Research on 5G in China

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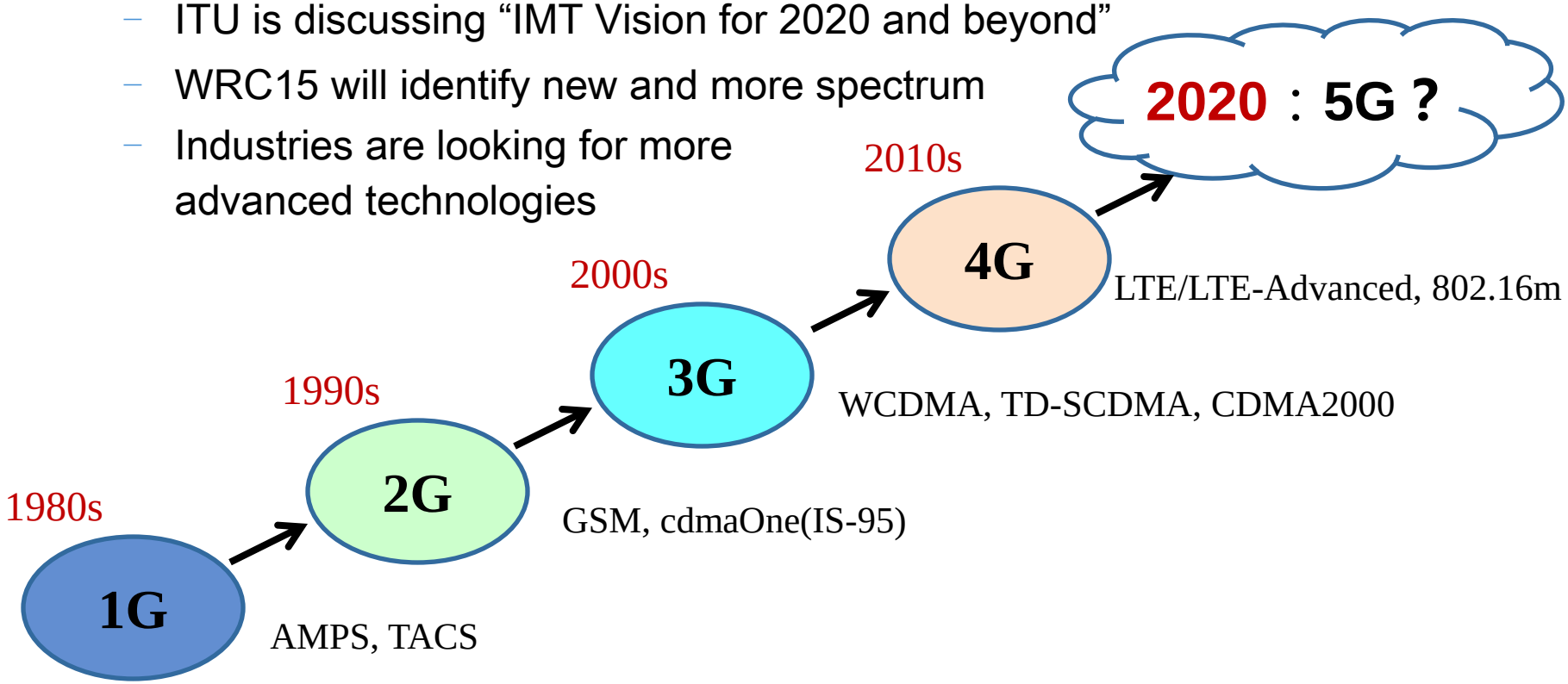
Outline

1. 5G is coming
2. Prospects of Technologies for 5G
3. IMT-2020 Promotion Group in China
4. 5G Industry Activities in China
5. Summary

