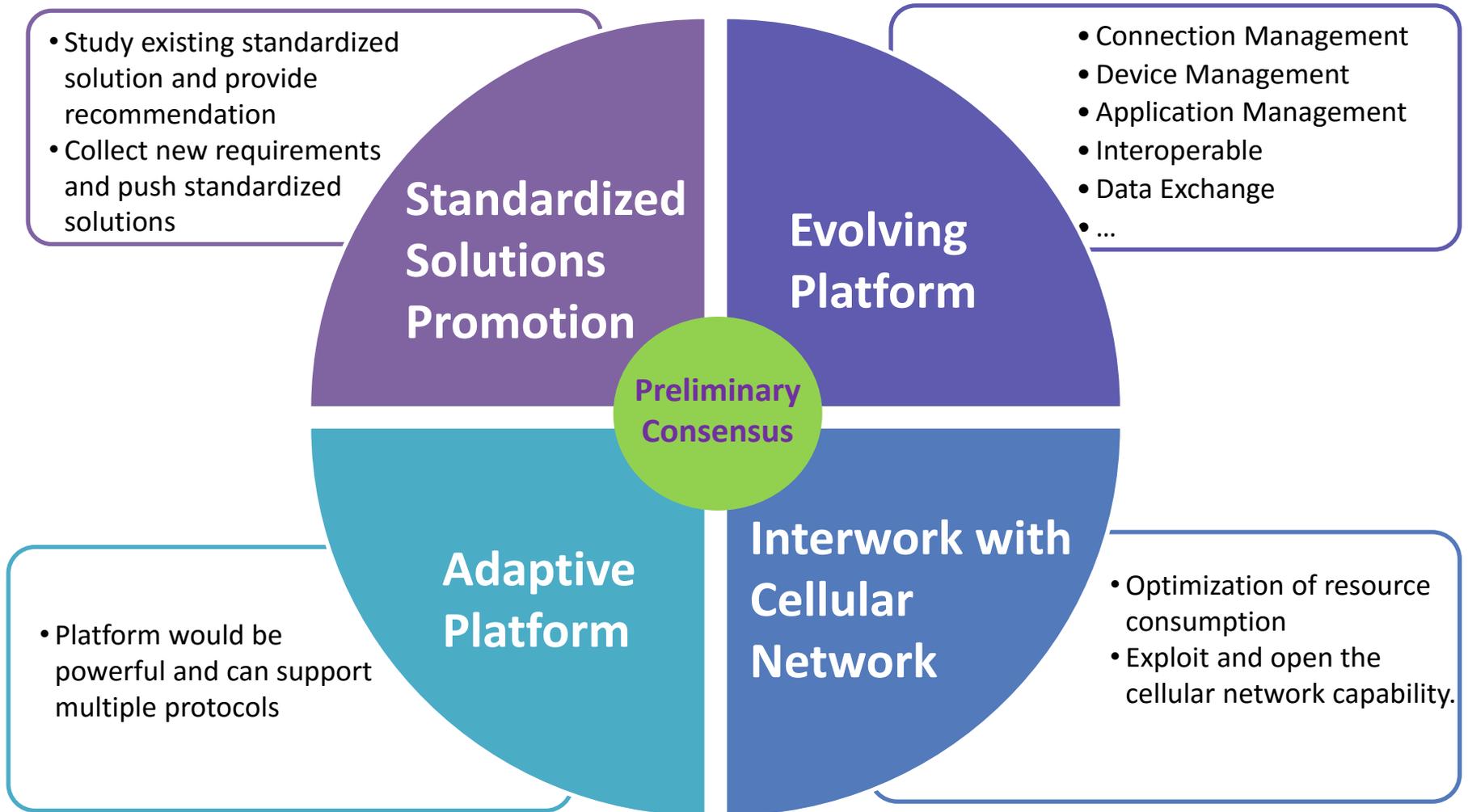- IoT Device Service Layer
- Software Instance (SDK) of Device API
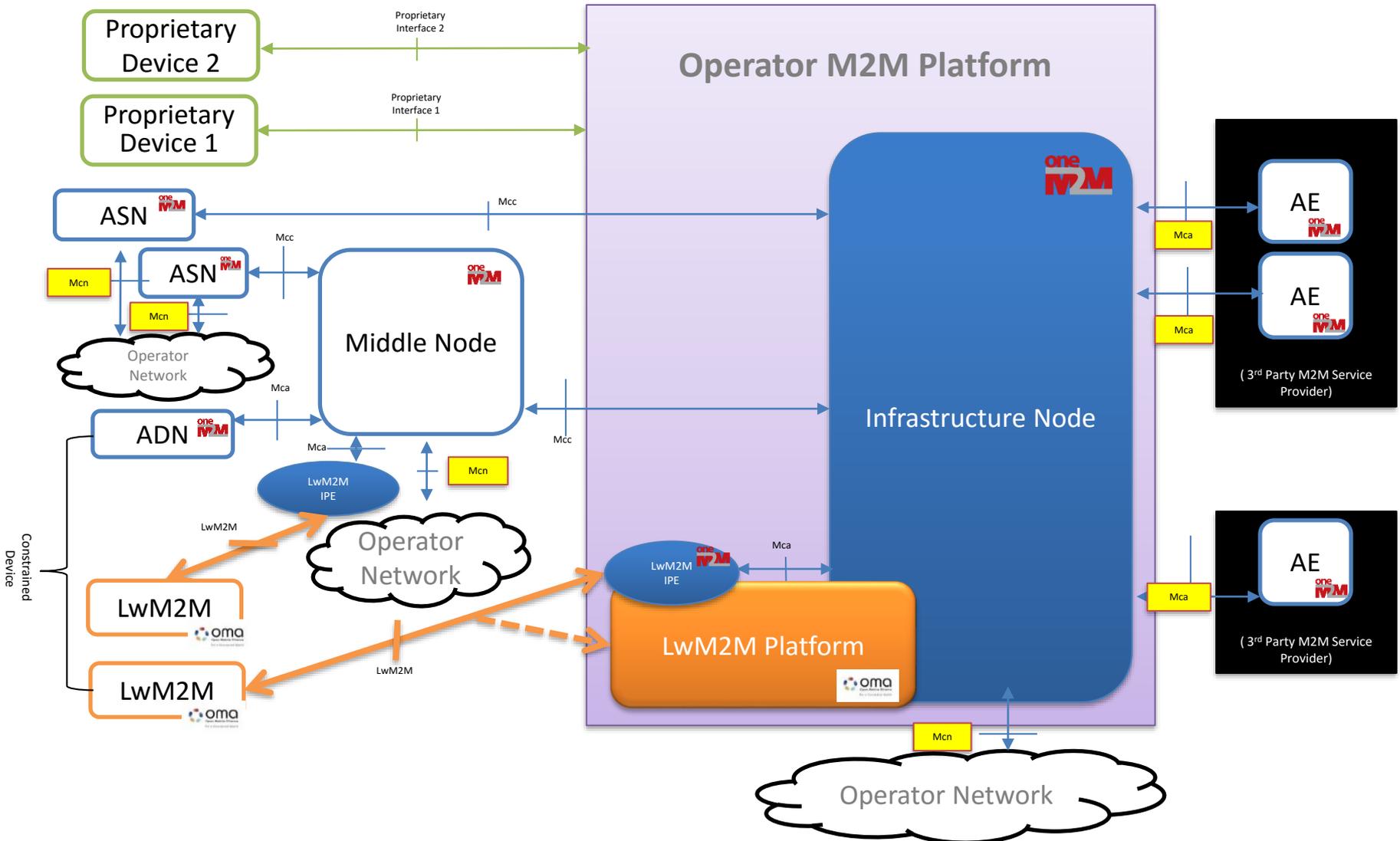
Deliverable

