NCE (Manage Domain) System Introduction
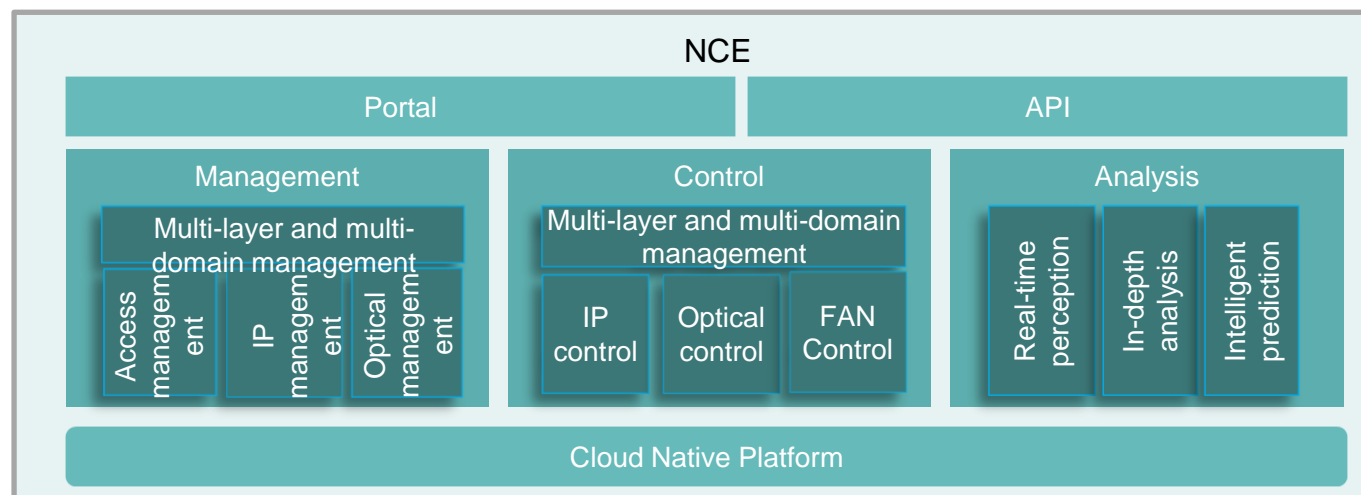
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Contents
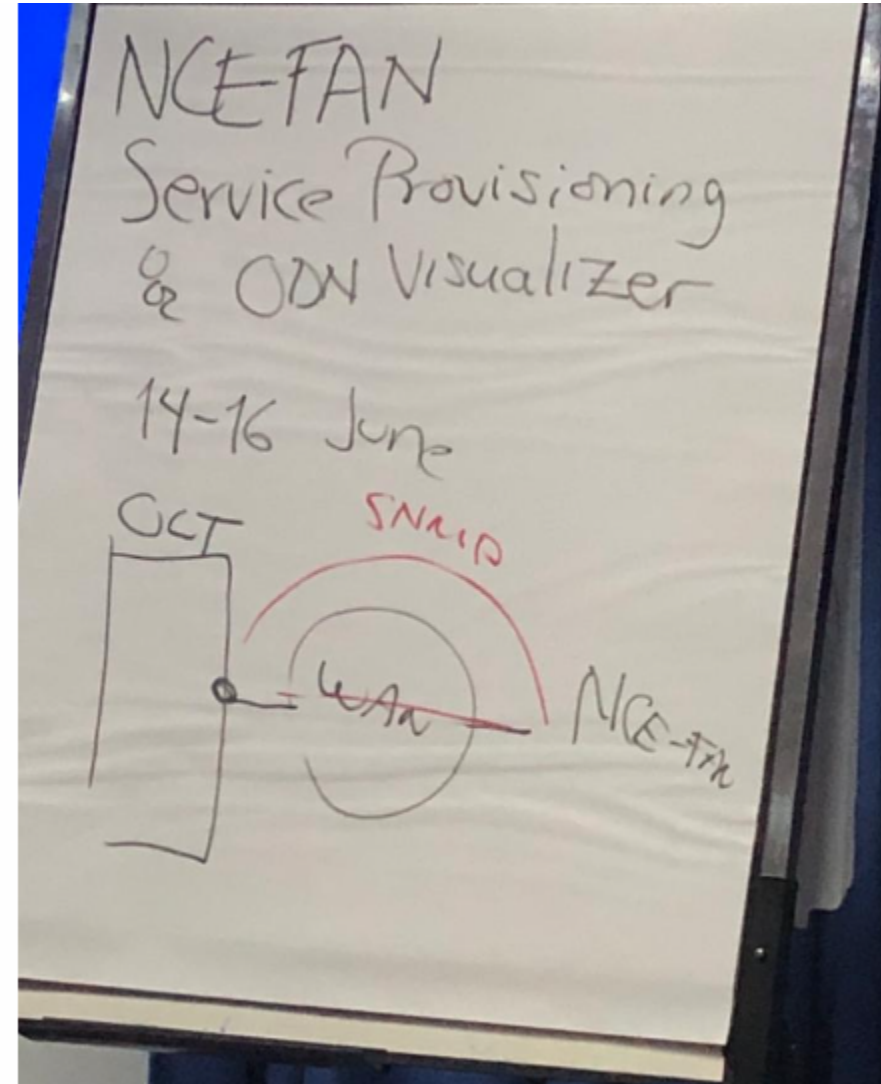
NCE System
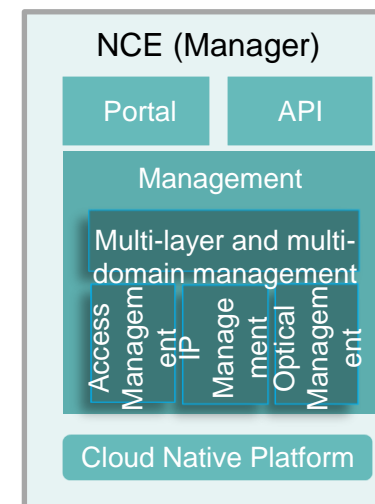
- NCE-FAN, and NCE (Manager) can be released as independent products.