Evolution of IMT Technologies

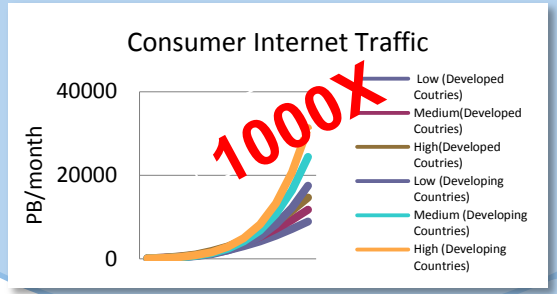
- **Every 10 years, a new generation of IMT technology emerged.**
  - 1980s: 1G → 1990s: 2G → 2000: 3G → 2010: 4G
- **Towards 2020, a new cycle for 5G starts**
  - ITU is discussing "IMT Vision for 2020 and beyond"
  - WRC15 will identify new and more spectrum
  - Industries are looking for more advanced technologies



Requirements for 5G

Traffic volume

Driven by growing usage of mobile internet, traffic keep increasing explosively



Number of connections

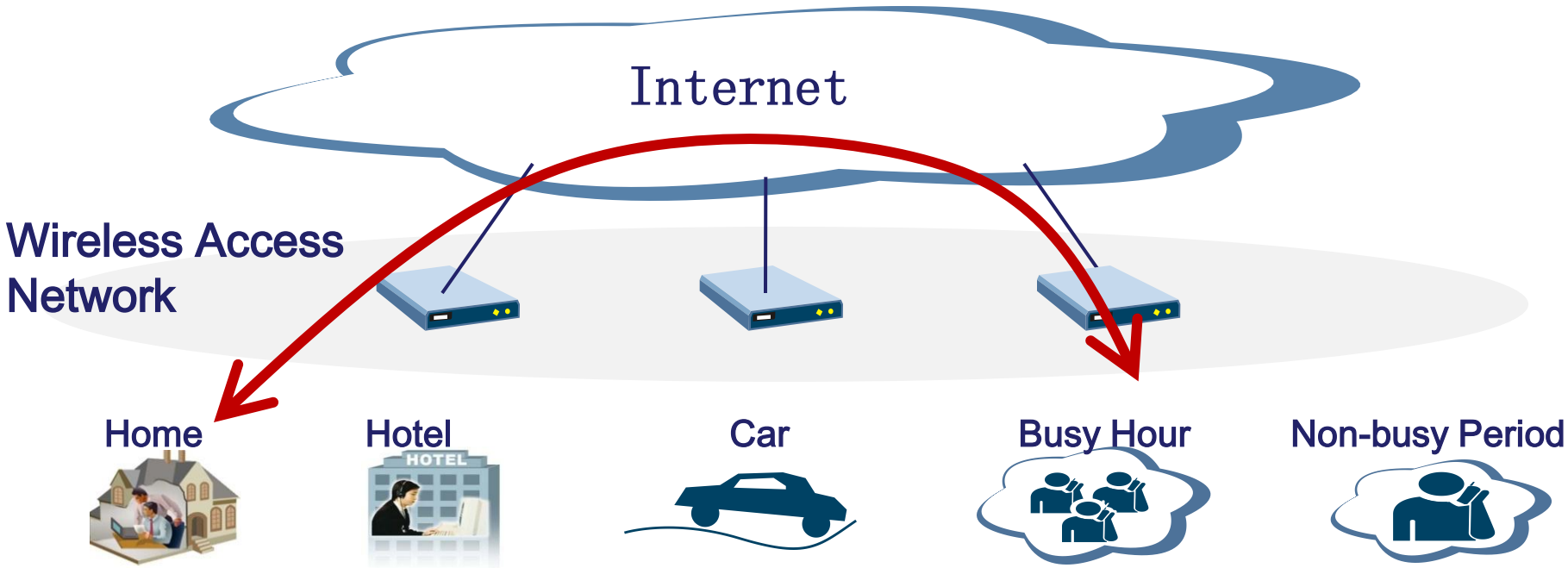
"Connecting everything" boosts the number of connections

