China Mobile 5G Network Slicing Exploration

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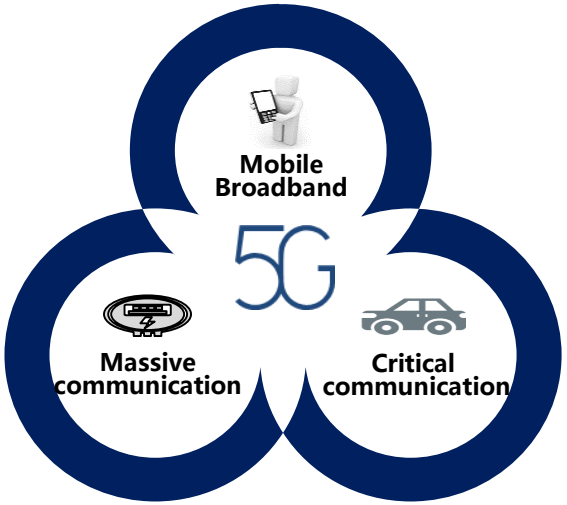
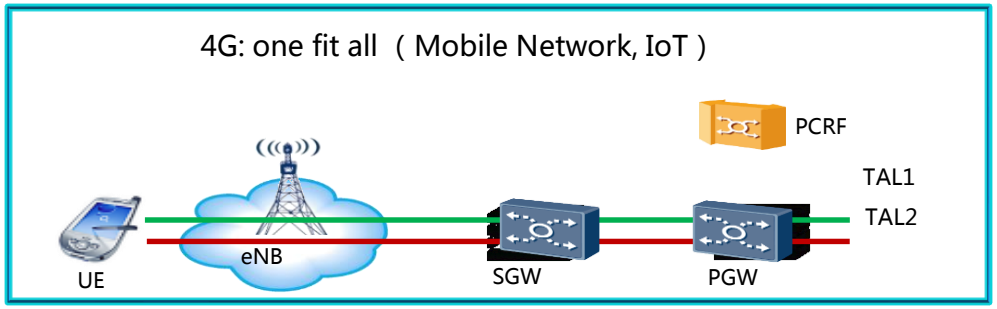
Motivation of Network Slicing

- Diversified Services in 5G
  - Massive Communication
    - Support at least tens of Tbps/km^2 traffic volume and millions/km^2 connection density at the same time
  - Mobile Broadband
    - Provide 100M to 1Gbps data rate anytime and anywhere
  - Critical Communication
    - Satisfy the E2E ms level latency and high reliability requirement



Evolve Towards Network Slicing

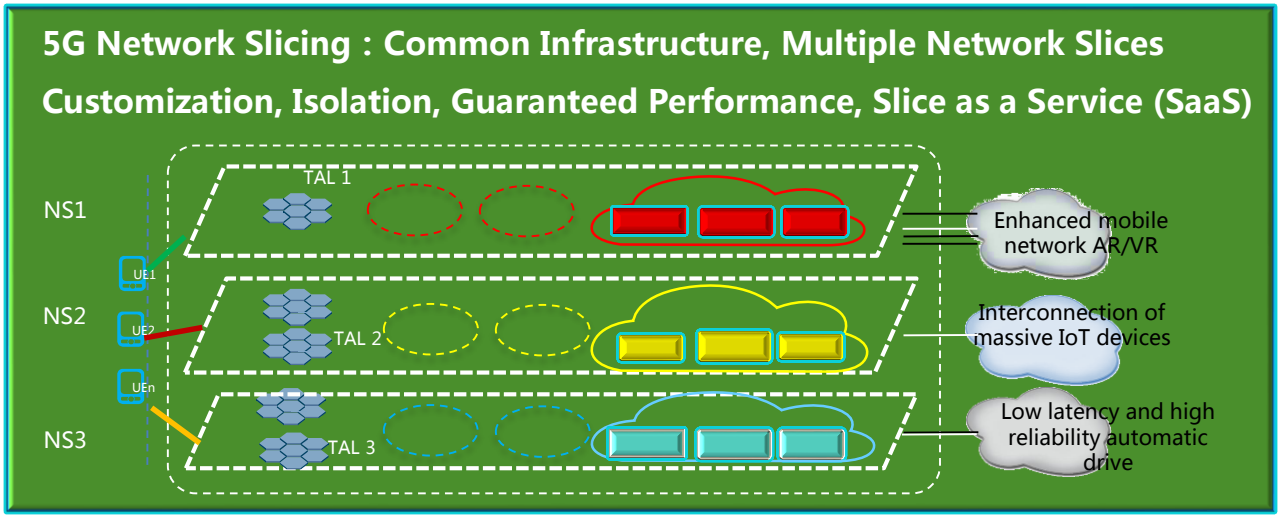
- From 4G one-fit-all to 5G network slicing