- The components are deployed on demand.

odn visualizer is an api that can be implemented to interact with the nce
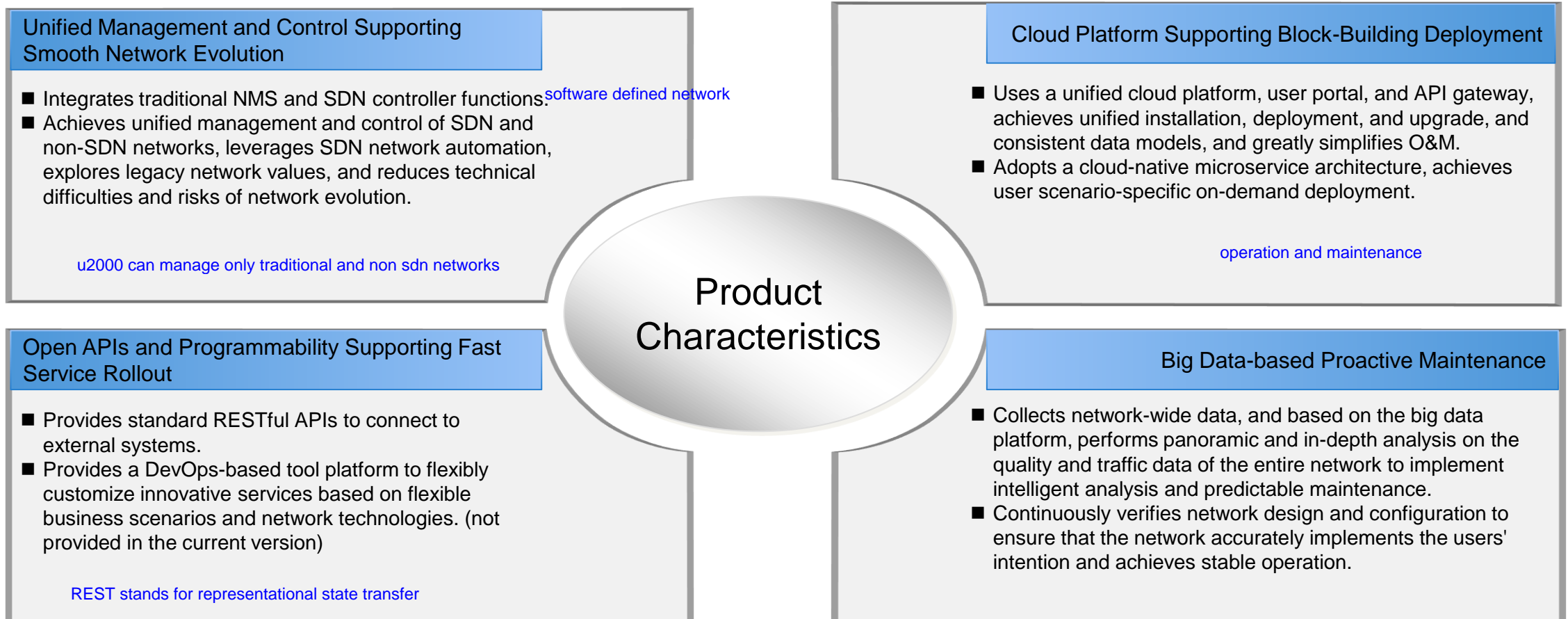fiber management system is included in de odn visualizer/analyzer

