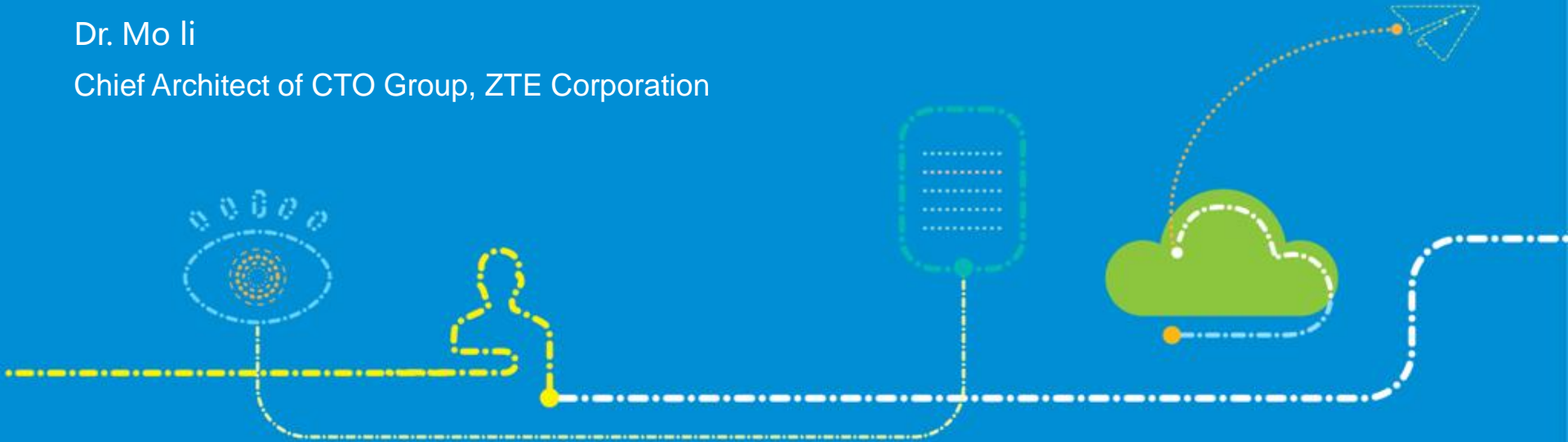


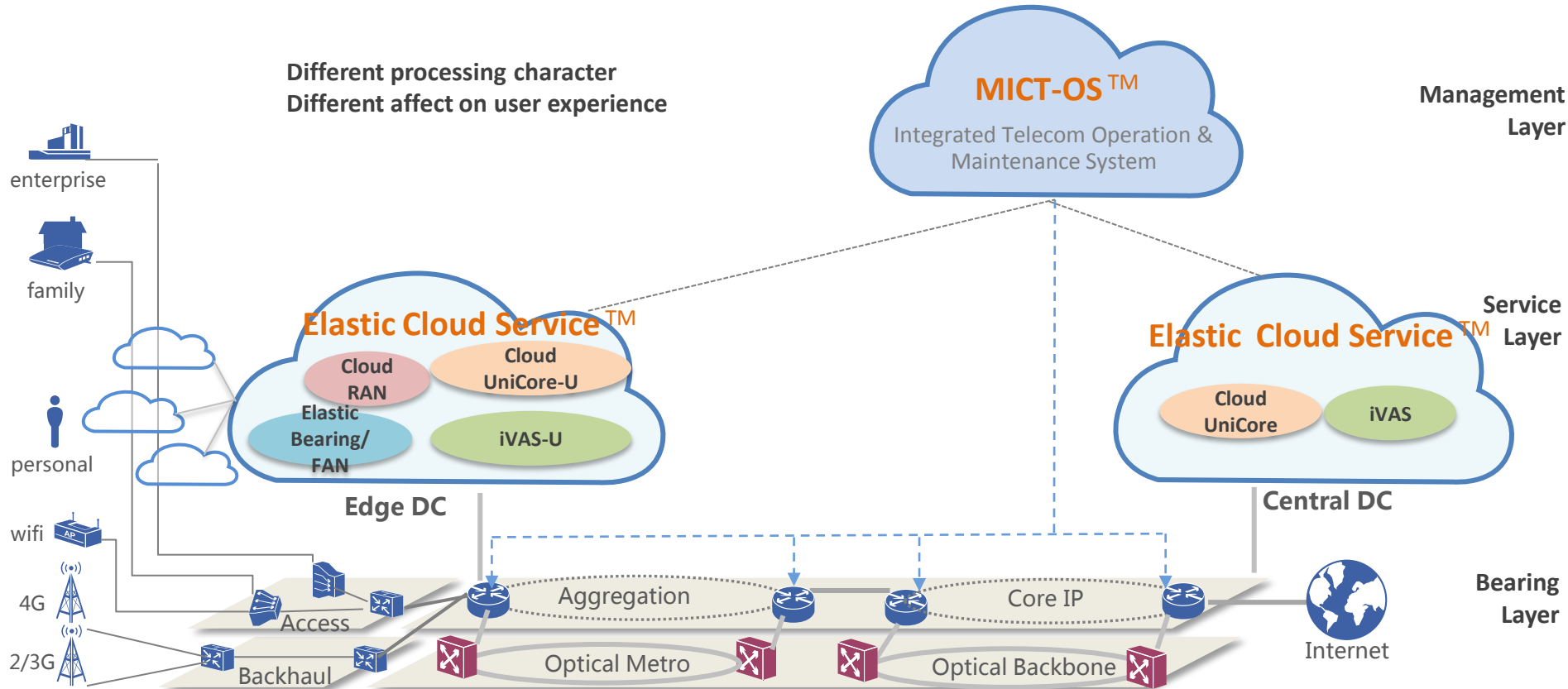
# C/U Separated and Modular Architecture for NFV