- Whitepapers
- Study Report
- Device SDKs

GTI IoT Application/Vertical: manages IoT elements from many verticals with common parameters, open data models, and APIs
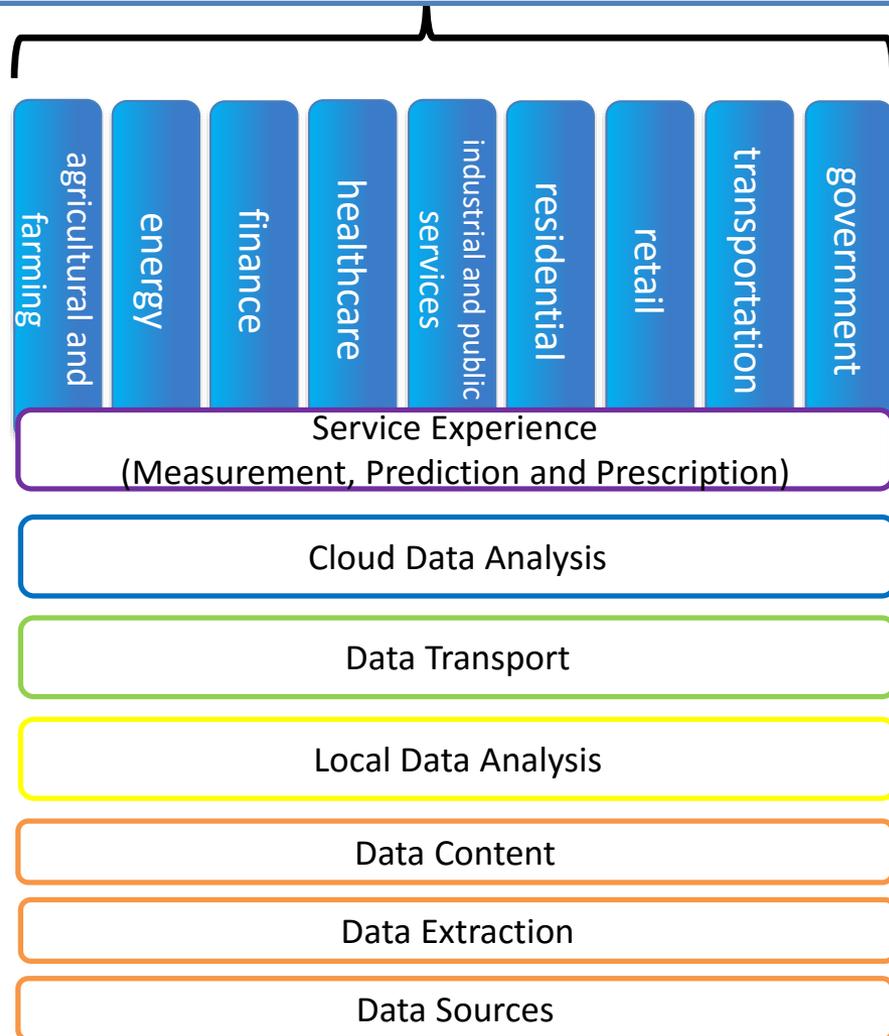
GTI IoT Open Platform as a Service at/cross any layer: provides a wealth of data about IoT device/product status, location, behaviors, usage, service configuration, performance and quality of experience