NCE Characteristics

A REST API (also known as RESTful API) is an application programming interface (API or web API) that conforms to the constraints of REST architectural style and allows for interaction with RESTful web services. REST stands for representational state transfer and was created by computer scientist Roy Fielding.
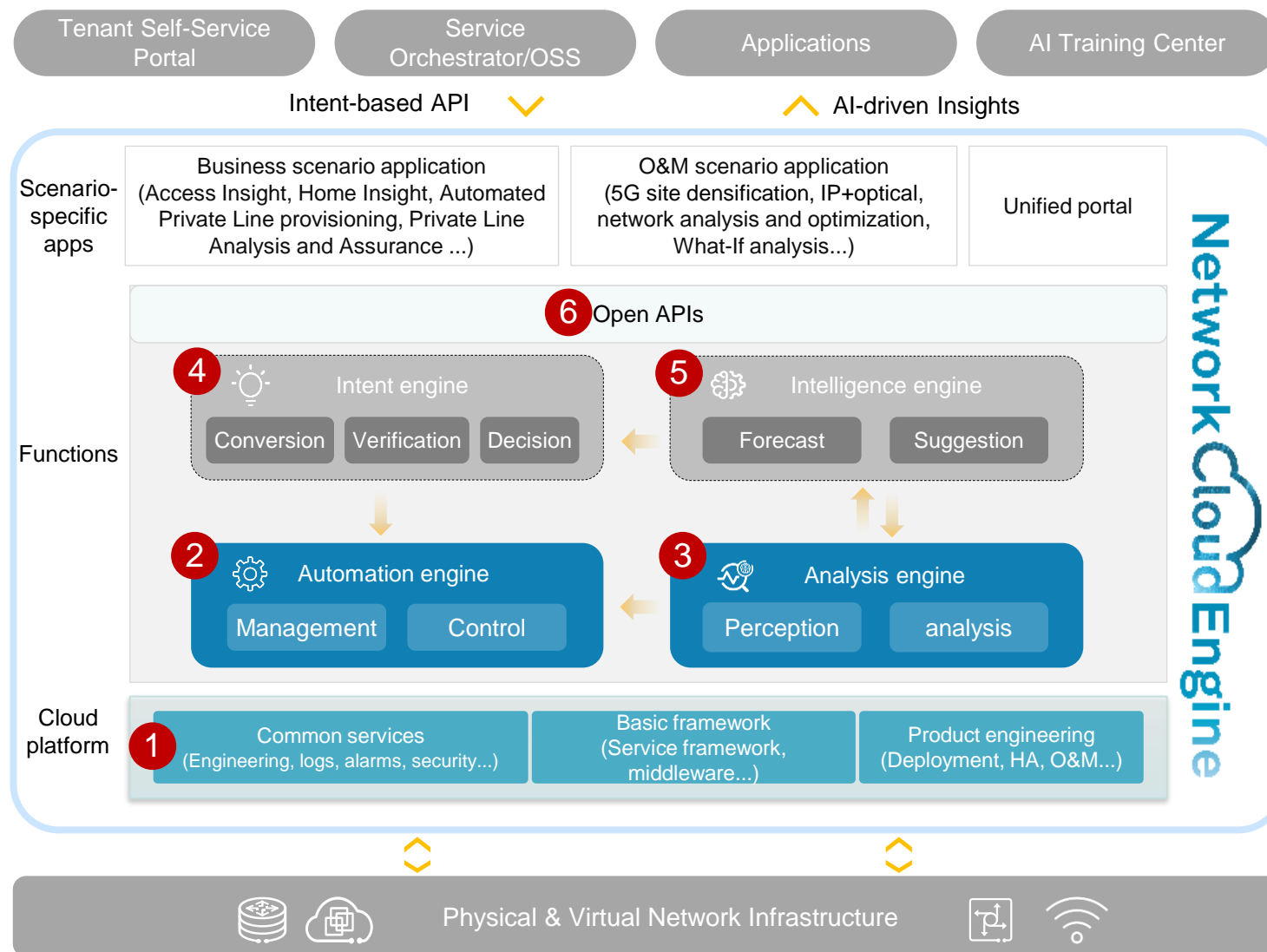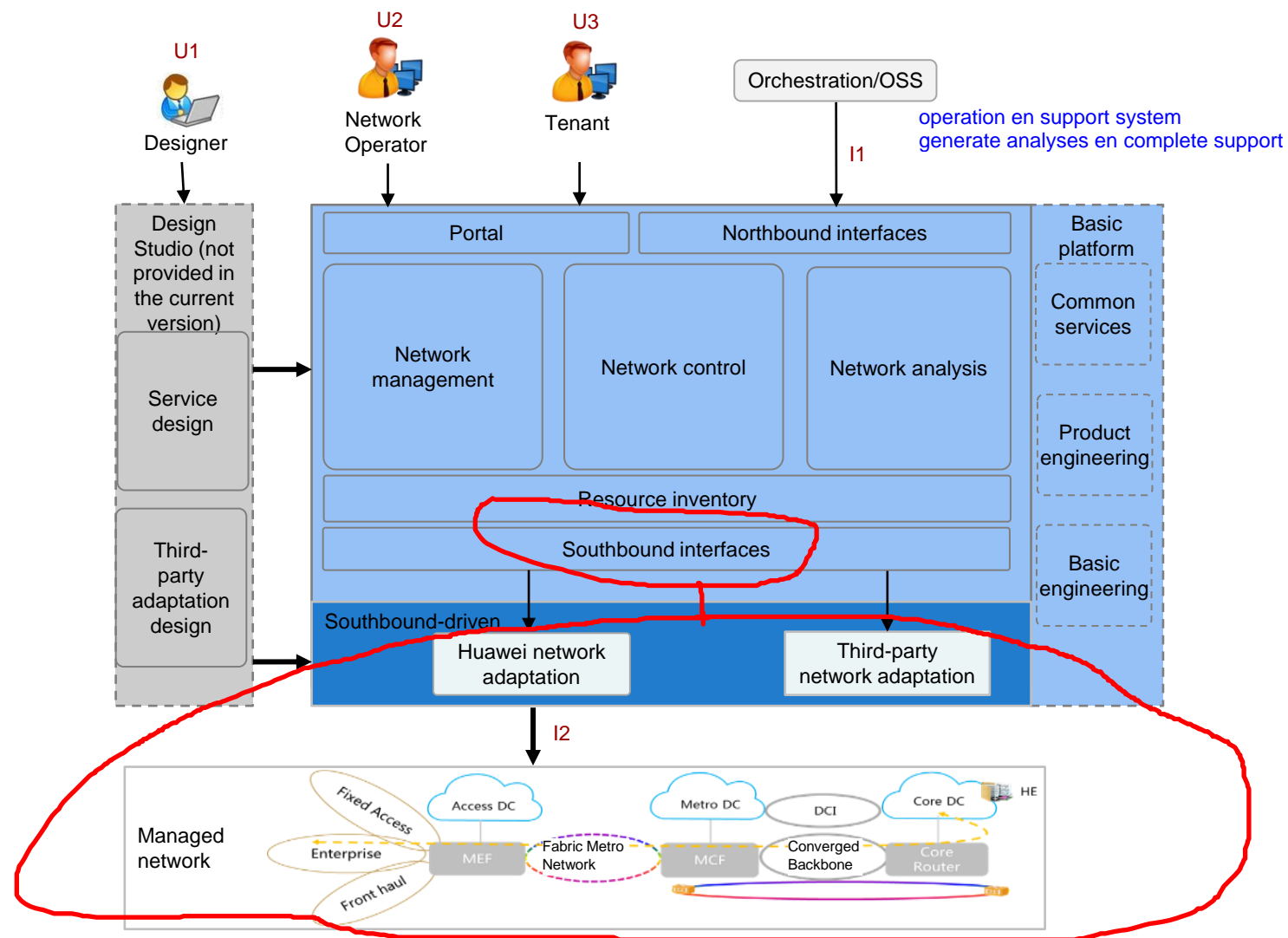
NCE is a network lifecycle automation platform that integrates management, control, and analysis. It focuses on service automation, O&M