Dr. Mo li

Chief Architect of CTO Group, ZTE Corporation

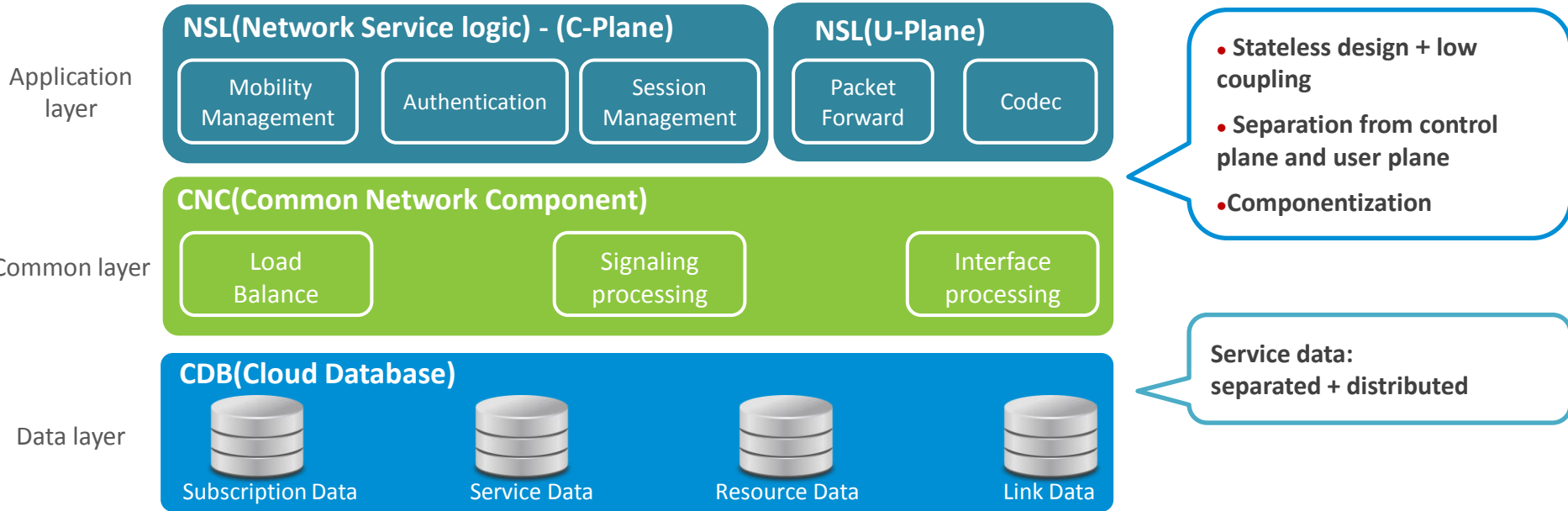


# C/U Separated Requirement for Multi-tier DC Scenario



# vCN Architecture – TCSA

## TCSA (Telecom Cloud Service Architecture)



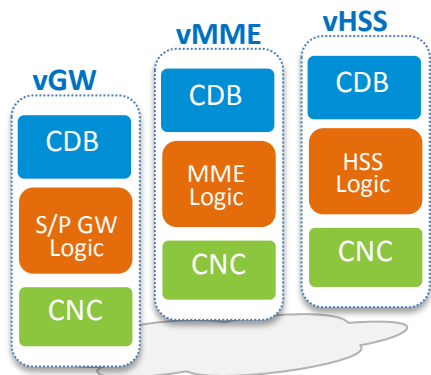
### Highlights

- **High performance:** all modules are active and carry traffic, higher resource utilization.
- **Better experience :** ISSU and seamless elasticity
- **Easy O&M :** fast upgrading and deploy new SW version

