Next Step Networks and Systems in China

CCSA

China Communications Standards Association

2019-11-27

Agenda

1 CCSA

2 China 5G Industry

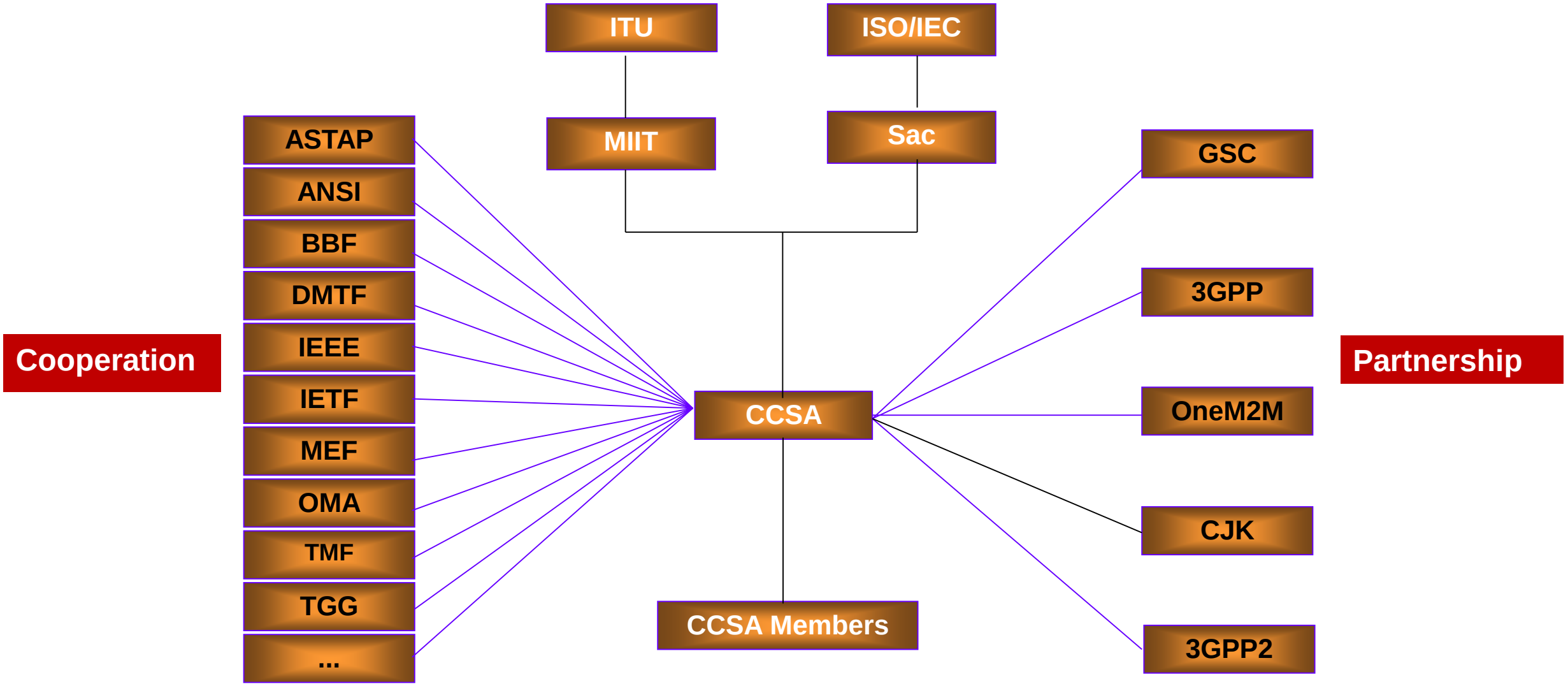
3 China 6G

CCSA
China Communications Standards Association

中国通信标准化协会
China Communications Standards Association

- Founded in 2002, starting as a trial of the Gov. reform
- Membership
  - 700+, industrial majority, covering a wide ICT industry chain
  - Leading Co.s & SMEs, Domestic & International members
  - Vertical industry members are coming
- Mission
  - A member driven industry org.
  - A recognized SDO assisting Gov. in National Standards Formulation
  - One of the SDOs in Global ICT standardization Eco.

CCSA International Liaison Chart



CCSA Standard Achievements & Future Plans

Transport Network

- ITU-T G Series **for packet transport networks** G.8112/G.8113.1/G.8121.1/G.8131/G.8132/G.8133
- Contribution to ITU-T G Series for **Optical transport networks**
- ITU-T G.mtn series for **5G sliced transport networks** G.mtn /G.mtn-arch/G.mtn-eqpt/G.mtn-prot/G.mtn-mgmt.
- ITU-T L.207 for **ODN Optical access networks**

Core Network

IETF
RFC_7341 and RFC_7596
For IPv4/6 transition
Having been used worldwide

IOT

3GPP
NB-IoT
WiFi-A
DPP

Intelligent O&M standard system (M.3040 series) for communication networks, Standard direction of AI and communication O&M Merging

Visible light communication ITU standard G.9991/G.9992/ 240V DC power supply technical standards for communications, ITU-T L.1200 series, and L.1325 standards

Broadband trunking communication (B-TrunC) standard ITU-R M.2009-1/ M.2377-0/ M.2014-3

