

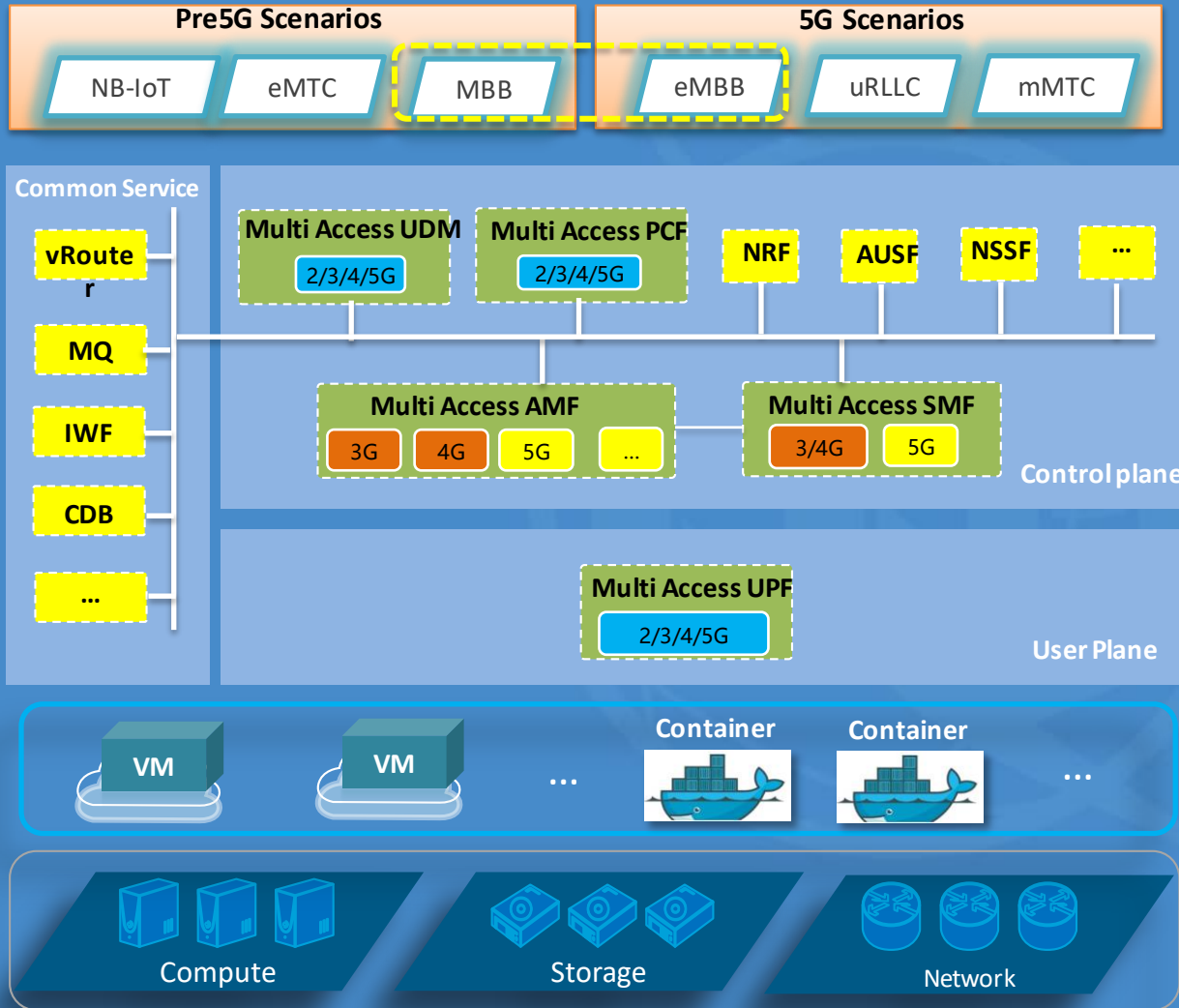


5G Core Network

- ZTE 5G Cloud ServCore

Zhijun Li, ZTE Corporation

ZTE 5G Cloud ServCore Overview



Orches
trator

MANO

VNFM

VIM

Standard & Open

- Compliant 3GPP, ETSI NFV, etc. Based on open source projects (OPNFV, OpenStack, etc.)