- **Better expansion :** easier to introduce new applications
- **Second-level elasticity :** VM disaster redundancy and migration without data migration
- **Higher reliability :** 0 service loss/N+K distributed disaster redundancy

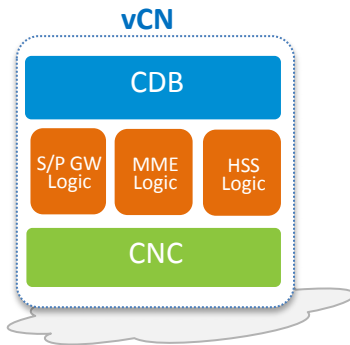
# Service Componentization & the Deployment Flexibility

**Scenario 1** : operator market, large-scale network, legacy traditional/cloudlization / multi vendor hybrid network



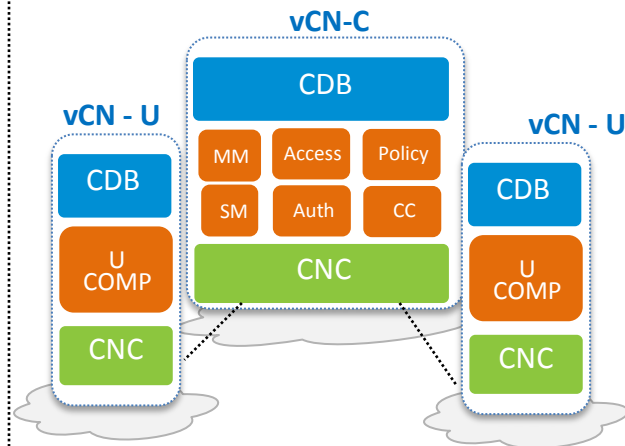
- TCSA architecture, more reliable and easy for expansion.
- Virtualized NE adopts standard interface for interconnection, construct with traditional network

**Scenario 2** : enterprise network market, small-size network, cloud-lization network



- Shared by CDB/CNC, more compact and save resources
- Internal interfaces among service logic components, higher efficiency

**Scenario 3** : large capacity, low cost, multi-tier DC deployment

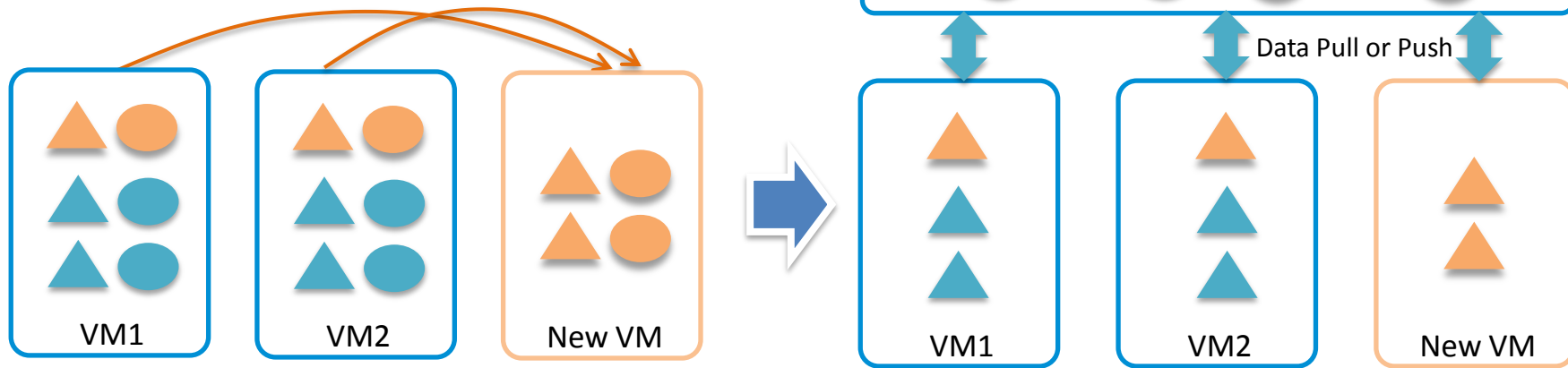


- Function componentization, deploy according to requirements and meet precise customized requirements.
- Distributed deployment, high efficiency of service processing.