automation, and network autonomy to support carriers' network cloudification and digital operation transformation.
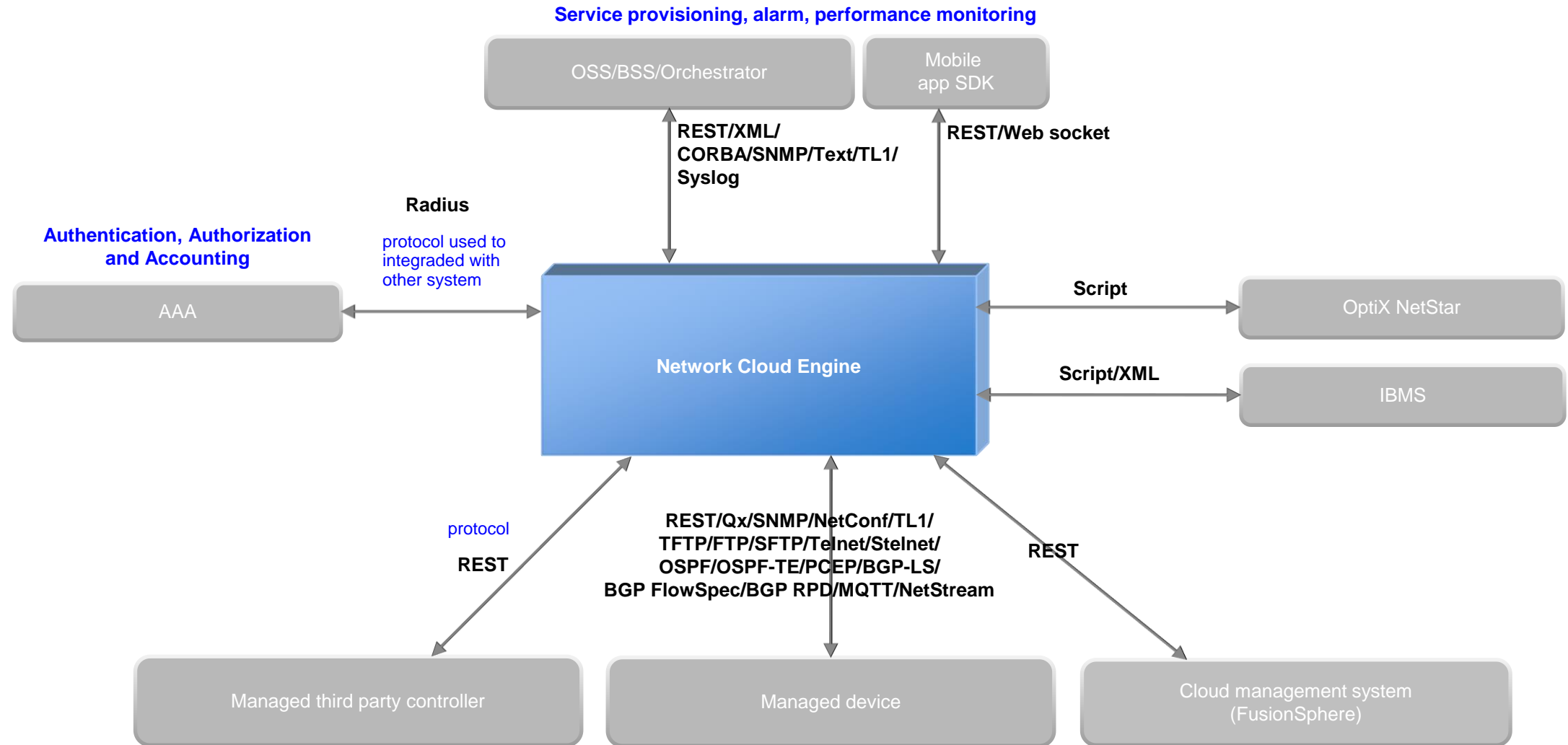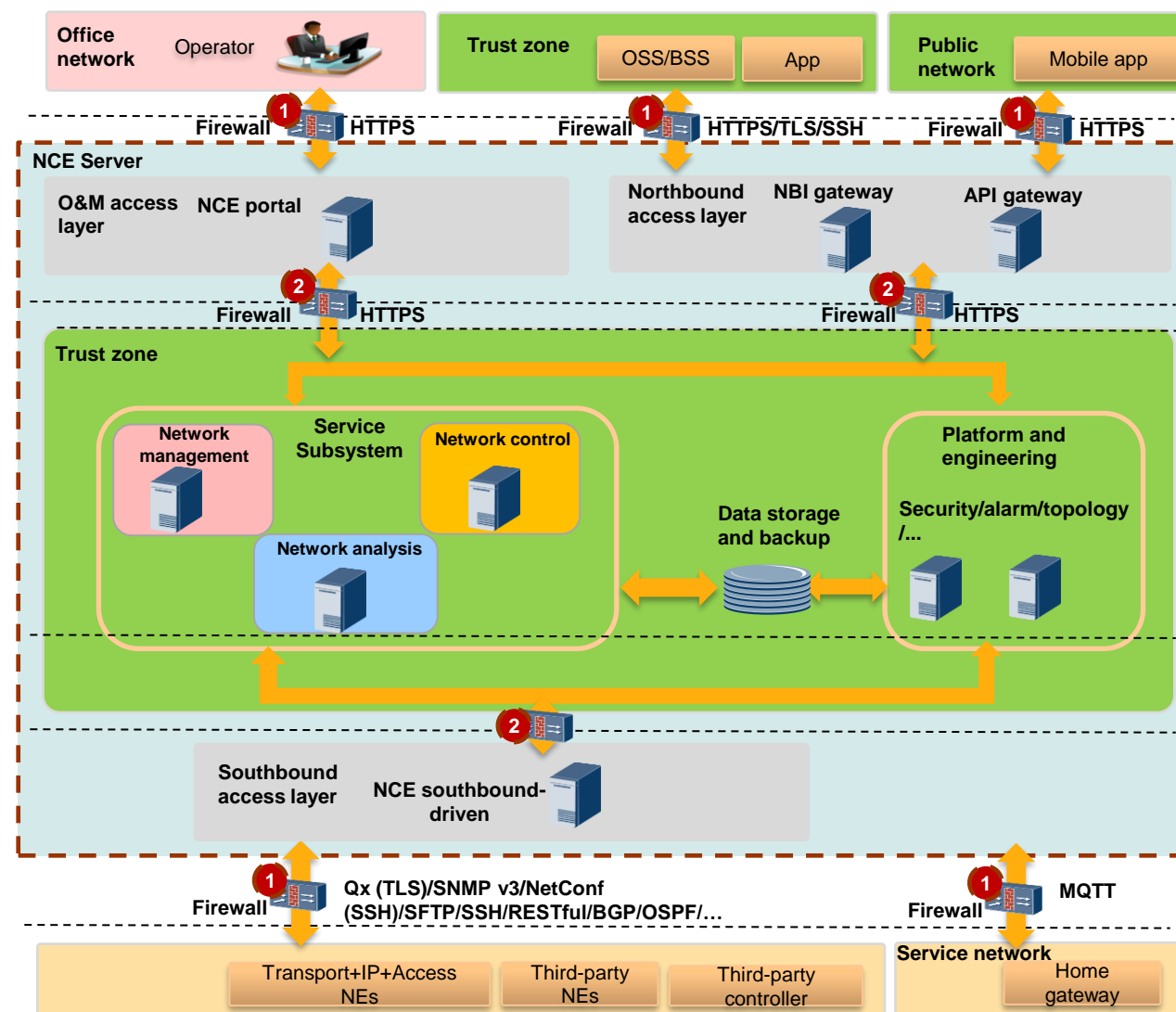
Unified Management and Control Supporting Smooth Network Evolution