Hot Area

- **Security**
- **IOT**
- **Quantum communication**
- **Space and aviation communications**
- **Green Energy & Energy saving**
- **Blockchain**
- **IDC and cloud computing**
- **Software engineering and open source**

5G Specification

(domestic)

- The **general technical requirements** for major scenarios.
- **Device-level standards** for devices and interfaces, technical requirements, and test methods
- **Base Station equipment specifications based on product portfolio**, including middle frequency base station, millimeter wave base station, and indoor device.
- **Terminal device specifications**, based on application scenarios, including eMBB, vertical…

Agenda

1 CCSA Introduction

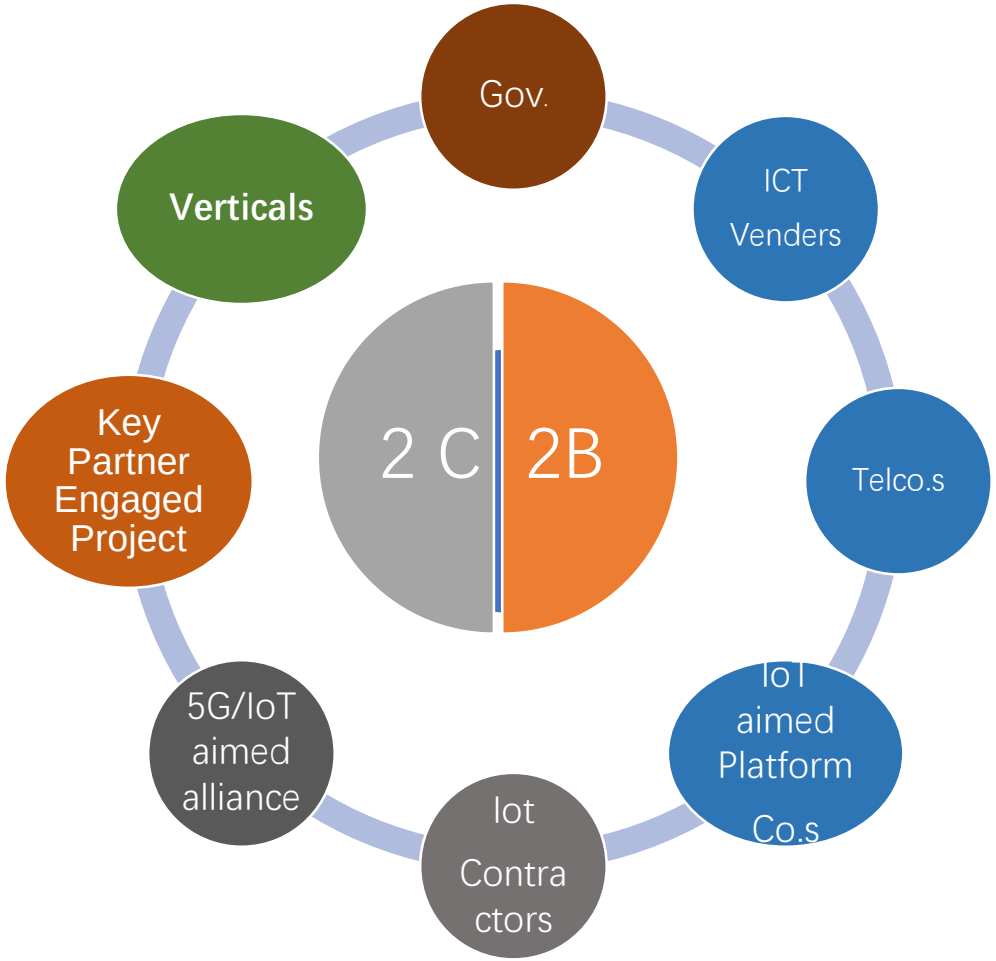
2 China 5G Industry

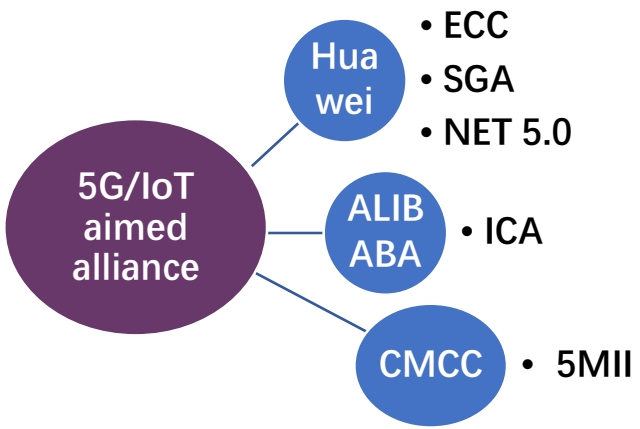
3 China 6G

Interesting Questions

- How to evaluate the IOT market, and the degree of prosperity?
- How to estimate the 5G market status in vertical industries?
- 5G Stakeholders might have different prospects and challenges (Vertical players, carriers, vendors, OTT, etc.)?