Verticals:
- agricultural and farming
- energy
- finance
- healthcare
- industrial and public services
- residential
- retail
- transportation
- government

Service Experience
(Measurement, Prediction and Prescription)

Cloud Data Analysis

Data Transport

Local Data Analysis

Data Content

Data Extraction

Data Sources

- Study existing standardized solution and provide recommendation
- Collect new requirements and push standardized solutions

Standardized Solutions Promotion

Evolving Platform

- Connection Management
- Device Management
- Application Management
- Interoperable
- Data Exchange
- …

Preliminary Consensus

Adaptive Platform

Interwork with Cellular Network

- Platform would be powerful and can support multiple protocols

- Optimization of resource consumption
- Exploit and open the cellular network capability.

- Goal is to provide a device side API for implementing an software instance (SDK) in order to enable developers to connect to the platform
  - CMCC is actively working on publishing a LwM2M Compatible SDK
- Encourage to deliver the API (SDKs) compatible with standardized solutions.
- Pending to decide whether to publish platform side implementation instance.
  - It would depend on participants' contribution.

Backup

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Meeting Plan 2017

2017	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec
Summit (2)	Time: 28th Feb. (MWC) Venue: Barcelona, Spain **GTI Summit**		Time: TBD (28th Jun.-1st Jul.) (MWCS17) Venue: Shanghai, China **GTI Summit**			
Workshop (4)	Time: 23th -24th Feb. (MWC) Venue: Barcelona, Spain **The 18th GTI Workshop**		Time: TBD (28th Jun.-1st Jul.) (MWCS17) Venue: Shanghai, China **The 19th GTI Workshop**		Time: TBD (in Sep.), 2017 Venue: San Francisco, USA ➤ **The 20th GTI Workshop** Time: TBD (during 25th -28th Sep.) (ITU Telecom World) Venue: Busan, Republic of Korea ➤ **TD-LTE Technology and Spectrum Workshop**	
5G Vertical Industry (3)	Time: TBD (during 27th Feb. -2nd Mar.) (MWC) Venue: Barcelona, Spain ➤ **IoT Ad-hoc** ➤ **IoV Ad-hoc**		Time: TBD (28th Jun.-1st Jul.) (MWCS17) Venue: Shanghai, China **IoV Ad-hoc**			
Exhibition (3)	27th Feb. -2nd Mar (MWC) **Barcelona, Spain**		28th Jun.-1st Jul. (MWCS17) **Shanghai, China**		25th -28th Sep. (ITU Telecom World) **Busan, Republic of Korea**	
Others (1)	Time: 28th Feb. (MWC) Venue: Barcelona, Spain **GTI Awards**					

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How to join as GTI Operator Member (with TDD spectrum)?

1 Submit the **application form** to Secretariat GTI_Secretariat_list@lte-tdd.org

2 Secretariat reviews the application form and send the **Letter of Intent (LOI)** to applicant.

3 The applicant signs the LOI for participation into the GTI.

4 The applicant receives an official confirmation from GTI Secretariat.

How to join as GTI Operator Member (without TDD spectrum)?

1 Submit the **application form** to Secretariat GTI_Secretariat_list@lte-tdd.org

2 Secretariat reviews the application form and send the **declaration form** to applicant.

3 The applicant signs the **declaration form** for GTI SC's approval

4 The applicant receives an official confirmation from GTI Secretariat.

How to join as GTI Partner Forum Member?

1 Submit the **application form** to Secretariat GTI_Secretariat_list@lte-tdd.org

2 Secretariat reviews the application form and send the **declaration form** to applicant.

3 The applicant signs the **declaration form** for GTI SC's approval

4 The applicant receives an official confirmation from GTI Secretariat.

CLICK HERE

http://gtigroup.org/joinUs.html