# Seconds level Elasticity



*Legacy elasticity service and data is migrated simultaneously, with slow speed, interrupted service and bad experience*

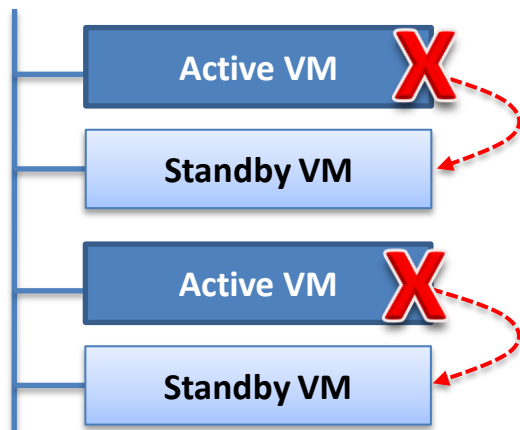


## Highlights

- **Seconds level elasticity** : Service and data separation, when service layer VM scales in or out, there is no need for complicated data migration, new VM directly acquires the latest subscriber data from CDB, the elasticity shortens from traditional minutes to second.
- **0 service interrupted** : Real-time synchronization of CDB data, after VM handover, VM directly acquires the latest data from CDB via Push or Pull, thus to guarantee service continuity and improves subscriber experience.

# Cloud Redundancy Solution Guarantees High System Reliability

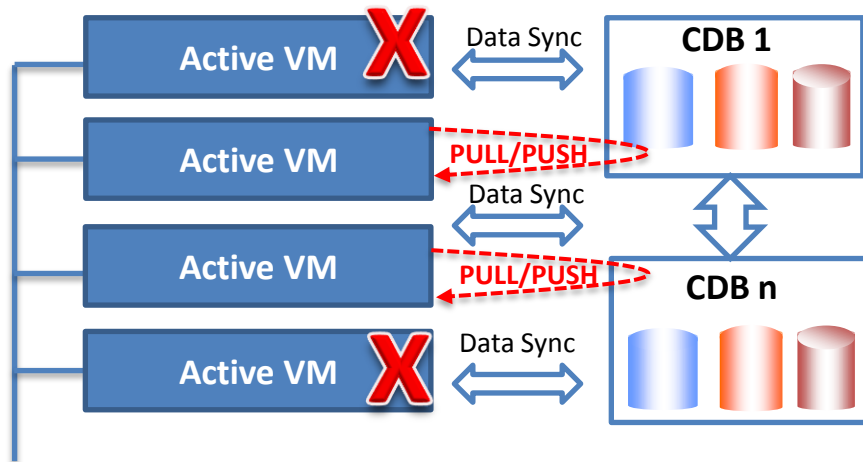
## Legacy 1+1 redundancy solution



### Challenges:

- ◆ **Discontinuous service** : if active module fails, service will be interrupted.
- ◆ **Resources with low efficiency**: backup module is only used for backup, which cannot be fully used.