Ecosystem of 5G/IoT deployment

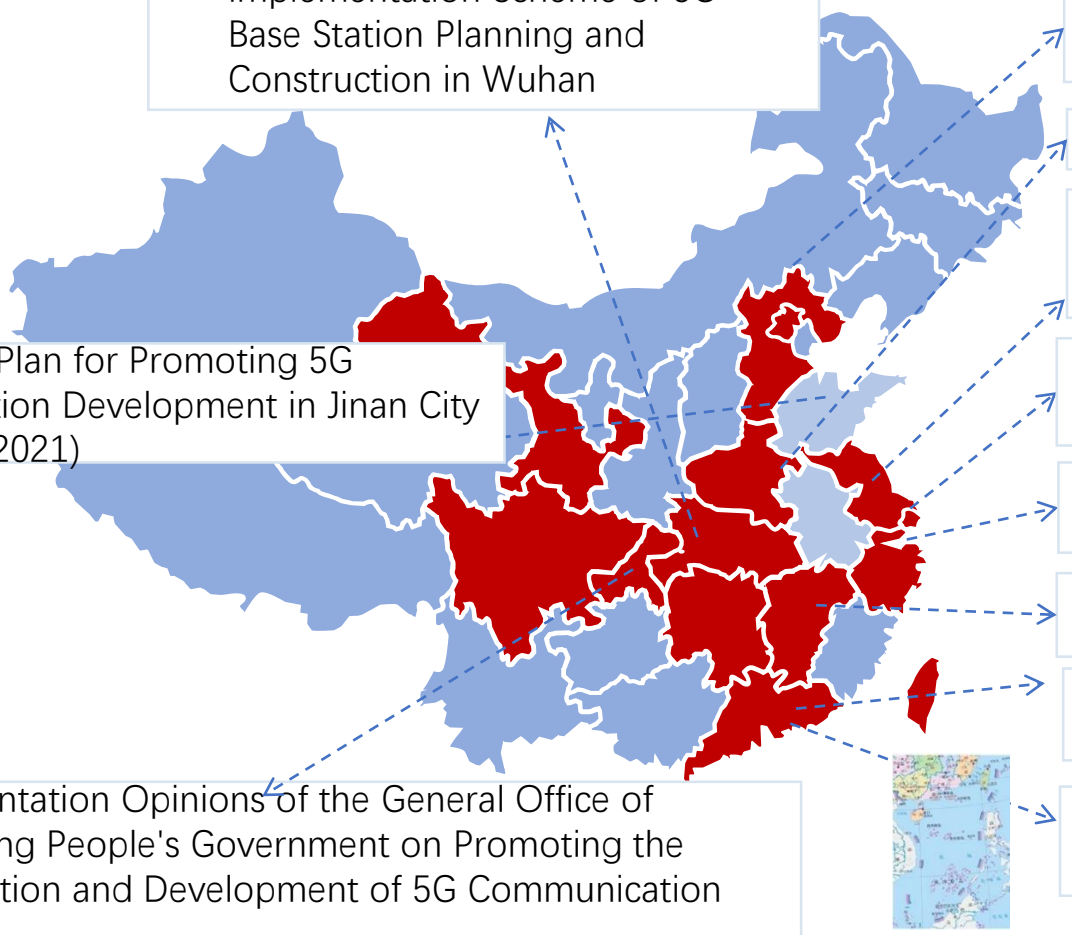




China Government Policies

5G development started in many provinces, converged applications become the focus of attention.

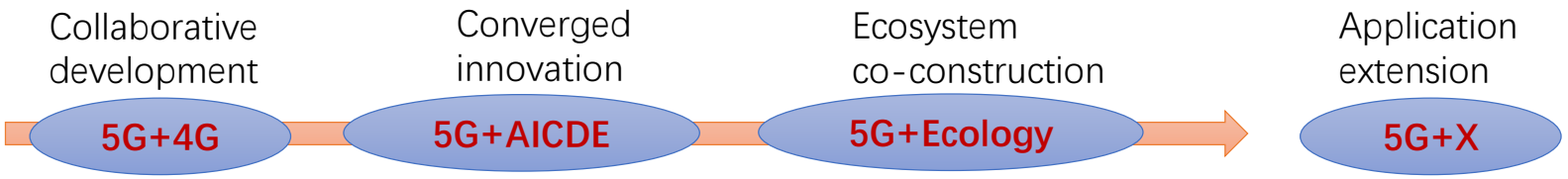
- ✓ **By July 2019, 35 5G policy documents have been released = 15 province-level + 20 City-level**
- ✓ **2018 policy focus on 5G network construction. 2019 policy focuses on 5G application**



- Implementation Scheme of 5G Base Station Planning and Construction in Wuhan
- Action Plan for Promoting 5G Innovation Development in Jinan City (2019-2021)
- Implementation Opinions of the General Office of Chongqing People's Government on Promoting the Construction and Development of 5G Communication Network
- Beijing 5G Industry Development Action Plan (2019-2022), to determine the "1551" project
- Henan Province 5G Industry Development Action Plan
- Several Policies of Hangzhou Municipality on Accelerating the Construction of the First City of 5G (Draft for Soliciting Opinions)
- Shanghai Suggestions on Accelerating the Construction and Application of the 5G Network
- NingBo Application and Industrialization of 5G in Ningbo City
- 5G Development Planning in Jiangxi Province, (2019-2023
- 3-year Action Plan for Accelerating 5G Development in Guangzhou (2019-2021)
- Shenzhen Promotes the Fifth Generation Mobile Communications (5G) Industry Development Action Plan