Service based

- Service based architecture
- Stateless Design
- C/U decoupled

Network On Demand

- Flexible network slicing
- Component sharing, cross-DC deployment
- Network acceleration

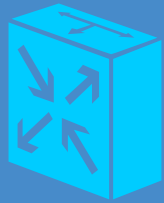
Convergent

- Common NFVI & MANO
- 2/3/4/5G access support
- Non-3gpp support

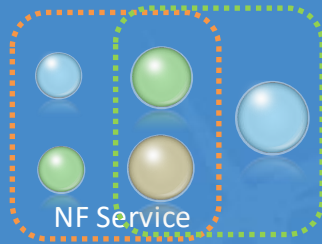
Design Principle: Support network virtualization and softwarization, Service based oriented, Support stateless and stateful, network slicing on demand, support multi-access from 2/3/4/5G;



ZTE 5GC Service Based architecture



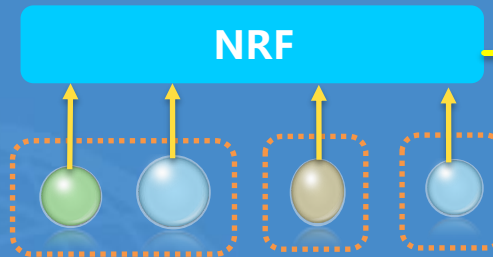
Network Element



NF Service

Network Function

- NE change to NF, NF split to NF service (VNFC)
- Service is self contained, reusable, independent scalability
- **On-demand** orchestration and **distributed** deployment

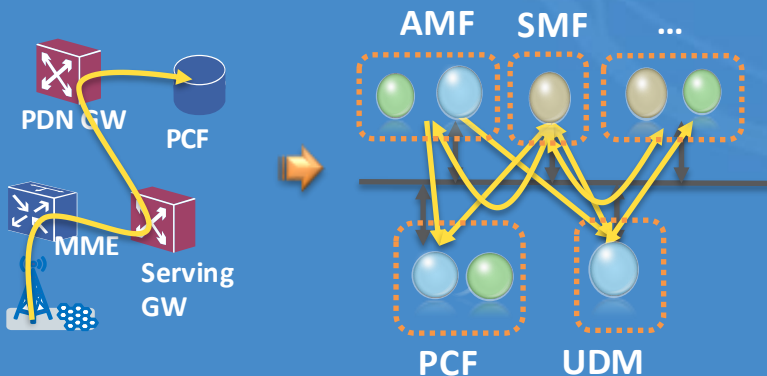


- NF type
- IP Address
- FQDN
- Service supported
- ...

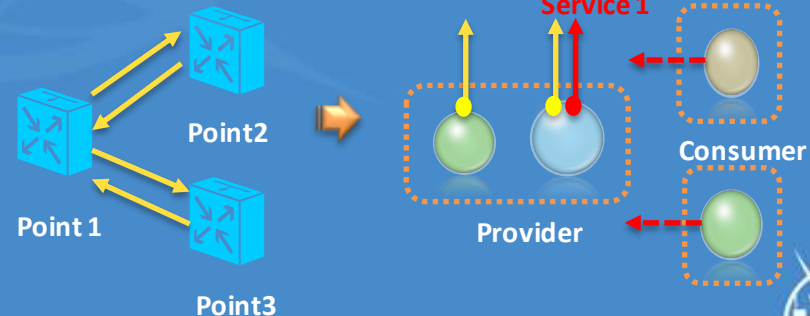
- NF service registration / De-registration to Standalone NRF
- Status detection between NRF and NF service
- NF service **automatic** management, selection and scalability



- Full-mesh communication
- **Shorten** network path



- Service based interface
- Provider and Consumer
- Communication mode: P to P, P to M
- **Decouple** and **high efficiency**



5GC Service Based Interfaces

Requirements for Service Based Interfaces

Bidirectional communication, Reliable communication, Scalability, Low response time, Security, Resource efficiency, Stateless enable, Forward compatibility, Easy to upgrade, Ease and speed of deployment and instantiation, ...



