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# 5G Security from a Network Operator's Point of View

China Mobile

2018.3.19 @ ITU Workshop on 5G Security

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# Outline

**1**

**Evolution of trust model from 2G to 5G**

**2**

**Major 5G security issues**

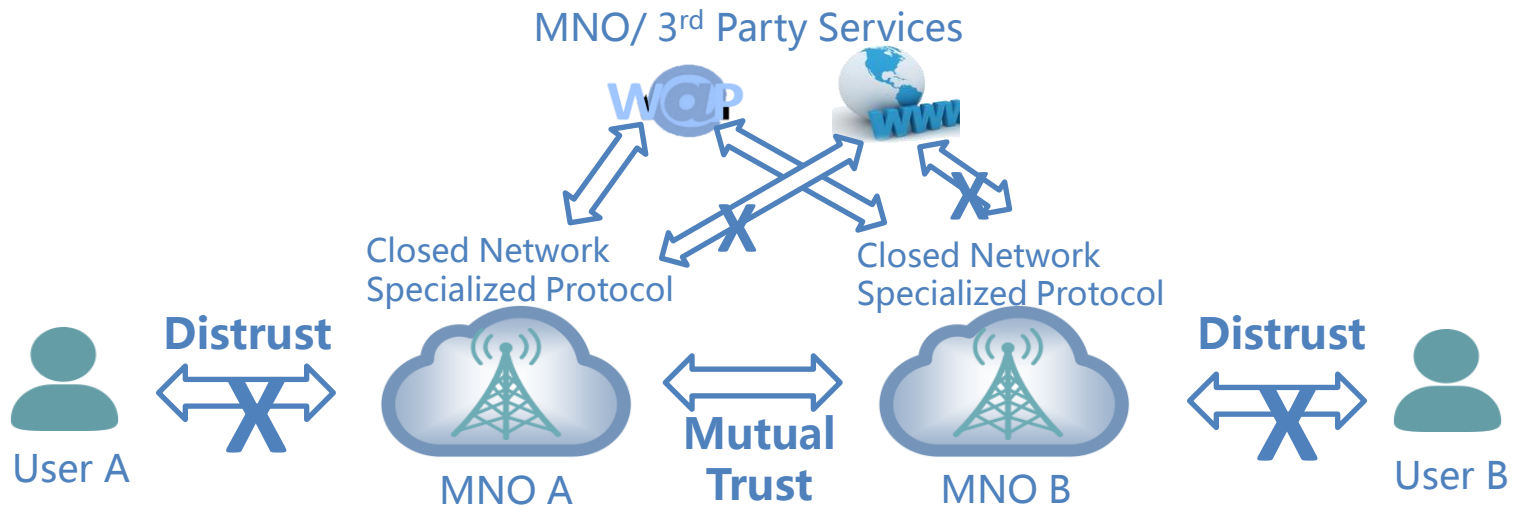
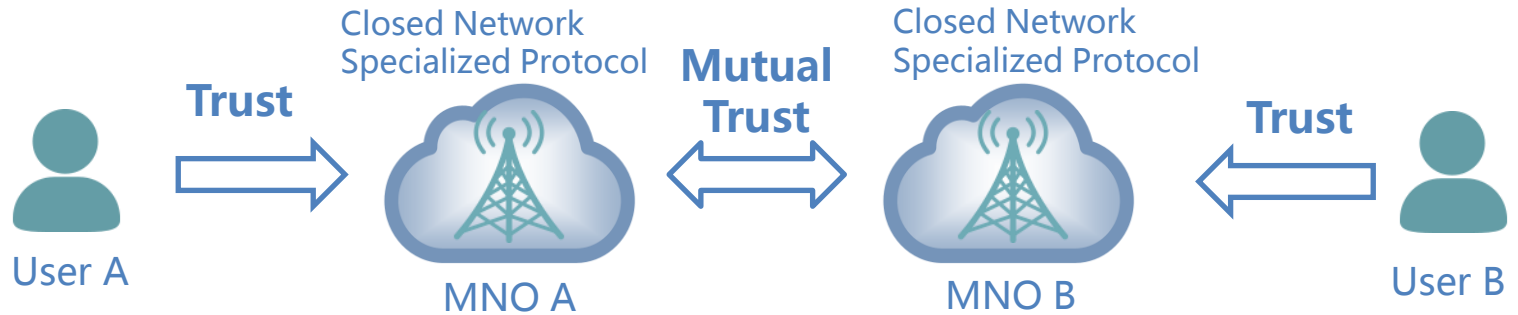
**3**