Diverse requirements

Different scenarios, New services, New types of devices bring new technical requirements

5G Vision

- Compare with 4G, 5G should be Faster, Smarter, More Efficient and Lower latency
- Provide higher speed End to End connection for user at anywhere and anytime



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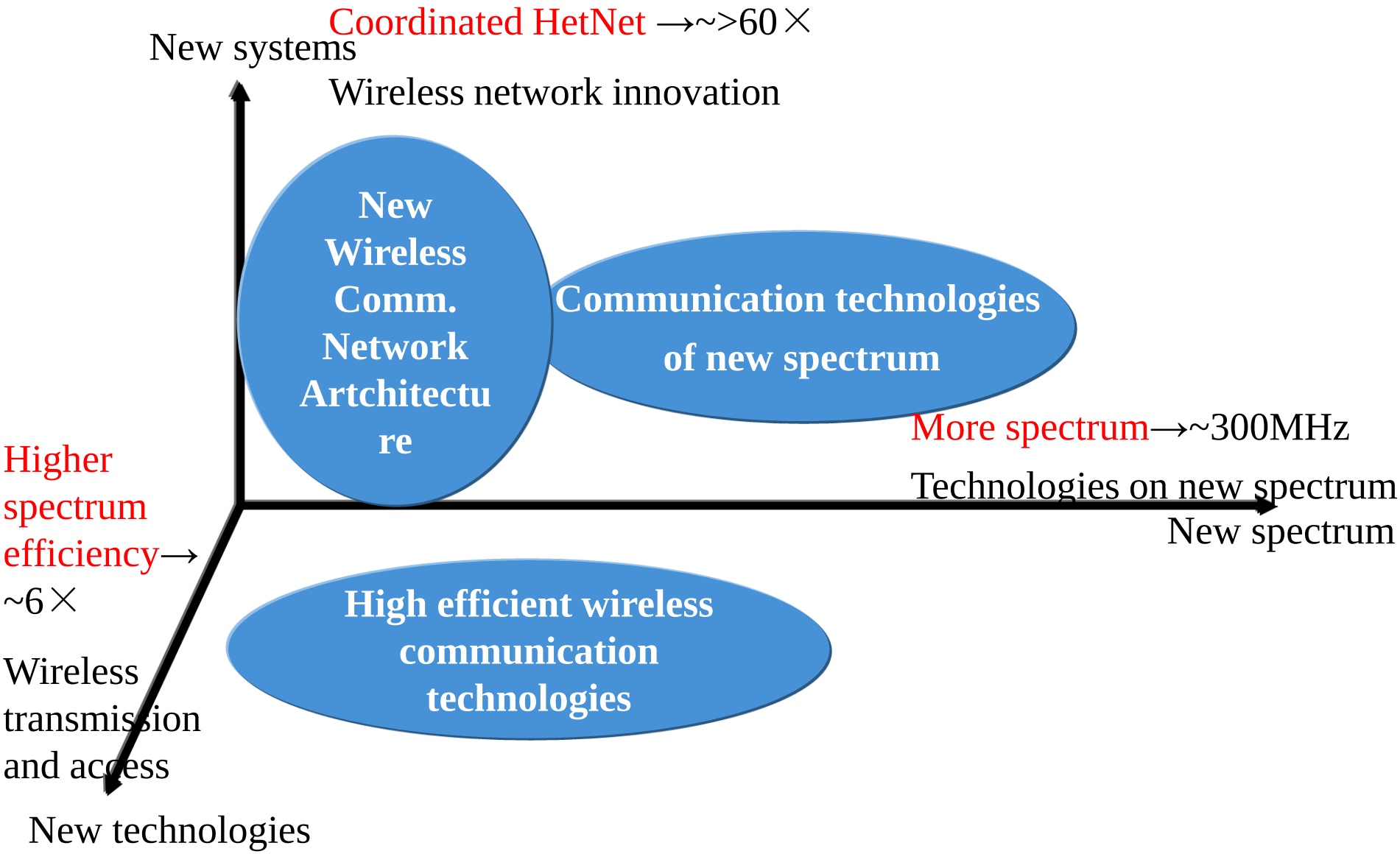
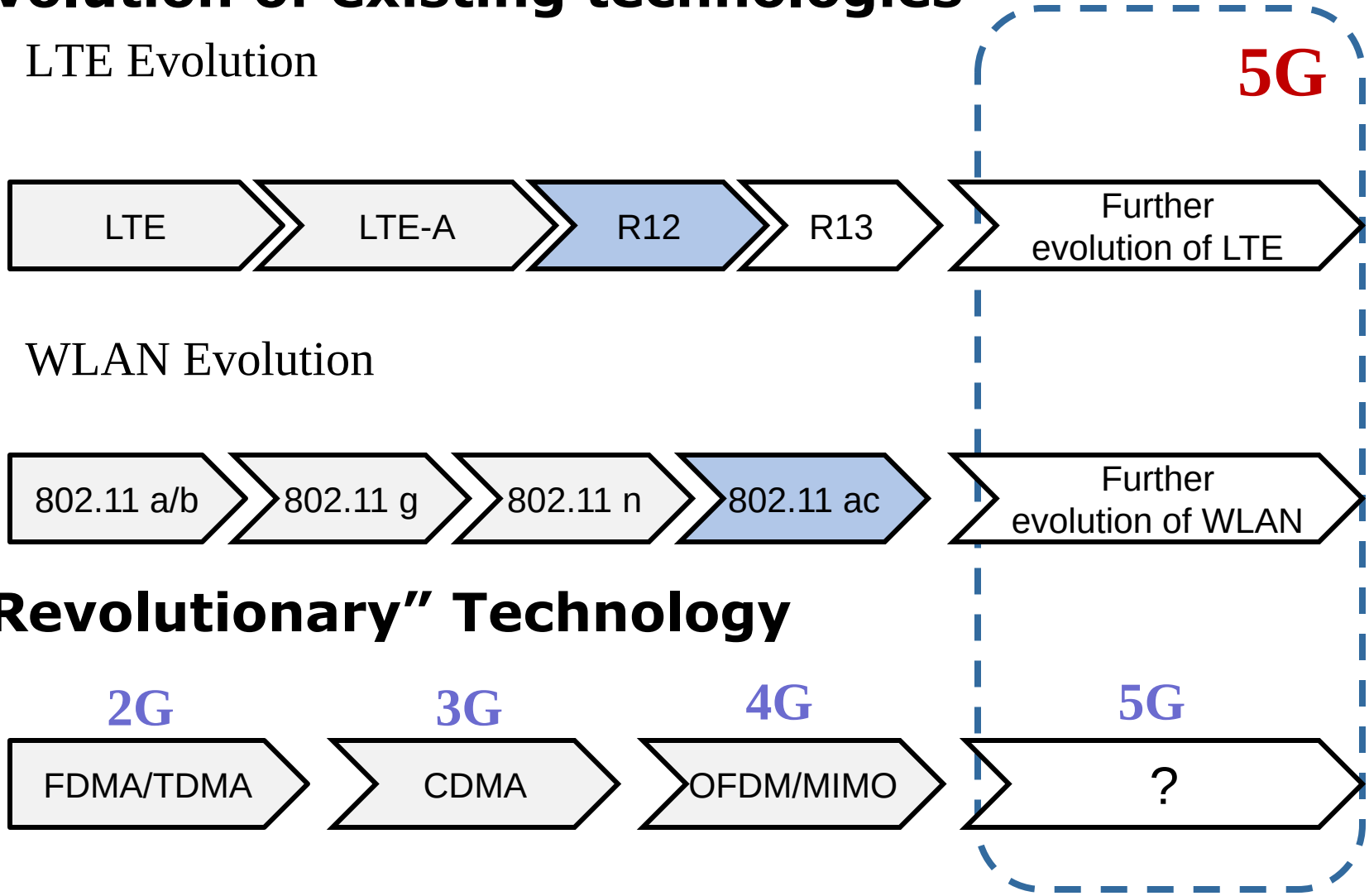
Tech. Solutions for Capacity Boost