On going discussion in 3GPP

1) HTTP Oriented

JSON/ProtoBuf/Diameter AVP/...

HTTP 1.1 / HTTP 2.0

TLS

QUIC

TCP

UDP

2) Diameter Oriented

AVP

Diameter

(optional) TLS / DTLS

TCP / SCTP



ZTE view and preference

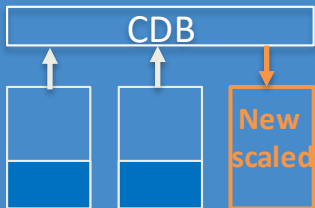
- HTTP is light weighted and suitable for service invocation;
- HTTP 2.0 provides advanced features and is more efficient than HTTP 1.1;
- QUIC is well-defined for reliable and high efficient communication, but it depends on the maturity of IETF spec;
- JSON is acceptable, if efficiency is not strictly required;
- Diameter AVP can be considered as HTTP payload, if high efficiency is required;

Redesign NF with common Stateless principles

- Computing **separation** from storage
- Data slice for **replication** and **migration**



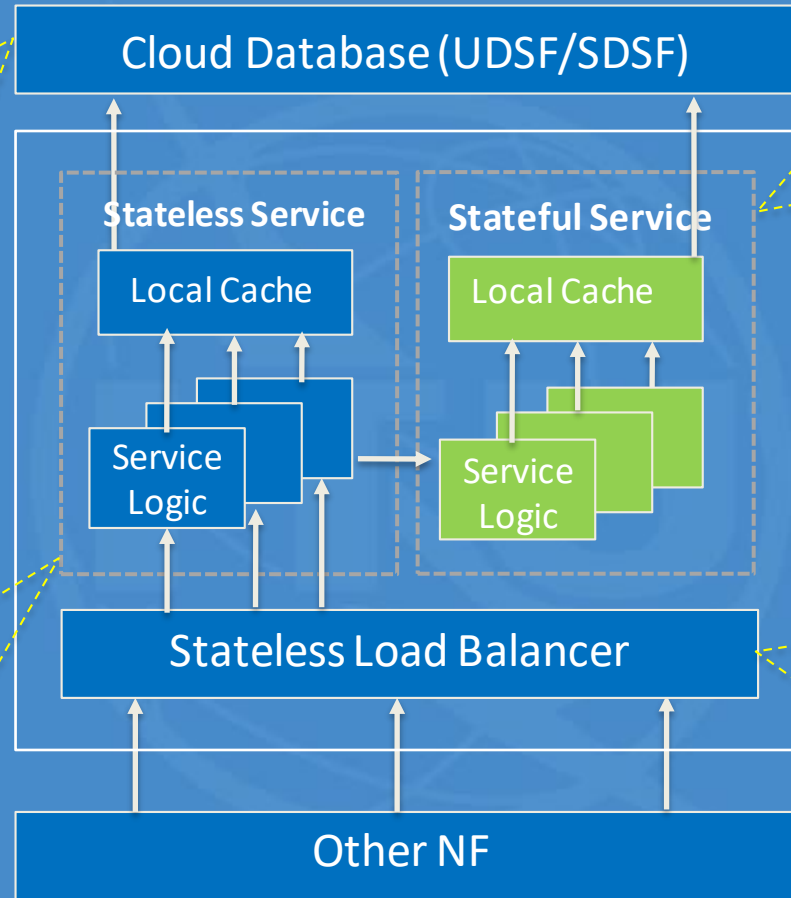
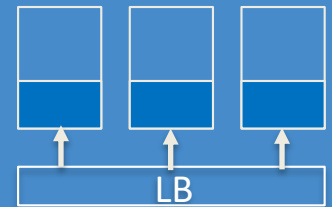
- **Procedure level stateless**