4G one-fit-all：

- Carrying different traffic flows with poor isolation through APN/QoS
- Complex functional design of one-fit-all network
- Inflexible expansion

Evolve from traditional single-network mode towards customized networking



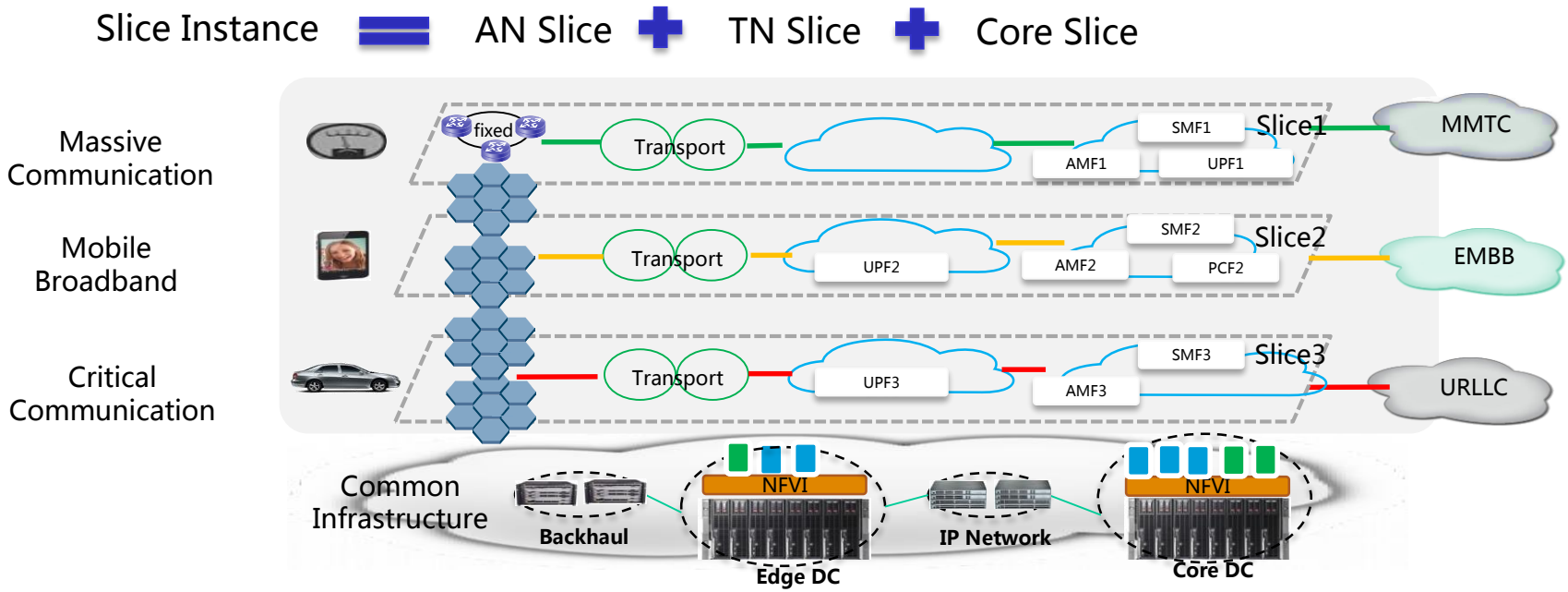
Network Slicing Definition and Key Features

Network Slice: A logical network that provides specific network capabilities and network characteristics.