Technologies Evolution for 5G

- **Evolution of existing technologies**
  - LTE Evolution



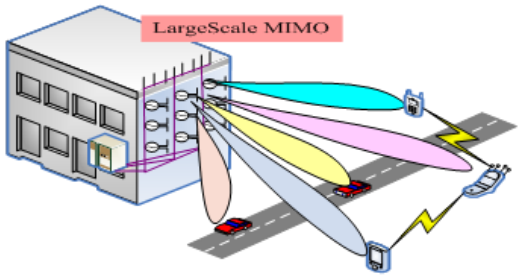
  - WLAN Evolution

- **"Revolutionary" Technology**

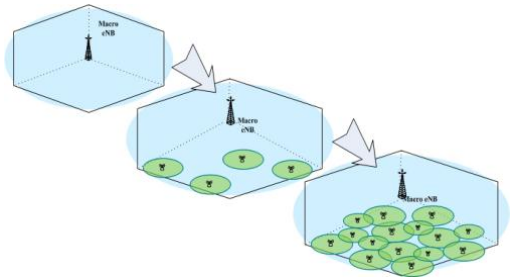
Prospects of Technologies for 5G

- Potential areas have been identified, including Radio Transmission Technologies, and Cellular Network Architecture

1) Advanced MIMO

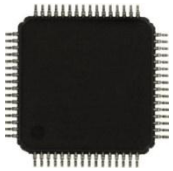


2) Denser Network



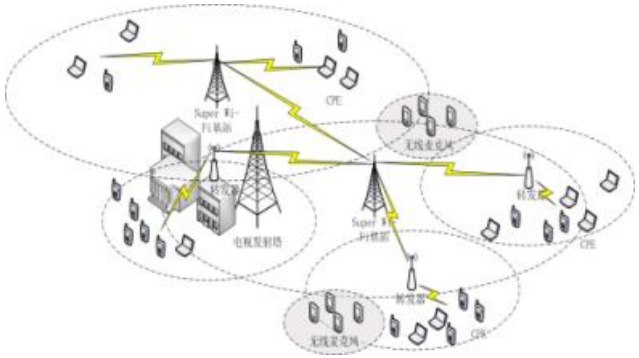
3) Advanced signal processing

e.g. coding, duplex method



4) Technologies for D2D

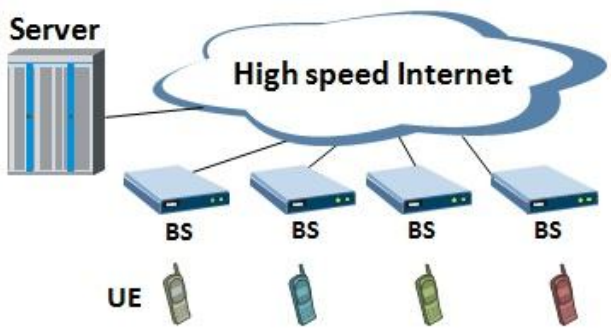
5) Spectrum Sharing



6) Higher frequency communication

Prospects of Technologies for 5G

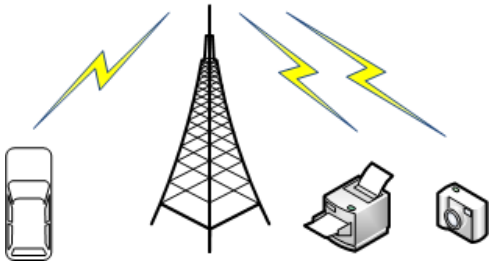
7) New system Architecture



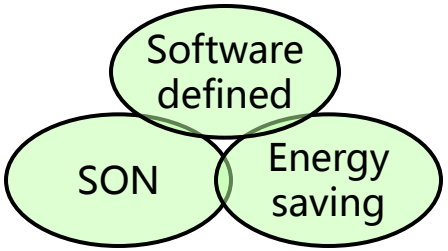
8) Low latency and high reliable communication