- **Standalone stateful process**
- **Decoupled from stateless service logic**

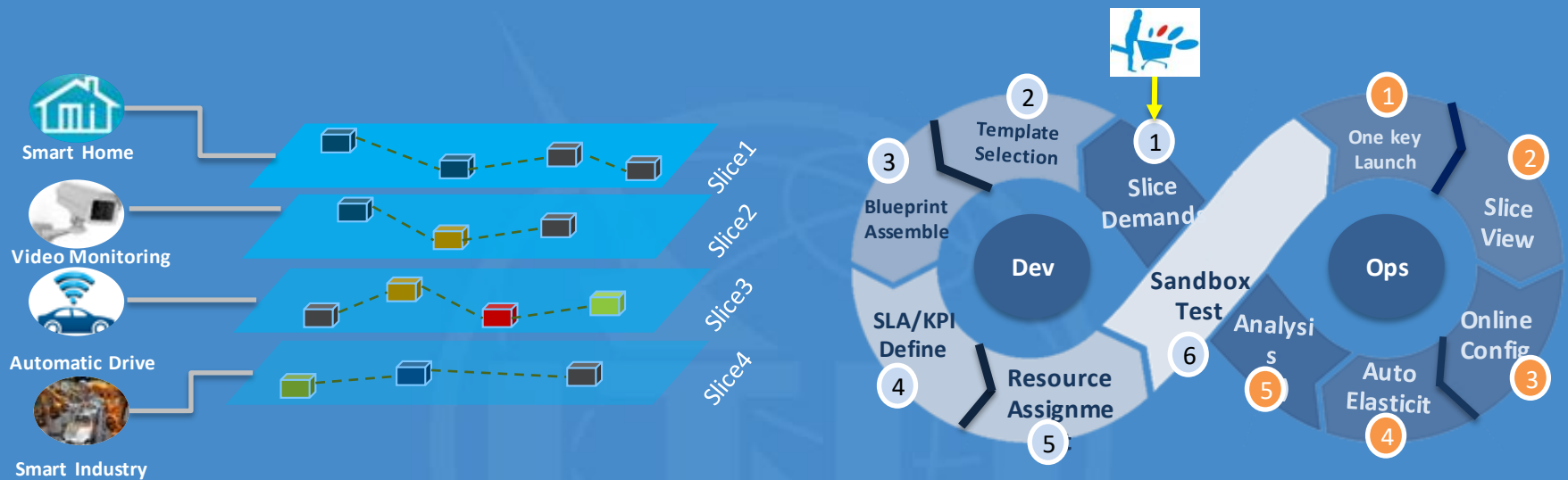


- **Stateless LB guarantee traffic more balanced**



Common NF Design Principle with Stateless

ZTE's new 5GC perfectly support Network Slicing



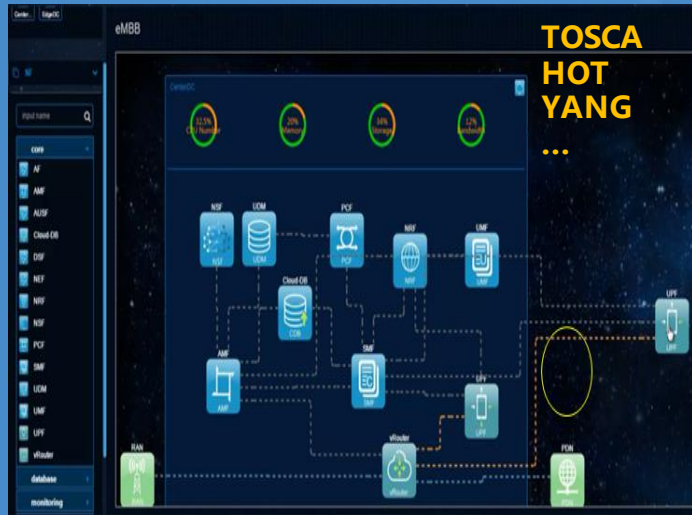
With New designed 5GC

- NS service be **selected** and **orchestrated** on demand into a slice
- NS service be **shared** between NFs and further shared between slices
- NF service **automatic** management to make a slice **flexible** and **easy** to maintain