- Integrates traditional NMS and SDN controller functions. software defined network
- Achieves unified management and control of SDN and non-SDN networks, leverages SDN network automation, explores legacy network values, and reduces technical difficulties and risks of network evolution.

u2000 can manage only traditional and non sdn networks

Cloud Platform Supporting Block-Building Deployment

- Uses a unified cloud platform, user portal, and API gateway, achieves unified installation, deployment, and upgrade, and consistent data models, and greatly simplifies O&M.
- Adopts a cloud-native microservice architecture, achieves user scenario-specific on-demand deployment.

operation and maintenance

Open APIs and Programmability Supporting Fast Service Rollout

- Provides standard RESTful APIs to connect to external systems.
- Provides a DevOps-based tool platform to flexibly customize innovative services based on flexible business scenarios and network technologies. (not provided in the current version)

REST stands for representational state transfer

Big Data-based Proactive Maintenance

- Collects network-wide data, and based on the big data platform, performs panoramic and in-depth analysis on the quality and traffic data of the entire network to implement intelligent analysis and predictable maintenance.
- Continuously verifies network design and configuration to ensure that the network accurately implements the users' intention and achieves stable operation.

Product Characteristics

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NCE Architecture

NCE Context

U1 — Designer
U2 — Network Operator
U3 — Tenant

Orchestration/OSS
operation en support system
generate analyses en complete support
I1

Design Studio (not provided in the current version)

Service design

Third-party adaptation design

Portal

Northbound interfaces

Basic platform

Network management

Network control

Network analysis

Common services

Product engineering

Resource inventory

Southbound interfaces

Basic engineering

Southbound-driven

Huawei network adaptation

Third-party network adaptation

I2

Managed network

Fixed Access
Access DC
Metro DC
DCI
Core DC
HE

Enterprise
MEF
Fabric Metro Network
MCF
Converged Backbone
Core Router

Front haul

Interfaces Between NCE and Other Systems

Service provisioning, alarm, performance monitoring

OSS/BSS/Orchestrator

Mobile app SDK

REST/XML/ CORBA/SNMP/Text/TL1/ Syslog

REST/Web socket

Radius

Authentication, Authorization and Accounting

protocol used to integraded with other system

AAA

Network Cloud Engine

Script

OptiX NetStar

Script/XML

IBMS

protocol

REST

REST/Qx/SNMP/NetConf/TL1/ TFTP/FTP/SFTP/Telnet/Stelnet/ OSPF/OSPF-TE/PCEP/BGP-LS/ BGP FlowSpec/BGP RPD/MQTT/NetStream