9) WLAN Integration

10) Technologies for M2M



11) Smart Network



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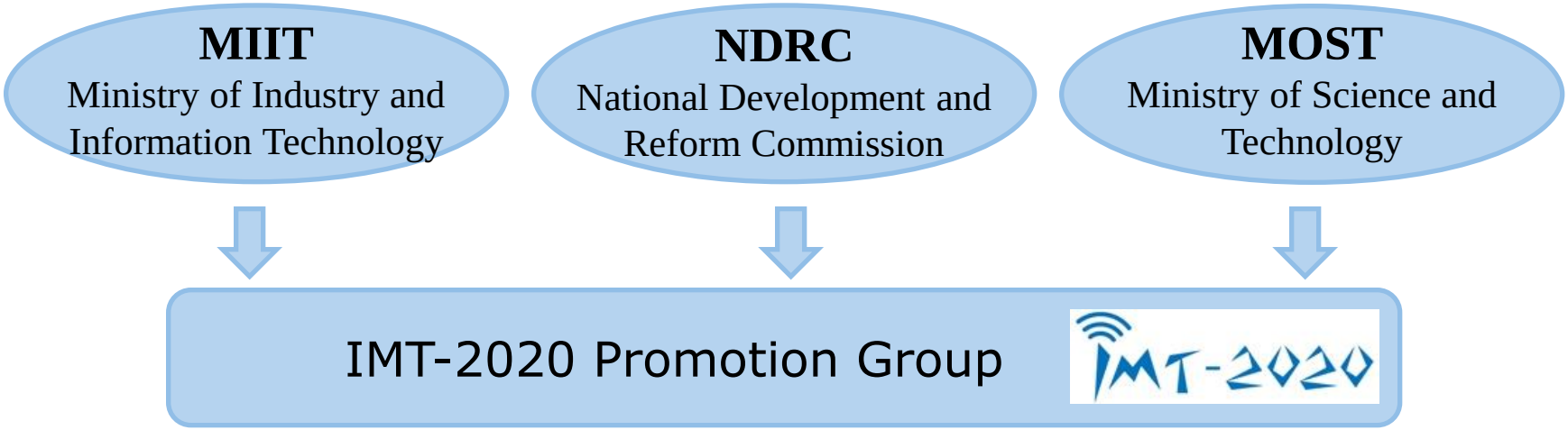
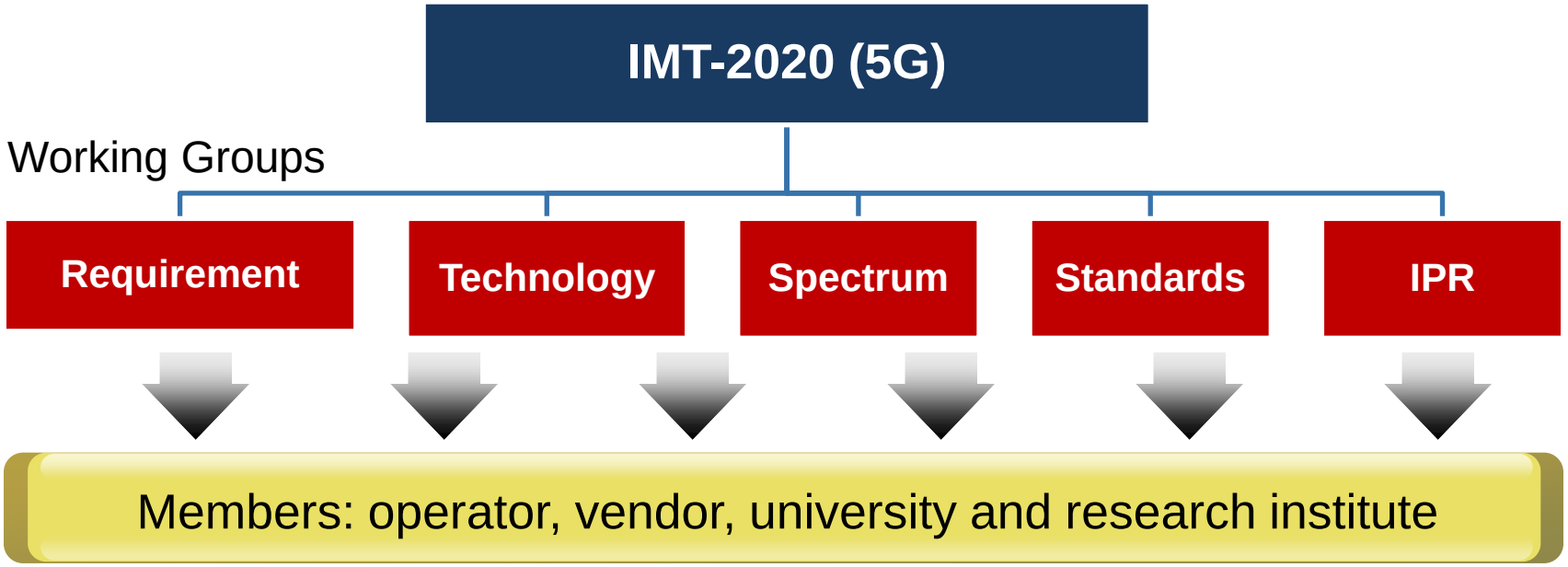
IMT-2020 (5G) Promotion Group