China Operators Actively Deploy 5G NW

CMCC 5G+Plan



NW Plan

In 2019: > 50,000 BS, >50 cities 5G Commercial
2020: 5G commercial in all Cities

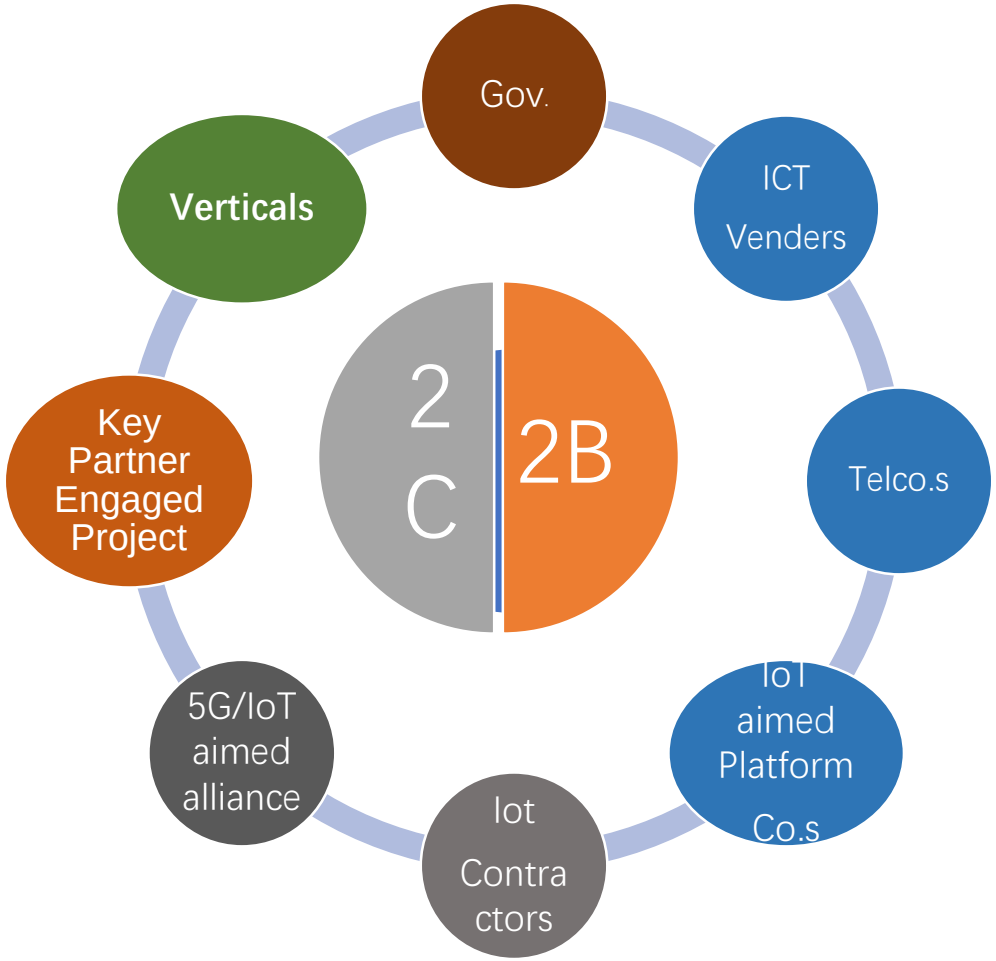
CTCC SA Solution

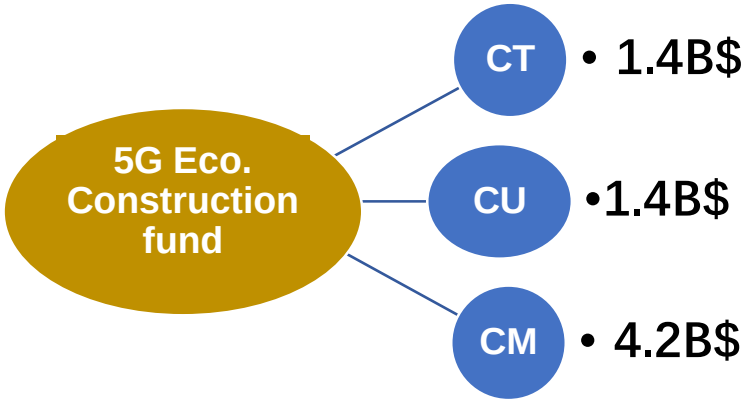
- **SA: > 40 cities NSA/SA Hybrid networking**
- **5G+ Cloud: CMCC New Generation Cloud Intelligent NW**
- **"5 Intelligence" Strategies (to C): Intelligent Broadband / platform/ application / security / services**
- **5G+Industry (to B): Public buildings, transportation, energy, police, education, media, healthcare, etc.**