Network Slice Instance: A set of Network Function instances and the required resources (e.g. compute, storage and networking resources) which form a deployed Network Slice.

-- 3GPP

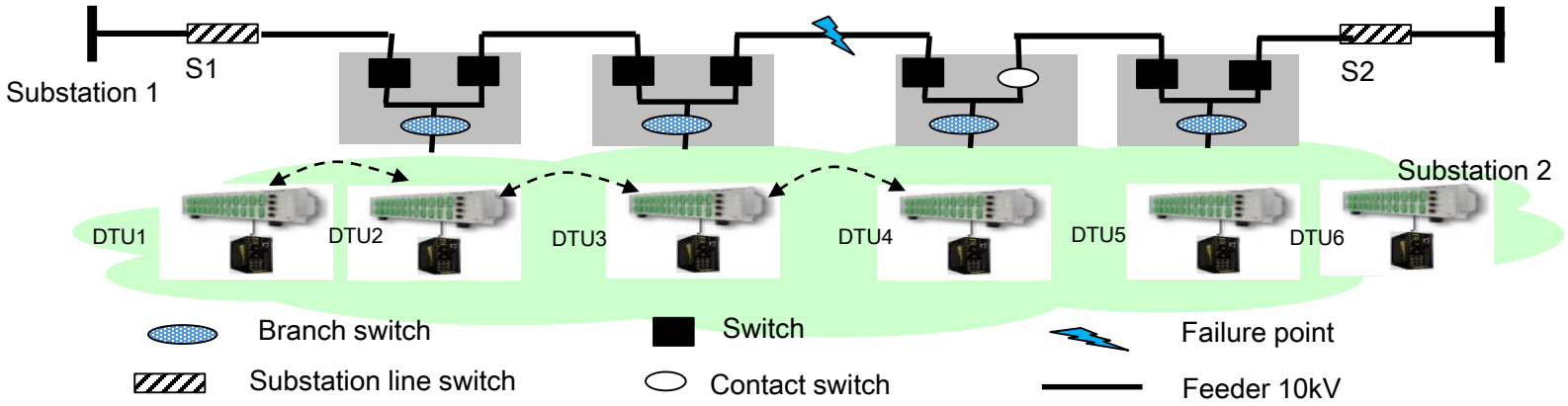
Slice Instance = AN Slice + TN Slice + Core Slice



Key Features

- **Customization:** Capability, Performance, Access type, Scope, Policy,...
- **Guaranteed Performance**: meet the specific SLA requirement of vertical industries
- **Isolation** : Avoid interference between different network slices
- **Slice as a Service** : Automatic/Flexible provisioning and management