With Carrier DevOps System

- **DevOps** system to support network slice lift cycle management
- Develop loop for network slice **on-boarding**
- Operation loop for network slice **assurance**

Dev: On-line Design Network Slicing



UPF

Property Resource sv-upf

Bandwidth (Mbps) 100

Max instances 2

Latency 500

Flow number 10000

Flowcreatedpers econd 200

Scale out throughput rate(%) 70

Scale in throughput rate(%) 10

UPF

Property Resource sv-upf

vnf_type UPF

vendor ZTE

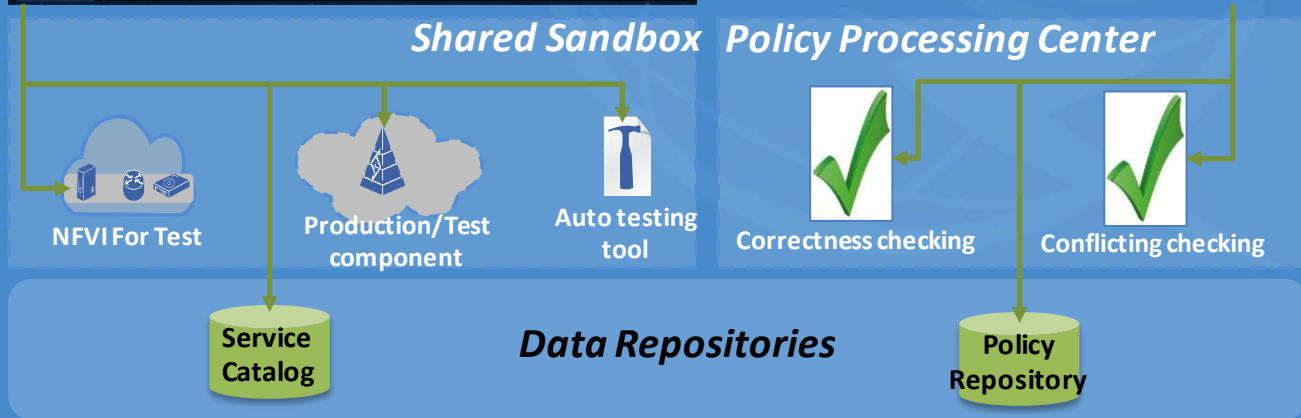
is_shared false

Software repository

- System comes with software packages up to 1000
- Software package support local upload and internet download
- Satisfy users requirements.

Design process

- Graphic interface **simple drag operation** to finish complicated network service orchestration design
- Finish in **3 steps within 3 minutes**
- All components, connection points and links can be set and customized
- Visible structures