REST

Managed third party controller

Managed device

Cloud management system (FusionSphere)

NCE Security Precautions

NCE HA Solution

high availability

U2000 HA Solution

Active

Standby

Heart beat monitor

Data backup

U2000 Server

U2000 Server

Hot Standby

DCN

Disk Array

Disk Array

(Disk RAID protection)

(Disk RAID protection)

NCE HA Solution

Main Site

Standby Site

VM 1 VM 2 ... VM N

Cluster-1 Cluster-2 ... Cluster-N

Cluster protection

Active Standby

Active-Standby

Database protection

Master Slave

Master Slave

Disk

Disk

Disk RAID protection

Cluster-1 Cluster-2 Cluster-N

Active Standby

Master Slave

Master Slave

Remote protection (disaster recovery)

		U2000	NCE
local protection (In site)	**Application protection**	NA	**Cluster** : ~ 0s
		NA	**Active-Standby**: RTO < 1 min
	Database protection	NA	**Master-Slave**: RTO< 60 sec
	Disk RAID protection	RAID0,RAID10	RAID0,RAID10
Remote protection (Between Sites)	Database synchronization	< 60 sec	< 60 sec
	Recover time	15 mins	15 mins

Contents

NCE System Architecture

Secure File Transfer Protocol

simple network management prot

NBI services

| CORBA/XML | Restconf | Restful | SFTP | SNMP | Websocket | SSE | JMS |

Network Cloud Engine

GaussDB

EulerOS V2.8

FusionCompute 8.0

cpu = ar

TaiShan 200 (Model 2280)

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Server(VMs)

Application
Database
OS
Virtual Machine
Virtualization
Server

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can be third party

DCN

Client

Browser
Win7/win10

SBI services

| CLI | Netconf | PCEP | BGP LS | OSPF | SNMP |

Server Hardware Configurations for On-Premises Deployment

On-Premises Deployment Scenario

Hardware Configuration Requirements of TaiShan 200 (Model 2280)

Hardware	Model	Requirement
512 GB standard-configuration server	TaiShan 200 (Model 2280)	● CPUs: 2 x Kunpeng 920 (2.6GHz, 64 Core) ● Memories: 16 x 32 GB DDR4 ● Hard disks: 12 x 1200 GB HDD ● RAID card: Avago3508 (2 GB cache) ● NICs: 2 x 4 GE electrical ports + 2 x 4 10GE/25GE
512 GB advanced-configuration server	TaiShan 200 (Model 2280)	● CPUs: 2 x Kunpeng 920 (2.6GHz, 64 Core) ● Memories: 16 x 32 GB DDR4 ● Hard disks: 12 x 1800 GB HDD ● RAID card: Avago3508 (2 GB cache) ● NICs: 2 x 4 GE electrical ports + 2 x 4 10GE/25GE

Server Hardware Configurations for On-Premises Deployment

TaiShan Servers Required

Service Scenario	Network Scale	Hardware	Number of Servers
Manager	< 30000 equivalent NEs	512 GB standard-configuration server	1
Manager + Controller (No local protection)	< 6,000 equivalent NEs	512 GB standard-configuration server	1
Manager + Controller	< 30,000 equivalent NEs	512 GB standard-configuration server	3
Manager + Controller	< 50,000 equivalent NEs	512 GB standard-configuration server	4
Home network (No local protection)	< 100,000 subscribers	512 GB advanced-configuration server	1
Home network	< 300,000 subscribers	512 GB advanced-configuration server	3
Home network	< 1,000,000 subscribers	512 GB advanced-configuration server	4
Premium broadband (No local protection)	< 100,000 subscribers	512 GB advanced-configuration server	1
Premium Broadband	< 500,000 subscribers	512 GB advanced-configuration server	3
Premium Broadband	< 1,000,000 subscribers	512 GB advanced-configuration server	4
Premium Broadband	< 3,000,000 subscribers	512 GB advanced-configuration server	6

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VM Configurations for Private Cloud Deployment