## Cloud redundancy solution

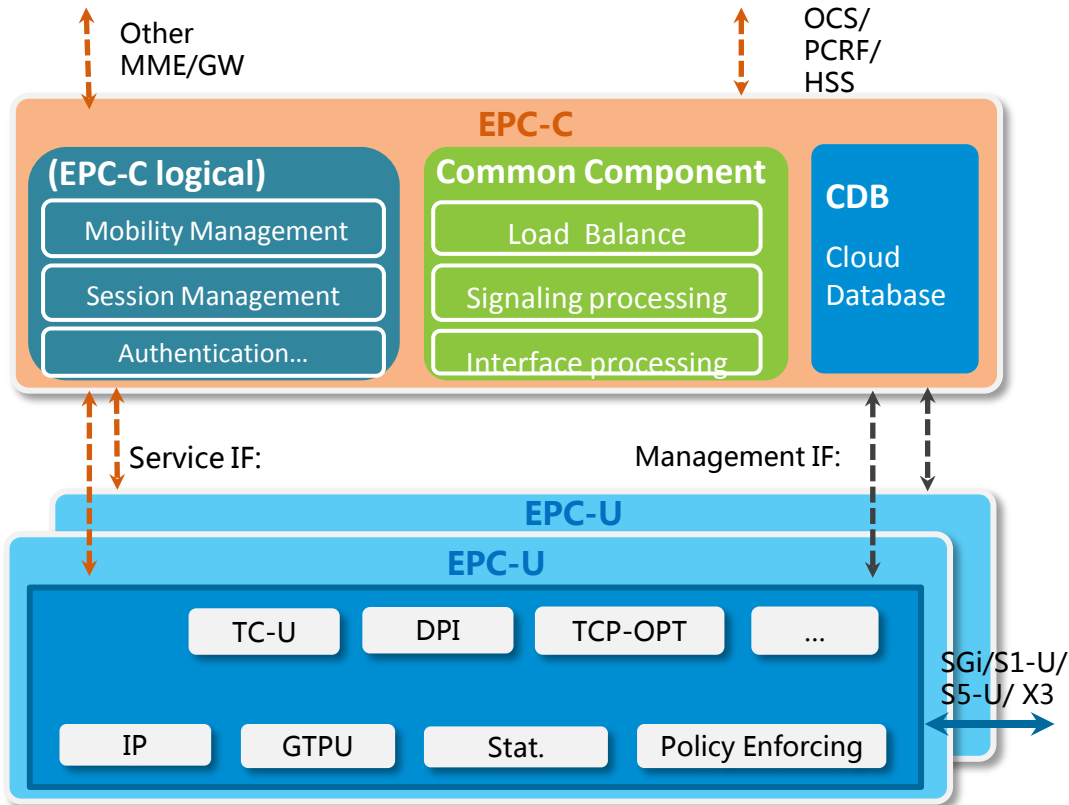


### Benefits:

- ◆ **No loss of service** : if the rest of the processing module resources meet existing service requirements, one or more service processing modules failure do not result in service interruption.
- ◆ **High efficiency use of resources** : service processing modules are all in active status, resources are fully used.

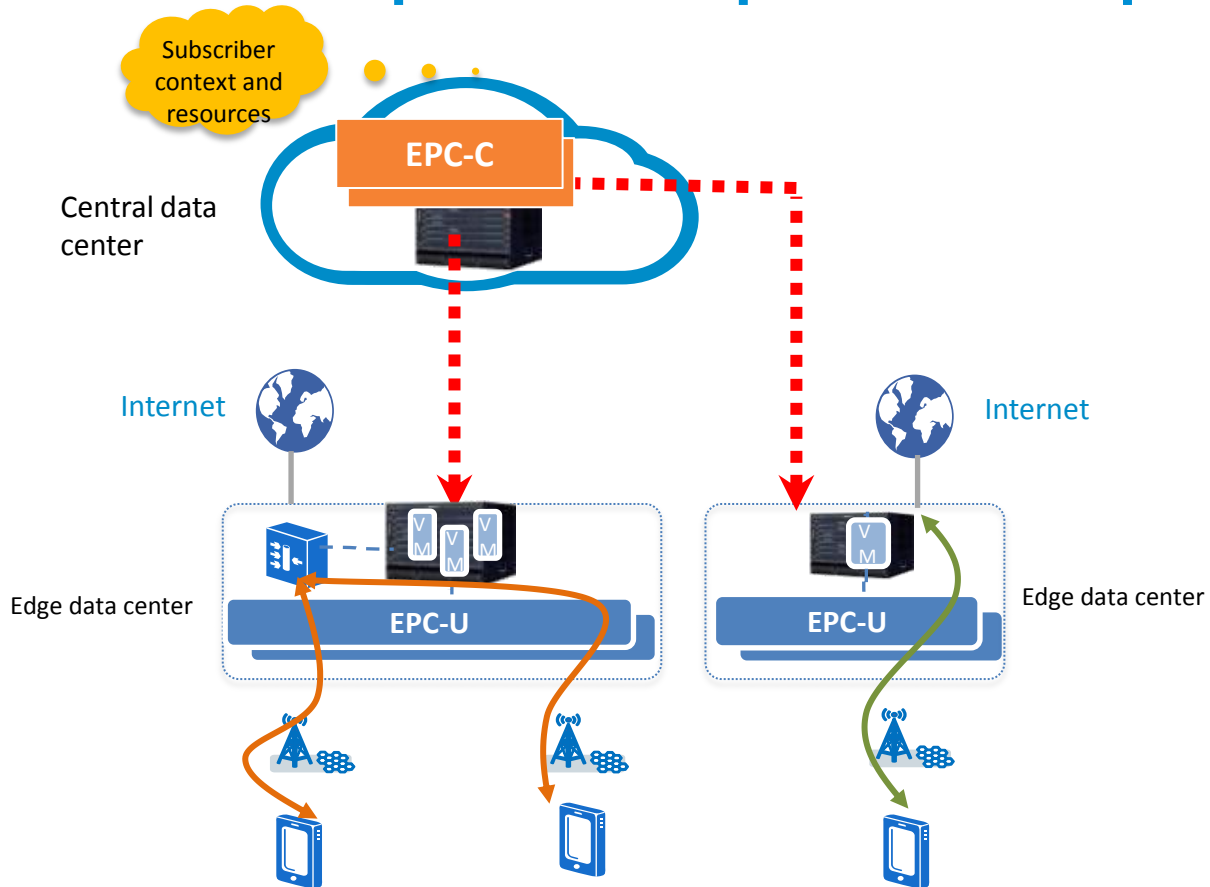
**1 to 1 backup VM module is not required, when one or more VMs fail, the subscribers access to other VM modules to continue the service processing**