**Activities related to 5G security in SG17 and a proposed work plan**

**4**

**Some strategic thoughts of 5G security**

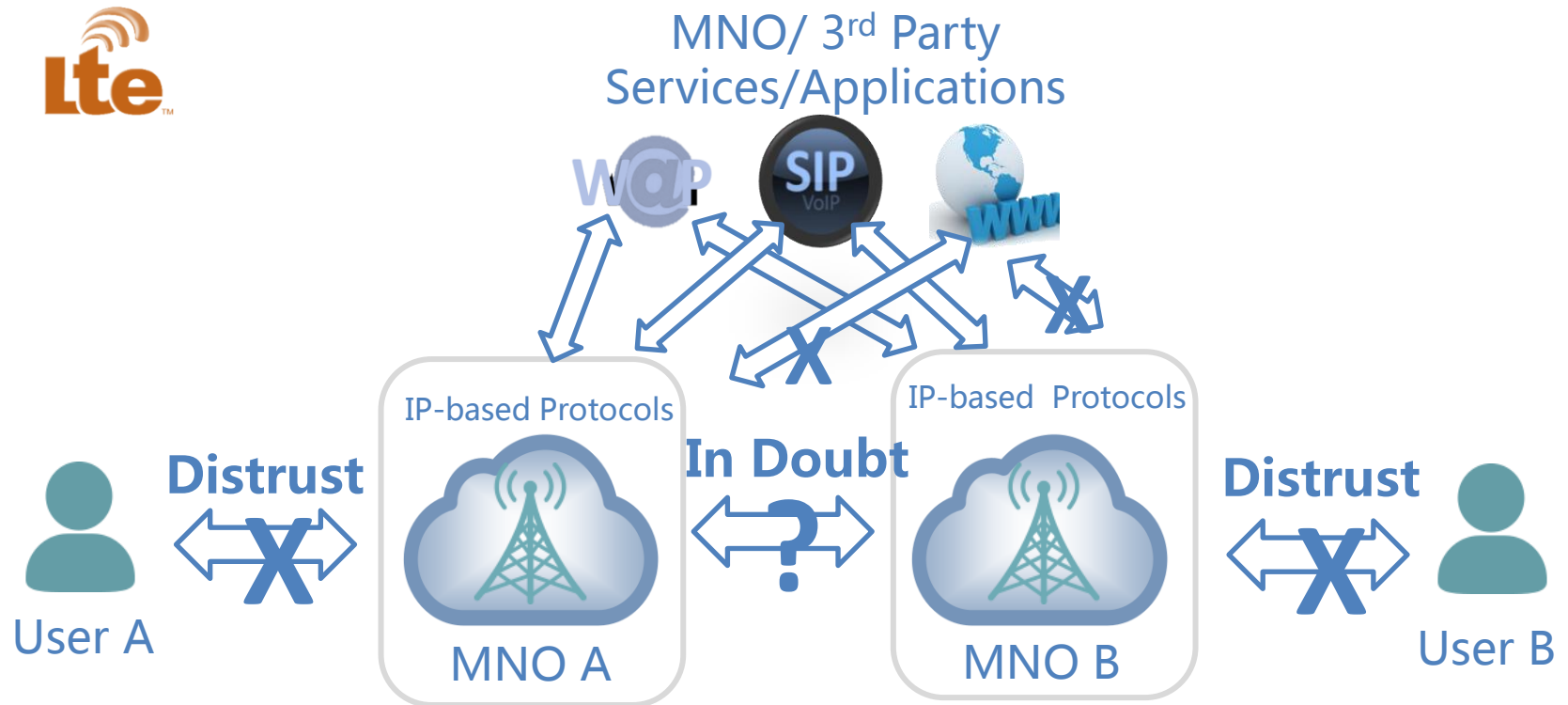
# Evolution of Trust Model



MNO: Mobile Network Operator

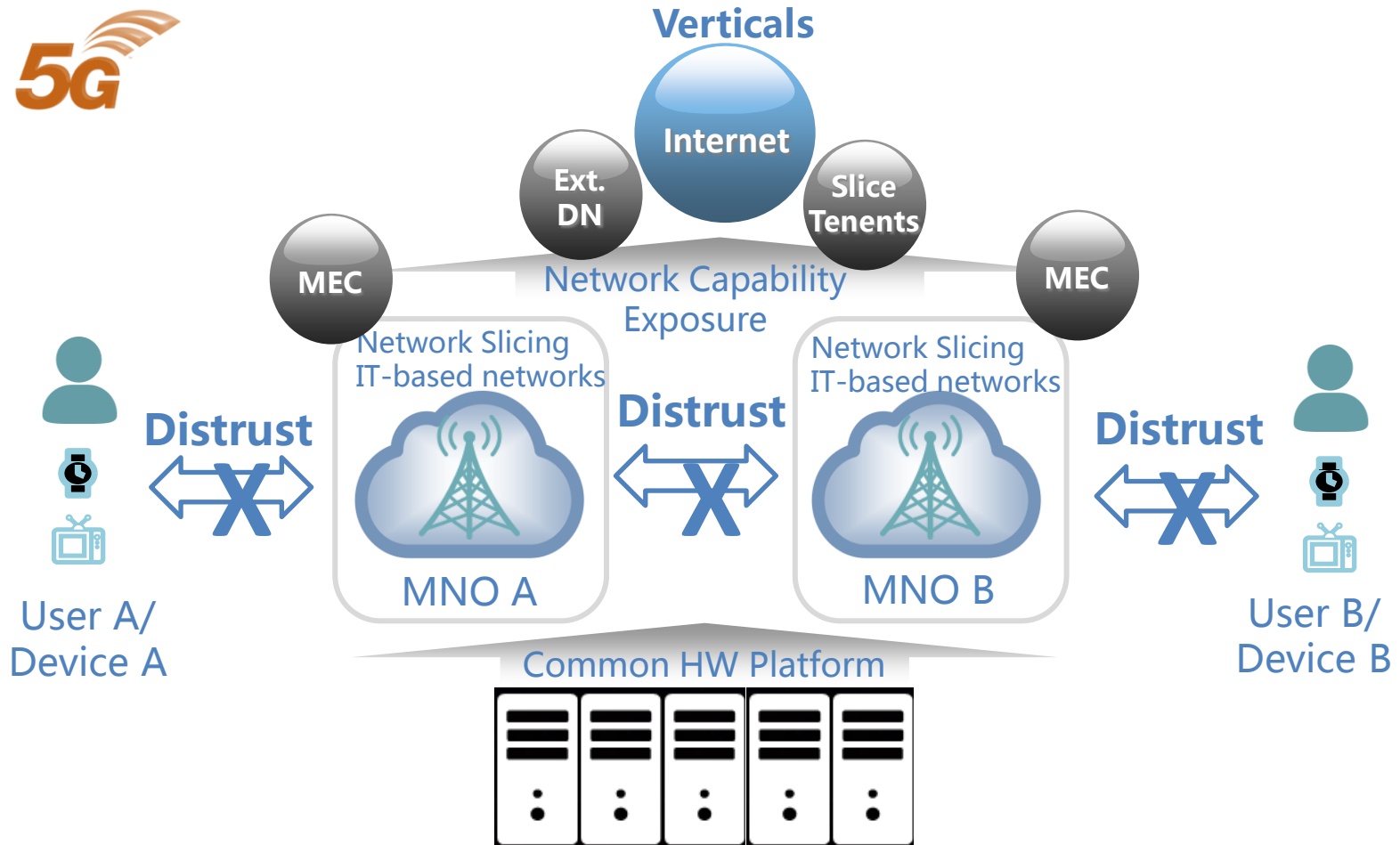


# Evolution of Trust Model



# Evolution of Trust Model

5G



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# Evolution of Trust Model