CUCC 5GN

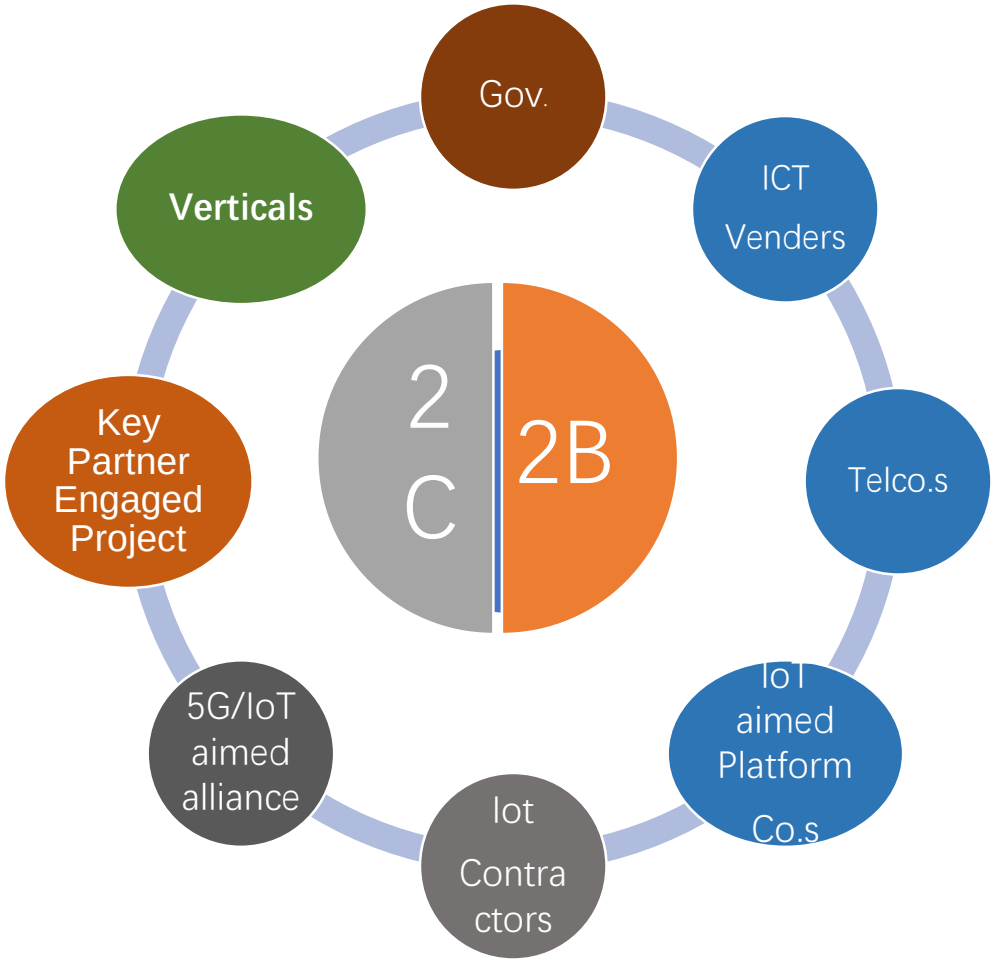
- **"7" 5G network coverage is implemented in the core areas of seven cities, including Beijing, Shanghai, Guangzhou, Shenzhen, Nanjing, Hangzhou, and Xiong an.;**
- **"33" 5G network coverage is implemented in hotspot areas of 33 cities;**
- **"n" the 5G dedicated network is provided in the industry application areas of n cities**

Ecosystem of 5G/IoT: Eco. Construction Fundation



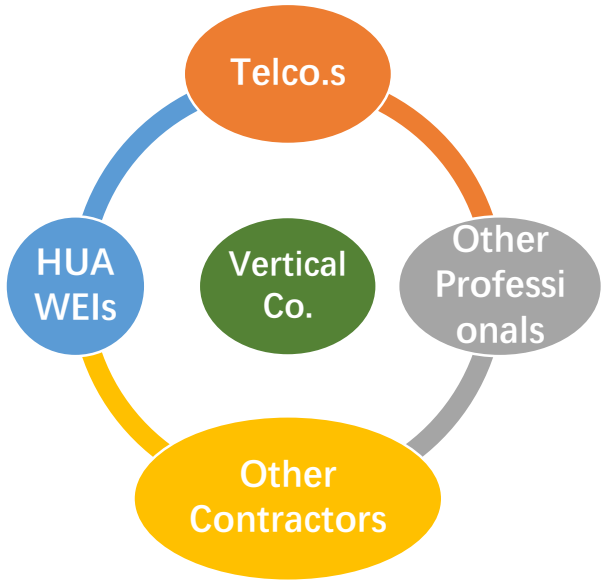


Ecosystem of 5G/IoT: KPEP



KPEP

Key Partners Engaged Project

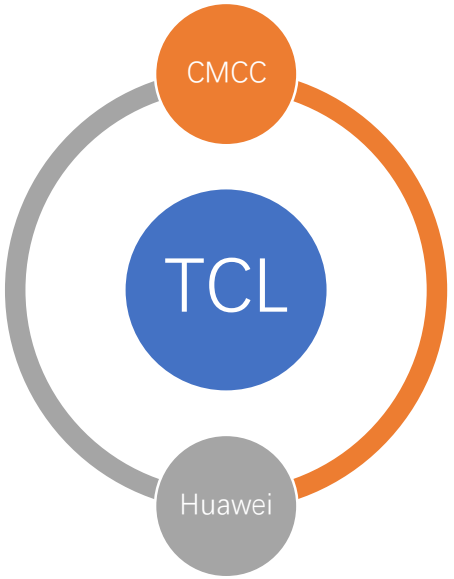


KPEP the World's Largest Liquid Crystal Industry Base is Being Built

Opportunity: TCL Liquid Crystal Industrial Park New Factory

From May 2018, TCL Group invested 13 billion Yuan in Huizhou to officially launch the integrated intelligent manufacturing industry base of modular integrated equipment. The production capacity will reach 35 million after completion, which is the largest LCD panel production base in the world.