Ops: All round & Real time Monitoring

Overview

Application Service Monitoring

VNF, Network Service,
Network Slicing

Virtualized Resource Monitoring

Usage of vCPU, vMem,
storage and network

Physical Resource Monitoring

Physical Server, Network
Device and Storage



Health Diagnosis

According to the severity and quantity of Alarm, evaluate the status of network

Ops: Policy based Closed-loop Operation



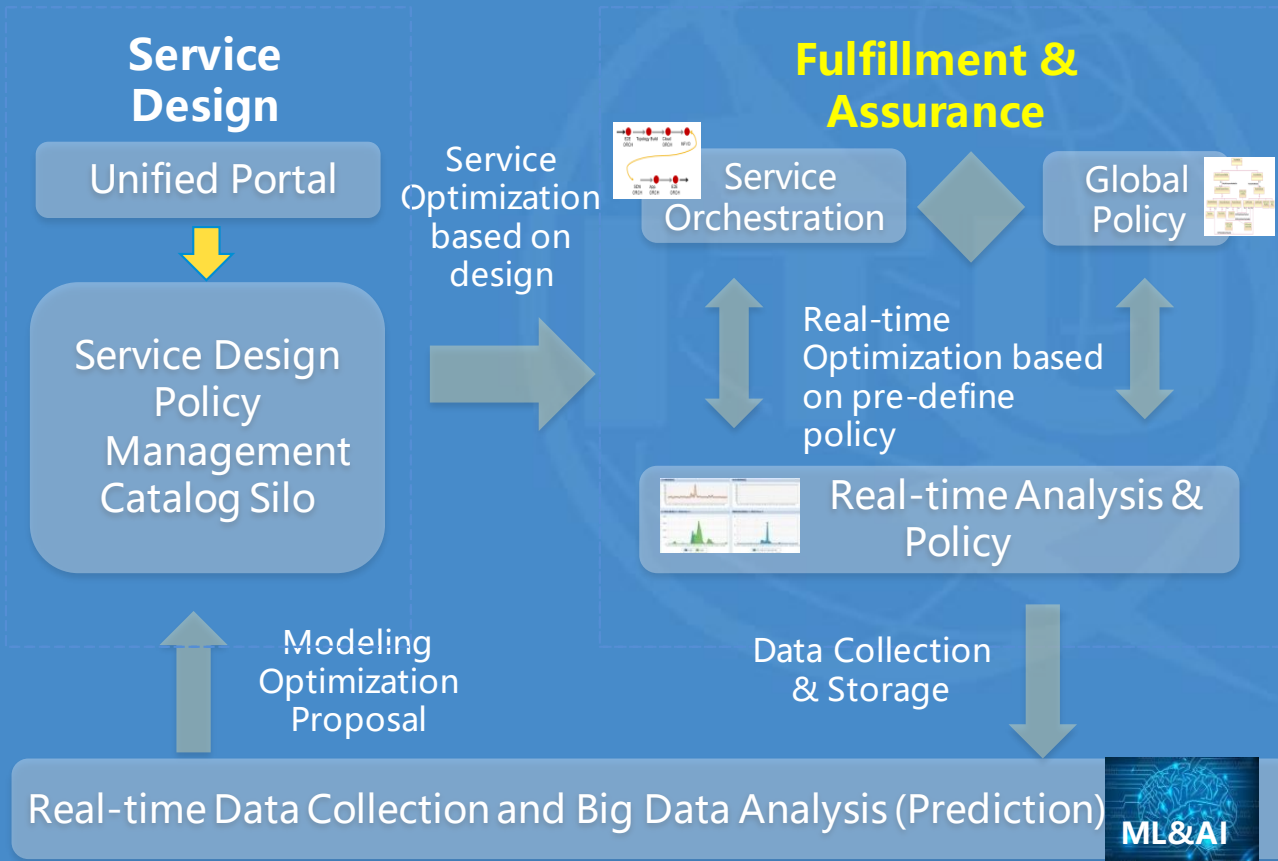
Marketing



Developer
& Testing



Operation
Service



Professional Design

- Visible Service Design
- Model Driven Design on-demand

Automatic Operation

- Service Fulfillment on-demand
- Monitoring & Analysis
- Simplified Operation

Closed-loop Operation

- Design → Deploy → Analysis → Re-Design
- Continues Optimization for User Experience and Network



ZTE Carrier DevOps Builder 2.0

Based on DevOps Concept



E2E Slicing

Based on 5G architecture, compatible with 2G / 3G / 4G network

End-to-end slice lifecycle view

Policy-based Ops deployment and O&M

Agile & Real-Time

Container-based, minute-level deployment, second-level scaling
Agile development, Continuous Integration, Continuous Delivery
Fast online/offline, real-time adjustment, delivery, effective and present

WYSIWYG

Dev wizard, components drag & drop
Network Slicing based on Slice templates
Visualization of resource occupation and service states

ZTE Carrier DevOps Builder v2.0, first show on 2017 MWC, Barcelona



5G Collaboration



Strategic Partnership and MoU



Communicate and cooperate with mainstream operators regularly