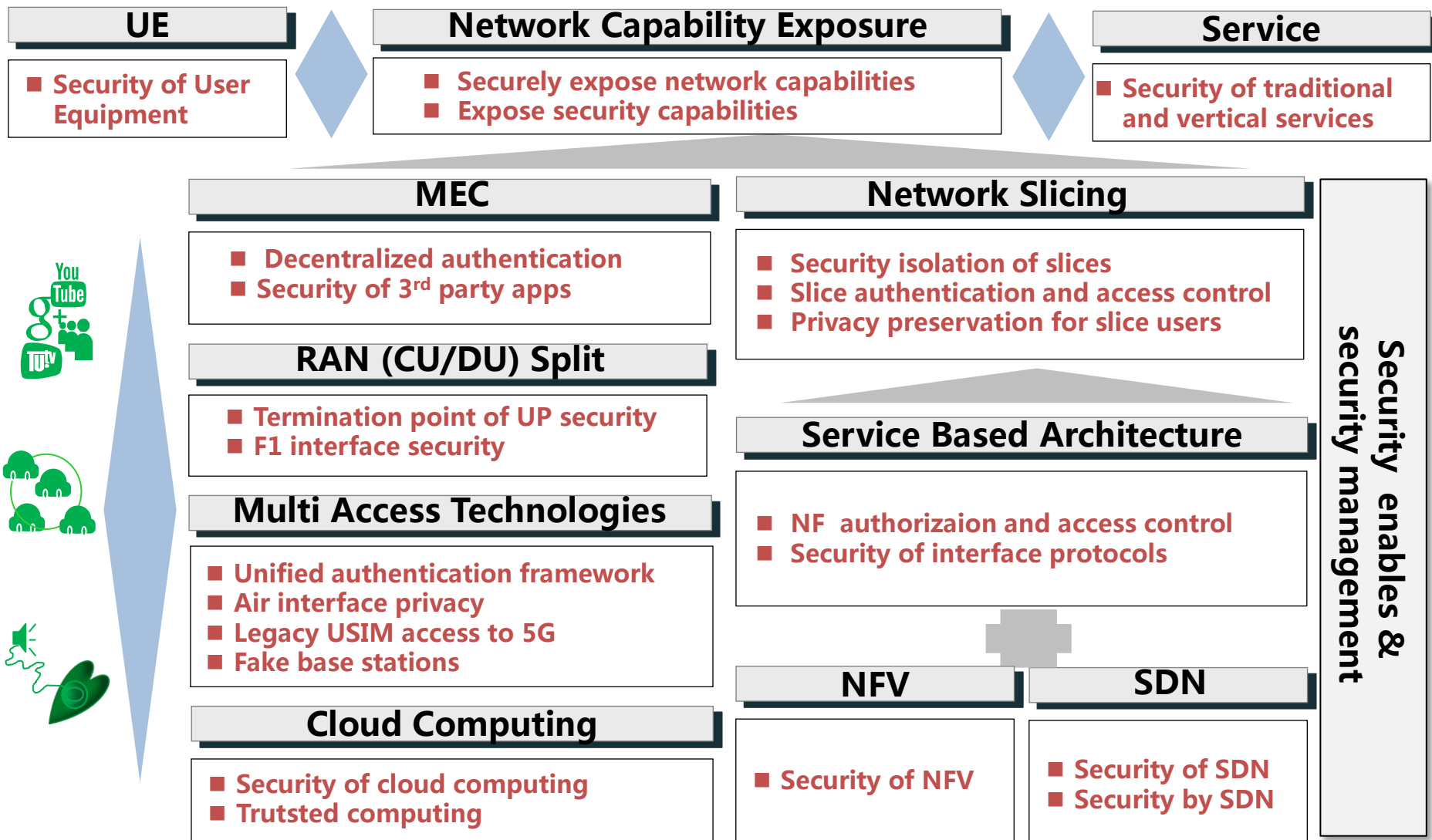
- **Evolution of trust model has a great influence on the security design of 5G, eg.**
  - 5G AKA (previously called EPS-AKA\*) is designed to mitigate the distrust between MNOs, enhancing the control of home network when the user is roaming.
  - Security isolation between network slices is vital for the success of the new 5G network architecture, and it is also a major concern for the verticals because they are supposed to be the mainstream of slice tenants.
  - It is still in doubt whether the common HW(Hardware) platform could provide the same security as the traditional blackbox equipments, especially with the report on the recently disclosed CPU vulnerabilities (Meltdown and Spectre). So it is necessary to impose a security baseline for the network infrastructure , such as NFV SCAS (SeCurity ASSurance).