Network Slicing Use Case: Smart Grid

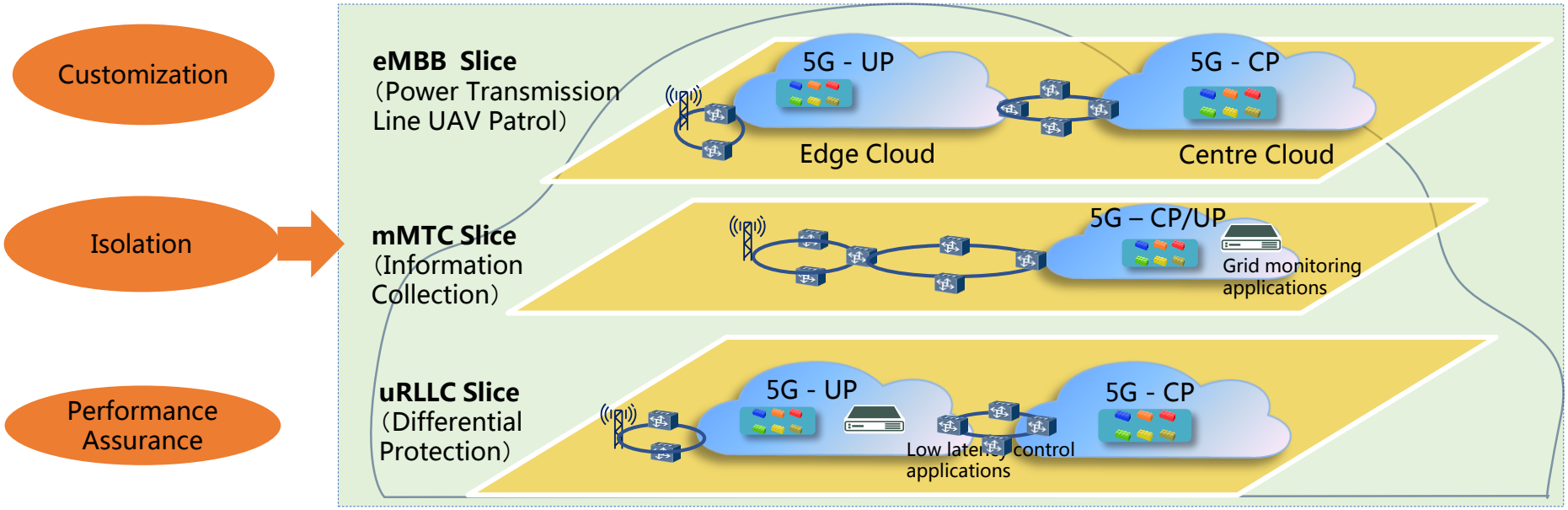


Challenges to transport network:

- Multiple services with different performance requirement need suitable isolation mechanisms
- Control of performance degradation caused by micro-burst of service traffic
- Per service type operation and management for monitoring, detection and localization of fault and SLA degradation

Service Type	Service name	Requirement		
		latency	bandwidth	reliability
Control	Relay Protection	<15ms (E2E)	>2Mbps	99.999%
	Demand side response for electrical load	<200ms	2Mbps	99.999%
Collection & Monitoring	Substation inspection robot	200ms	10Mbps	99.9%
	Transmission line unmanned aerial vehicle inspection			
	Mobile site construction operation control		100Mbps	