1. Implement indoor and outdoor coordinated coverage of 5G networks to build a highly reliable "5G industrial bus".
2. Built the overall architecture of "Industrial Internet + Enterprise Private Cloud + Edge Cloud + Function Cloud".
3. Build a new "5G+Ecology" ecosystem based on the openness of edge computing (MEC).
4. Autonomous mobile logistics robot based on 5G
5. The investment/cost is reduced by 41.1 million Yuan each year. The reconstruction investment is 100 million, Recoup investment in 2.5 years.



1st Haier Smart Factory

Practicability: After actual implementation and verification, the feasibility of the project meet the requirements.

TEST

5G+ machine vision

Delivery completed

MAN

5G+AR man-machine collaboration

Delivery completed

MACHINE

5G+ intelligent device

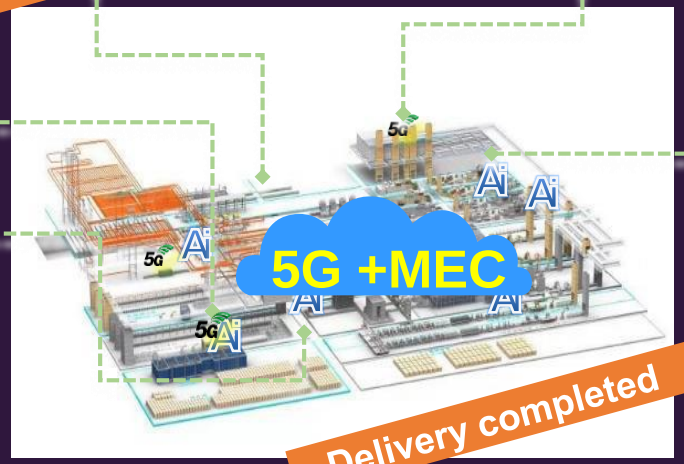
MATERIA

AI+ Intelligent Transportation

In Delivery

AI+ Smart Energy

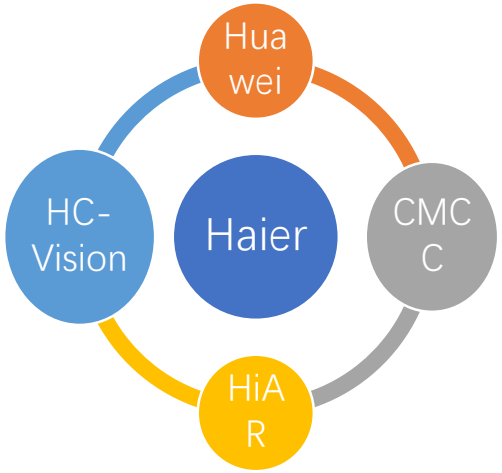
ENVIRONMENT



Delivery completed

Knowledge accumulation and digitalization

Regulation

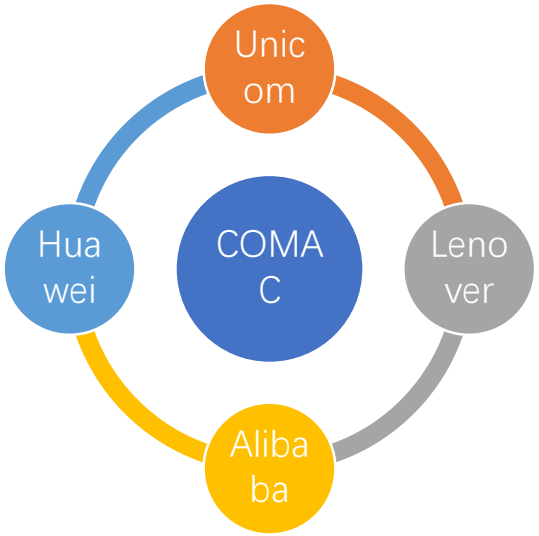


- ✓ MEC is deployed in the campus, the production data is inside the campus. The security is high.
- ✓ The first "5G+MEC+ home appliance industry application" real implementation factory

- ✓ Define the new delivery model and verify it.
- ✓ Define new business model

1. Investment: 50% ↓
2. The delivery is shortened by 90%. ↓
3. Efficiency: 70% ↑
4. Quality 10% ↑
5. Maintenance cost 65% ↓

COMAC Commercial Aircraft Co. of China
5G Smart Manufacturing Trial



- **Constructing the 5G+ Industrial Internet =**

New standards, new models, and new business status

- **Promote solutions based on 5G digital transformation.**

Industry leading Social benefits

- **Build a new engine for innovation and drive development in the manufacturing industry.**
- **New mode of employment transformation**