# C/U Separated Architecture of vEPC



Interface	Usage
<b>Service</b>	Loading flow policies of traffic processing Load Quota for online charging Reporting usage for offline charging
<b>Management</b>	Configuration, KPI, alarming...

# vEPC CU Separation Improves transportation Efficiency



## •Solution :

- CU separation , centralized control plane, distributed forwarding, select user plane based on the following strategies:
  - Load ( load balance )
  - location ( near offload )
  - APN ( service guide )

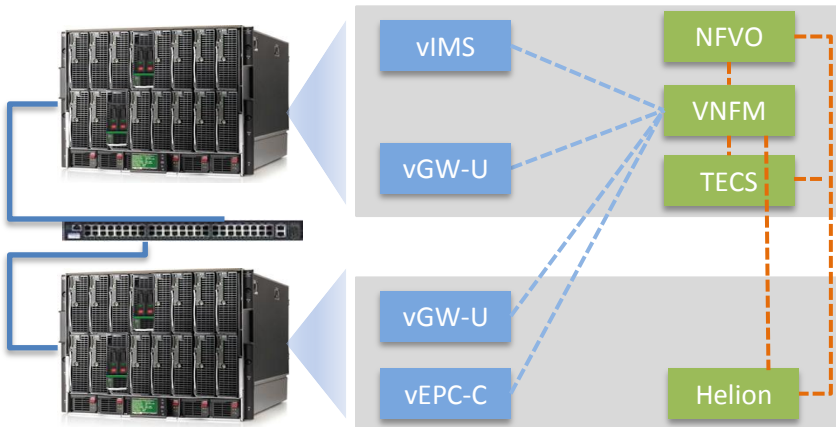
## • Benefits :

- Centralized O&M, control plane function is centralized, fast deployment reduces TCO
- Centralized management of context and resource control plane, fast self-heal of forwarding point, better reliability.
- Control plane coordinates the subscriber to optimize seamless service path during mobile procedure, with better experience.