- **In Feb. 2013, three ministries (MIIT, NDRC and MOST) jointly established "IMT-2020(5G) Promotion group"**
- **Objectives:**
  - The platform to promote the research and development of 5G
  - The platform to facilitate global cooperation on 5G R&D



Structures of IMT-2020



- ***Requirement WG***: **study the 5G scenarios and requirements towards the year 2020 and beyond**
- ***Technology WG***: **study key enabling technologies, design 5G system framework**
- ***Spectrum WG***: **work on spectrum related topics**
- ***Standards***: **interactive with international standard organizations including ITU, 3GPP, IEEE, etc**
- ***IPR***: **deal with IPR issues and relevant policy.**

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Activities of Chinese Operators

- **CMCC's Efforts for 5G**
  - Standard work is the most important area
  - Strengthen the TDD standards and system
  - Focusing on Globalization of next generation system research
  - Working on the common technologies for TDD/FDD evolution
  - Promoting TDD/FDD Integrations
- **Activities for 5G**
  - Collaborating in establishing the "5G Innovation Center"
  - Joint research on 5G key technologies
    - Green and High Energy Efficiency
    - High Density Cellular Deployments
    - Exploring Spectrum Efficiency

Activities of Chinese Manufacturers

- **Huawei**
  - Active participating in EU FP7 METIS

- **Efforts for 5G**
  - Fulfill the requirements of Market and Services
  - Focus both on new Air Interface and LTE further evolution
  - Evolve not only Access Network, but also Core Network
  - Enhancing collaborations with EU
  - Highlight the standard work for future universal mobile system

Activities of Chinese Manufacturers

- **ZTE's Focuses**
  - Research on Advanced MIMO to enlarge the resource dimensions
  - Focusing on future Wireless Network Architecture with cellular structure and base stations
  - Spectrum refarming to improve the spectrum efficiency

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Summary

- **It's time to start 5G research.**
  - 1000X+ growth of capacity needs more powerful mobile comm. system in 2020 and beyond
- **Roadmap for 5G**
  - Evolution of existing technologies (LTE and WLAN)
  - Potential revolutionary new technologies
- **Strengthen the global collaborations**

Thank you