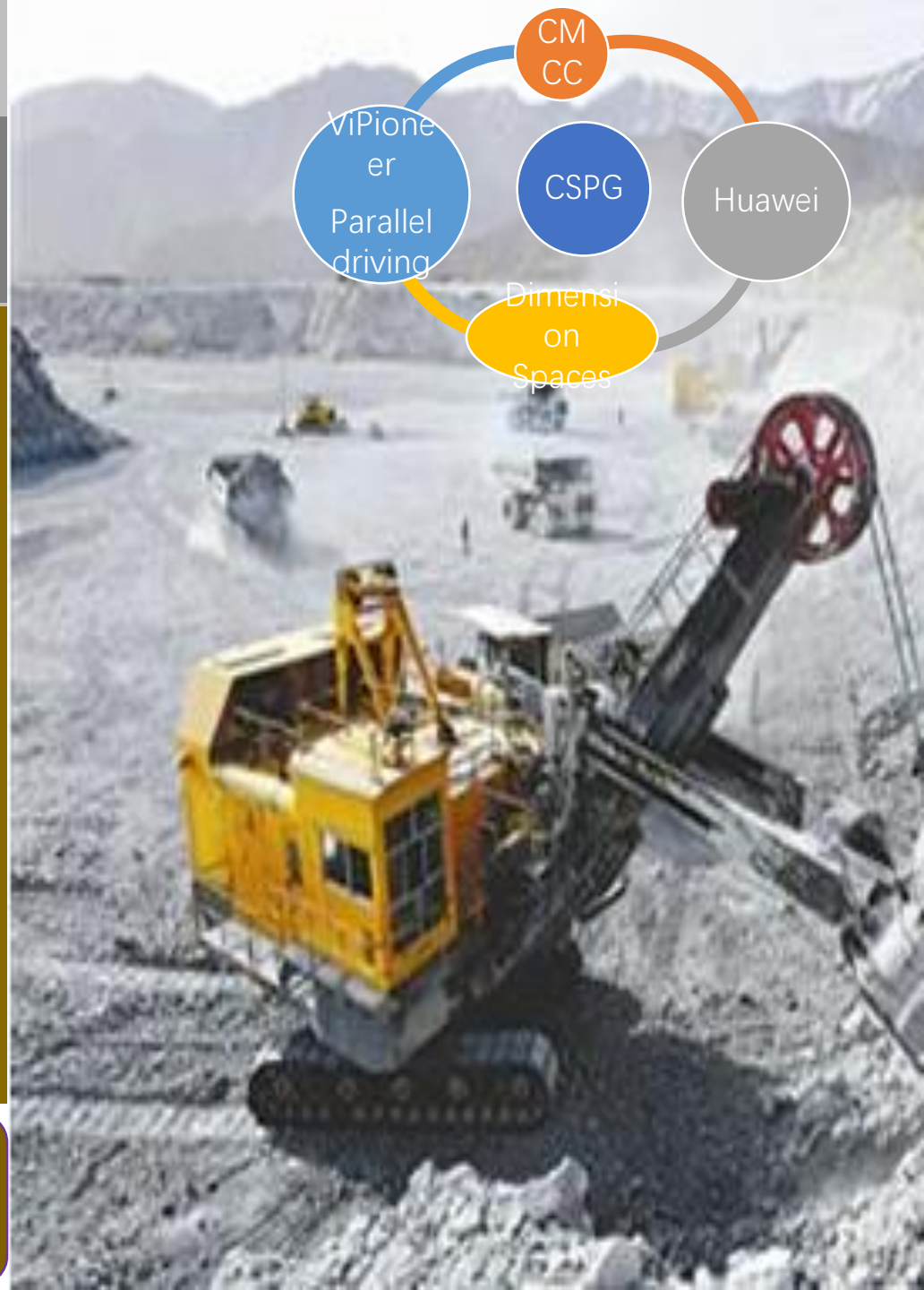
1. 25 5G industrial application scenarios
2. Assembly efficiency 30%
3. Detection rate x10
4. Quality inspection efficiency 300%
5. Design, manufacturing, O M, and management bring revolutionary changes.

Smart Mine

- Urgent requirements for digital transformation in the mining industry
- Ample funds
- The scenario requirements are highly aligned with the 5G capability.

- The annual output value of the mining industry exceeded 3 trillion, more than 3% of the country's GDP. At present, there are 4271 coal mines in China, with an annual output of 3.5 billion tons. Among them, there are 1200 large mines in Inner Mongolia, Shanxi and Shaanxi provinces, accounting for 63% of the total output of the country.
- Pain points: The number of excavators is large, the risk is high, and the personnel mobility is high. As a result, the production efficiency is low. The operation qualification personnel of heavy equipment are short of labor and management is difficult.
- The mine environment is closed, low-speed, and controllable, facilitating the deployment and application of the automatic driving system. Based on the 5G+ high-precision positioning + mine truck automatic driving and low cost remote mining.
- In the Changyuan mining area of Ningwu, Xinzhou, the 5G pilot smart mine construction was carried out, including UAV surveying, unmanned mining truck, remote excavation, and 5G video surveillance. Which was developed to form the 5G smart mine solution that can be quickly replicated and promoted.
- The capability of cost burden of coal digital transformation is more than 1 yuan / ton, and the government has urgent demand for digital transformation of mining industry,

- Annual production of 3.5BT coal, 1 ¥ /T affordable for D.T., e.g. 3.5B ¥ /year (from a recent survey)
- Annual output value: 3000B ¥ , 3% of GDP of China