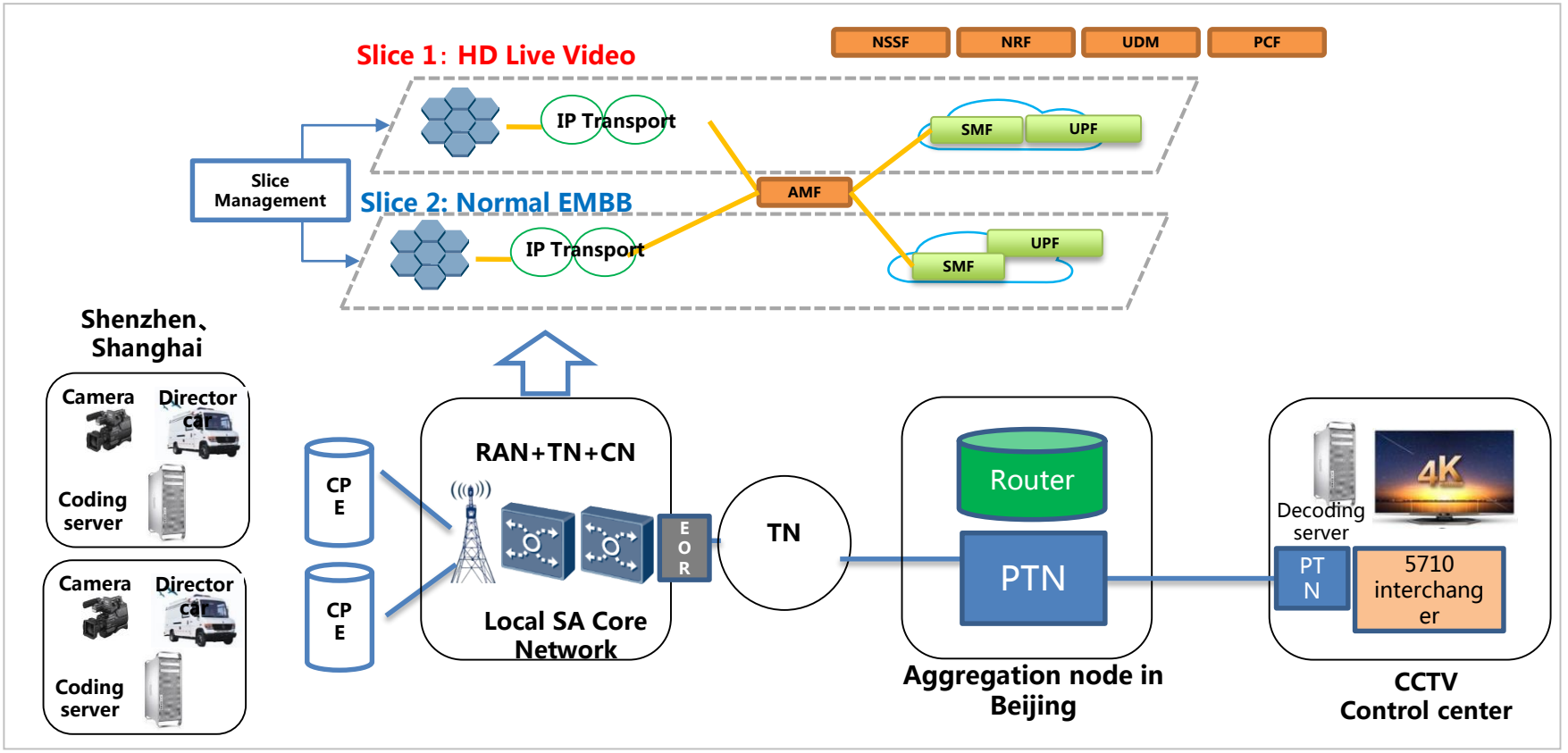
Network Slicing Use Case: Smart Grid



- 5G network slicing provide logically isolated, performance assured end-to-end virtual networks/network slice instances to meet differentiated business requirements of smart grid

- Transport network uses soft and hard isolation mechanisms to provide different levels of SLA guarantee

Network Slicing Use Case：HD Live Video



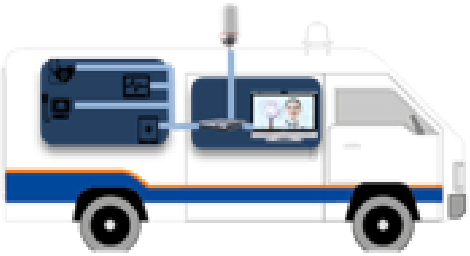
- **Different requirement from normal EMBB services**
  - Bandwidth: upstream 40-60Mbps, downstream 100Mbps
  - E2E latency: 20~30ms
  - On-demand slice provisioning: from months to days

Other Network Slicing Use Cases

- More network slicing use cases in lab test or trial

Financial Data Exchange

Remote/Mobile Surgery



Autonomous Driving

Summary of Transport Network Slicing Requirement

- Customization
  - Customized topology/connectivity for AN and CN network entities in E2E network slice
- Isolation
  - Suitable degree of isolation to meet different levels of SLA requirement
- Automation
  - Dynamic network slice life-cycle management and E2E network slice coordination

Thanks!