**About 90Mbps Inter DC transportation is required for 300K subs (based on CMCC traffic model).**



# VoLTE NFV PoC with China Unicom



## Multi-vendor NFV environment

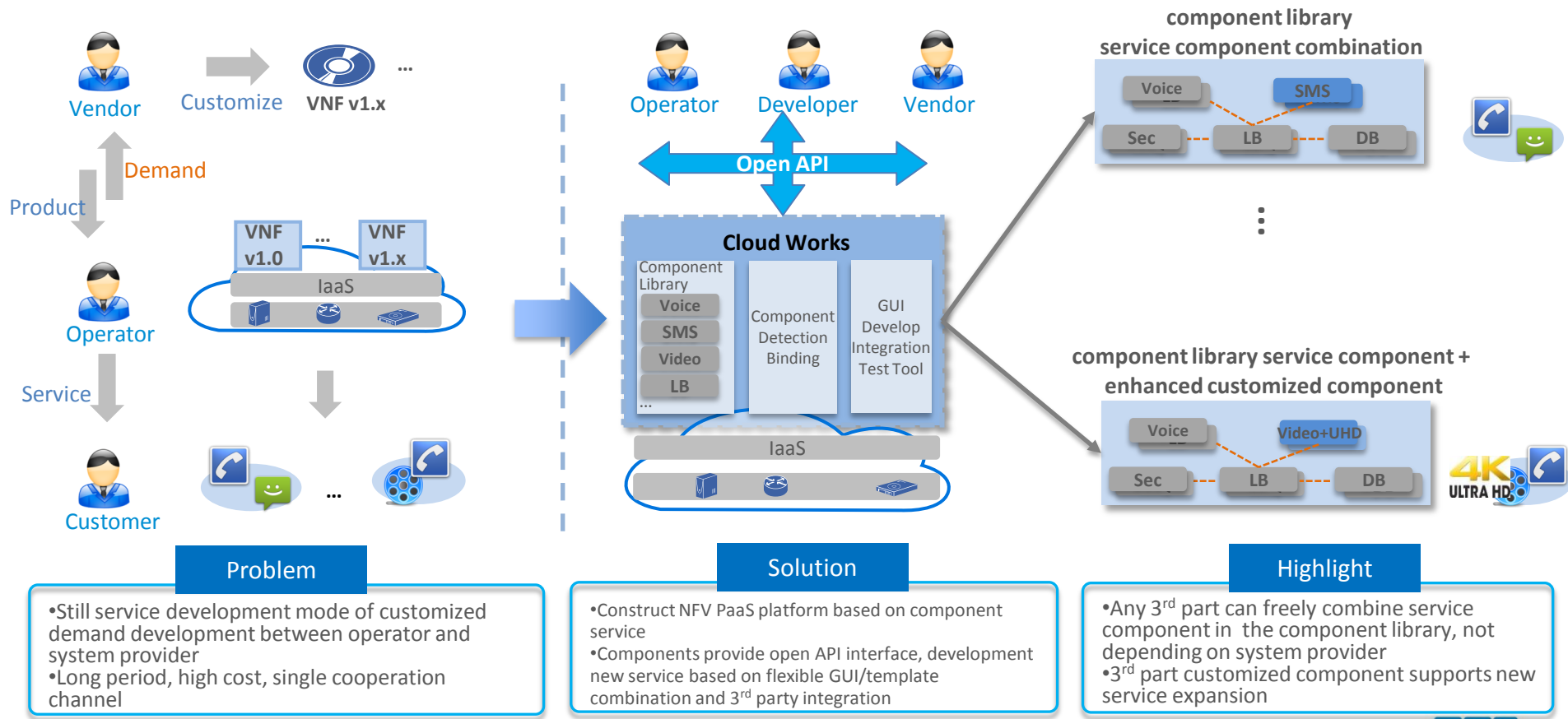
- **NFVO:** ZTE (vManager), HP(NFV Direct)
- **VNFM:** ZTE (vManager) ;
- **VNFs:** ZTE (vEPC & vIMS);
- **EMS:** ZTE (NetNumen U31)
- **VIM:** ZTE (TECS) , HP(Helion);
- **HW:** HP (BL460c Gen9) ; ZTE (ZXCLoud E9000).