5G+ Industrial Internet

Industrial wireless camera

Remote monitoring

Remote auxiliary and collaborative design

Cloud-based robot

Intelligent warehousing and logistics

Remote device maintenance

Remote automatic control

5G+ Cloud Multimedia

HD video

Carrier-class 4K

Ultimate 4K

8K

VR/AR

Weak interactive cloud game

Strong interactive cloud game

Partially immersive interactive services

Fully immersive interactive service

5G+ Smart Healthcare

Patient localization

Wireless monitoring

Mobile room check

Emergency rescue

Remote surgical demonstration

Remote robot ultrasonic

Wireless infusion

Wireless specialist diagnosis

Remote real-time consultation

Robots room Check

Remote robotic surgery

5G+ Automotive

Infotainment

Blind zone notification

Voice interaction

Steering collision warning

Emergency brake

Formations

Remote control

Fatigue driving reminder

Smart driving, specific scenarios, dedicated vehicles

Signal violation warning

Lane management

Traffic Channeling

Full-road automatic driving

2018 2019 2020 2021 2022 2023 2024 2025

Agenda

1 CCSA Introduction

2 China 5G Industry

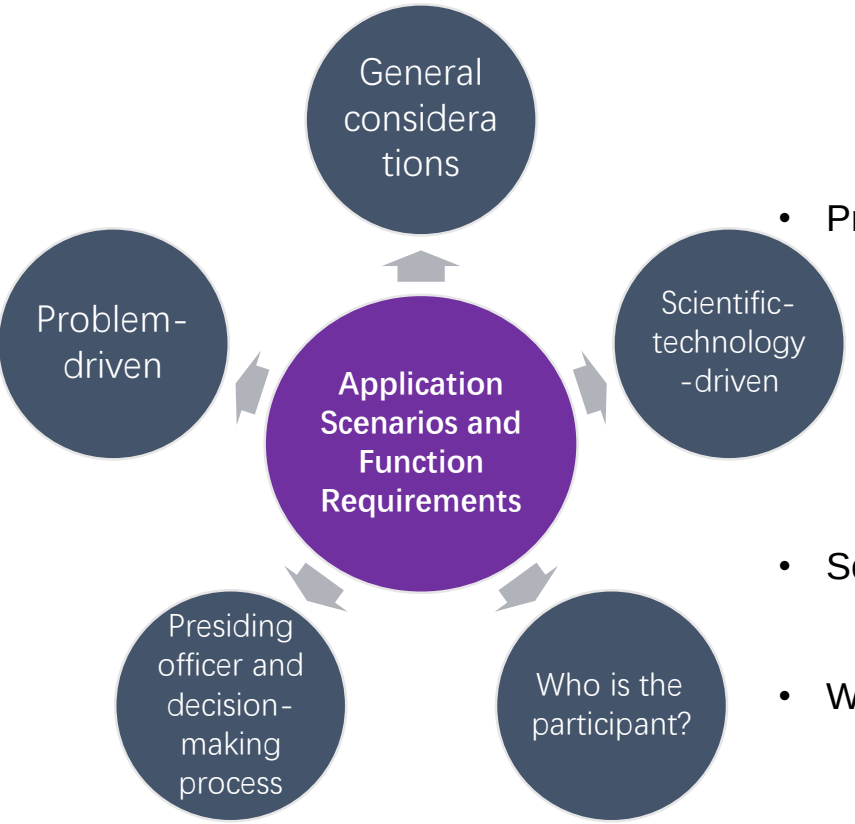
3 China 6G

China 6G – Kick Off 6G Promotion Task Force & Expert Group Founded

- On November 3, 2019, the Ministry of Science and Technology, together with the Development and Reform Commission, the Ministry of Education, and the Ministry of Industry and Information Technology, established the National 6G Technology Research Promotion Working Group and the General Expert Group. It is mainly responsible for providing suggestions on the layout of 6G technology research and technical demonstration, and providing advice and suggestions for major decisions.
- This marks the official launch of 6G technology research in China.
- National 6G Technology Research Promotion Work Team
  - The promotion workgroup consists of relevant government departments and is responsible for promoting the implementation of the 6G technology R D work.
- General Expert Group
  - The overall expert team is from universities, research institutes, and enterprises (vertical industry enterprises). A total of 37 experts, mainly responsible for proposing 6G technical research layout suggestions and technical demonstration, to provide advice and suggestions for major decisions.
- The Ministry of Science and Technology will organize the overall expert team with relevant departments to develop the 6G technology research solutions, explore possible technical directions, resolve a series of basic theories, design methods, and core technical issues facing the mobile communication and information security field, strive to make breakthroughs in basic research, key technical breakthroughs in key technologies, and standard specifications.

About 6G
(For Discussion)

Basic Requirements | **Application Scenarios and Function Requirements** | Technical solutions and standards



- General considerations
  - Same functions and lower costs
  - Obviously stronger performance
  - New way.
  - New capabilities
  - Philosophical and spiritual considerations
- Problem-driven: Why? What? When? How?
  - Market demand
  - Social issues/political issues (e.g., truth and better "facts" and "evidence")
  - Environmental problems
  - The Value and Significance of Life in Reality and Virtual Space
- Scientific invention and technological innovation drive
  - Revolutionary technology? What should we have and soon?
- Who is the participant?
  - Stakeholders (for example, vertical industry ?),
  - Weight of vote
- Proponents and procedures
  - Convener and Chair
  - Decision procedure

CCSA' s mind

1. **Should start thinking, starting with asking yourself questions.**
2. **Support the decision-making system (architecture and process) adopted by 5G.**
3. **International cooperation is very important and hope for effective cooperation between China and Europe.**


Thank You!