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- ② Major 5G security issues
- ③ Activities related to 5G security in SG17 and a proposed work plan
- ④ Some strategic thoughts of 5G security

# Major 5G Security Issues





# International SDOs related to 5G Security



1986~

- **ipsecme**

IP Security  
Maintenance and  
Extensions

- **tls**

Transport Layer  
Security



1988~

- **SCP**  
Smart Card Platform
- **SAGE**  
Security Algorithm  
Group of Experts



1995~

- **FASG**  
Fraud and Security Group
- **SIM**  
Subscriber Identity Module



1998~

- **SA3**  
Security



2006~

- **SCT**  
Security Competence  
Team

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# Activities related to 5G Security in SG17

- Q2/17 (Security architecture and framework)
  - network aspects including SDN for 5G security
  - X.1038, X.sdnnsec-3, X.ssc, X.srnv, etc
- Q6/17 (Security aspects of telecommunication services, networks and IoT)
  - mobile and infrastructure aspects for 5G security
  - X.1121 - X.1127, X.sdnnsec-1, etc
- Q7/17 (Secure application services)
  - application/service aspects for 5G security
  - X.srfb, etc
- Q8/17 (Cloud Computing Security)
  - Cloud computing and big data infrastructure for 5G security
  - X.sgtBD, etc
- Q11/17 (Generic technologies to support secure applications)
  - cryptographic profiles for 5G security
  - X.509, etc

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# A proposed work plan on 5G security in SG17

- **SG17's opportunity in the 5G end-to-end security picture at least resides in:**
  - Generic Security Enabler: Q4, Q9, Q10, Q11, etc.
  - Service/Application security: Q2, Q5, Q8, etc.
  - Cloud, Big Data and SDN/NFV security: Q2, Q3, Q6, Q7, Q13, etc.
- **And here are some initial proposals for specific 5G security issues which SG17 may work on:**
  - 5G security in Quantum Computing era
  - 5G IDM
  - 5G trust management, feasibility study on a global PKI to support 5G security, optimization of PKI for IoT and ITS/V2X, etc.
  - 5G network infrastructure security, including SDN/NFV security, Cloud Computing security, Big Data security, etc.
- **China Mobile brings some new work item proposals in this area:**
  - Security Guideline for 5G Network in the Quantum Computing Era(C242)
  - Guideline on Software-defined Security in SDN/NFV Network (C249)

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# Some Strategic Thoughts of 5G Security

- ❑ **5G proposes a vision of “Communications change the society”. It puts great emphasis on the mutual trust and cooperation between telecom operators and the verticals. It is an opportunity of industry confusion, cross- border exploitation and ecosystem reconstruction.**
- ❑ **5G is the integration of various new radio, network and IT technologies. And it is an important turning point for telecom network reconstruction.**
- ❑ **Evolution of 5G security technologies are driven by two wheels :**
  - ❑ The ever-lasiting and upgrading battles around vulnerabilites and amends
  - ❑ Great variety of use cases, and evolving new technologies
- ❑ **5G security design should be based on 3 important assumptions :**
  - ❑ Upgrading of computing power
  - ❑ Change of trust model
  - ❑ Evolution of network architecture
- ❑ **The lifetime of 5G is still long. The whole 5G ecosystem should be prepared to confront up-springing new risks .**

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**Thank you**  
**Merci**  
**Спасибо**  
**谢谢**  
**شكرا**  
**Gracias**  
**ありがとう**  
**감사합니다**