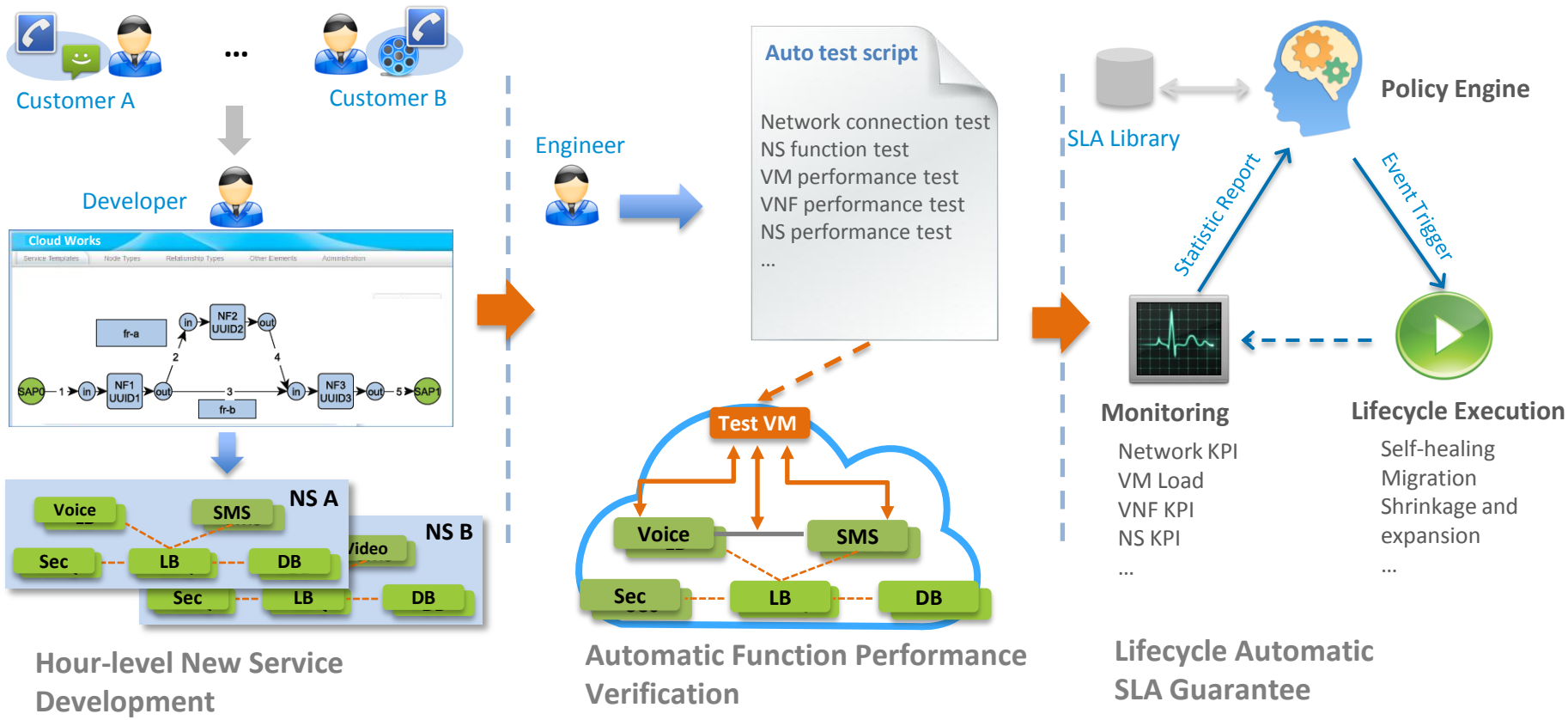
## PoC

- **E2E VoLTE service verification:** LTE service, Voice service, billing
- **NS&VNF life cycle management:** registration, deployment, expansion, hot migration, upgrade;
- **Elastic scalability:** manual and automatic Scale-in & Scale-out;
- **User plane acceleration technology:** DPDK, SR-IOV;
- **vGW based iSDN:** separate control plane and user plane;

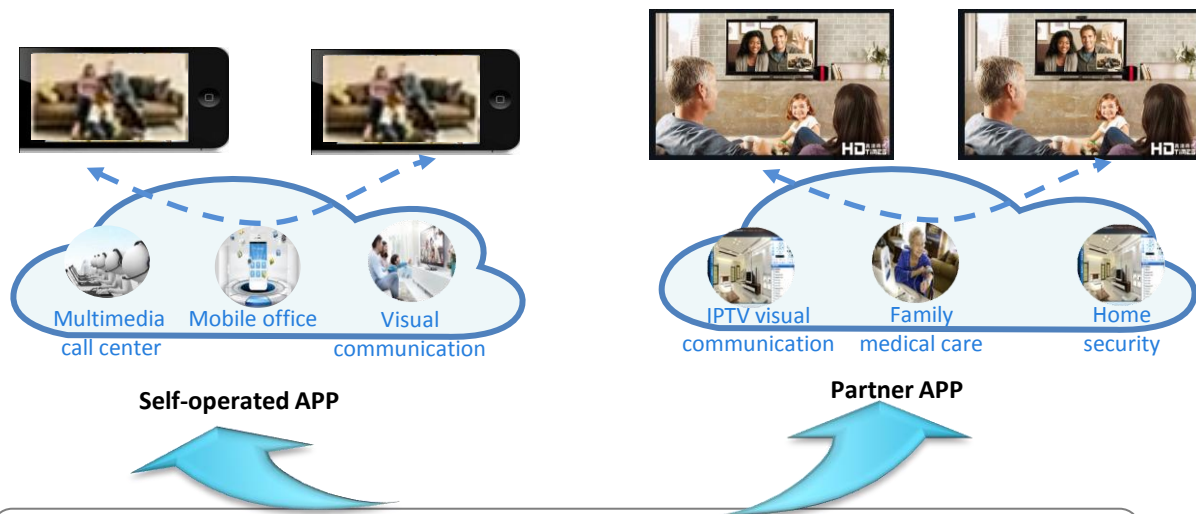
# Cloud Works – Break Bottleneck of Service Development & Innovation



# Cloud Works – Hour-level New Service Development & Deployment Platform



# Cloud Works Helps Operator to Build Carrier-class Open Ecosystem with RCS



## ZTE Cloud Works

### Ability open layer

Dev Tool	Basic API set	Service API capability set				Operation API capability set		API Integration Framework
	Message	Signaling	Protocol stack	Voice	Video	Big data analysis	Precise marketing	
	Database	VPN	DPI	SMS	Multimedia conference	Closed loop control	Charging	
	...	Access management	Policy routing	QoS control	Subscriber management	...	...	
	...	...	...	...	...	...	...	

### Ops Framework



### ◆ Cloud Works: Carrier-class open ecosystem

- Convenient for the operator to quickly launch new services for enterprise customers
- Open API to partners, diversified services

# Thank you



Tomorrow never waits