Private Cloud Deployment

Service Scenario	Network Scale	VMs	vCPUs	Memory (GB)	Storage (GB)
Manager (single domain)	< 2000 equivalent NEs	2	24	96	650
Manager (single domain)	2000–6000 equivalent NEs	2	40	128	700
Manager (single domain)	6000–15,000 equivalent NEs	3	64	256	900
Manager + Controller (No local protection)	< 6000 equivalent NEs	5	56	224	1.90
Manager + Controller	< 6000 equivalent NEs	14	128	512	4.54
Manager + Controller	< 30,000 equivalent NEs	21	200	800	6.93
Manager + Controller	< 50,000 equivalent NEs	27	336	1344	12.30
Home network (No local protection)	< 100,000 subscribers	6	76	304	7.13
Home network	< 300,000 subscribers	15	184	736	9.86
Home network	< 1,000,000 subscribers	25	356	1424	20.61
Premium broadband (No local protection)	< 100,000 subscribers	6	108	432	7.13
Premium broadband	< 500,000 subscribers	21	228	912	22.17
Premium broadband	< 1,000,000 subscribers	28	424	1696	24.90
Premium broadband	< 3,000,000 subscribers	38	660	2640	43.65

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Server Software Configurations

Type	Version	Remarks
Virtualization software	FusionCompute 8.0.0	Used on the TaiShan server in the on-premises scenario and in the private cloud scenario
OS	EulerOS V2.8	Used on the TaiShan server in the on-premises scenario.
Database	GaussDB V100R003C20	OMP Management node Access Domain Controller
	GaussDB 100 V300R001C00	Manager Analyzer
	Druid 0.13.0	Used by the Analyzer.
Web OS	Windows 10 (32-bit or 64-bit)	
Web browser	• Google Chrome 70 or later (32-bit or 64-bit) • Firefox ESR 61.0.1 or later (32-bit or 64-bit)	

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Performance Specifications (1)

Category	Sub-domain	Indicator
NE Management Capabilities	Maximum NE management capability	• Access Manager: 2,000, 6,000 and 15,000 equivalent NEs • Access Manager & Controller: 6,000, 15,000, 30,000 and 50,000 equivalent NEs • Home Network: 100,000, 300,000 and 1,000,000 ONTs • Premium Broadband: 100,000, 500,000 and 3,000,000 ONTs
	Maximum Concurrent Client Connections	• 2,000 equivalent NEs: 32 • 6,000 equivalent NEs: 64 • 15,000 equivalent NEs: 100 • 30,000 equivalent NEs: 200 • 50,000 equivalent NEs: 200

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Performance Specifications (2)

Category	Sub-domain	Indicator
System startup and shutdown	System startup time	≤ 10 minutes(70% of the management capacity)
	System shutdown time	≤ 10 minutes(70% of the management capacity)
Database restoration time		≤ 60 minutes
storage capacity	Maximum Current Alarms	≤30,000 equivalent NEs: 100,000
	Maximum Historical Alarms	≤30,000 equivalent NEs: 4,000,000
	Log capacity (Operation logs and system logs)	≤ 1,000,000 Storage duration in database: 90 days
Topology Capabilities	Links in the current topology	≤ 200,000
	Subnets	The number of subnets is not limited. Each subnet can contain a maximum of 500 physical NEs at a maximum of six layers. 200 physical NEs are recommended.
Alarm Management Capabilities	Alarm response speed	In normal circumstances, alarms are displayed on NCE within 10 seconds after they are generated on NEs.
	Alarm handling capability	Normally, 100 alarms/second when NCE manages NEs in all domains 50 alarms/second when NCE manages only access NEs In peak hours, No alarm loss within 15 seconds when not more than 1000 alarms are reported per second

Performance Specifications (3)

| Category	Sub-domain	Indicator
User Management Capabilities	Users	≤ 2000
	User groups	≤ 500
	Object sets	≤ 100
	Operation sets	≤ 255
Concurrent NE upgrades		≤ 60
NBI Capabilities	Maximum Concurrent Requests/Maximum OSS Connections	• CORBA (Maximum Concurrent Requests): 4 • XML (Maximum Concurrent Requests): 20 • SNMP (Maximum OSS Connections): 10 • TEXT (Maximum OSS Connections): As the FTP client, NCE transmits files to only one OSS. As the FTP server, NCE can be accessed by a maximum of three OSSs. • RESTful (Maximum Concurrent Requests): 10 • TL1 (Maximum Concurrent Requests): 30

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Overview of Access Network Management

The NCE access domain provides comprehensive solutions for access network devices such as FTTx, and supports unified management and maintenance of FTTx NEs, DSLAM NEs, and MSAN NEs.
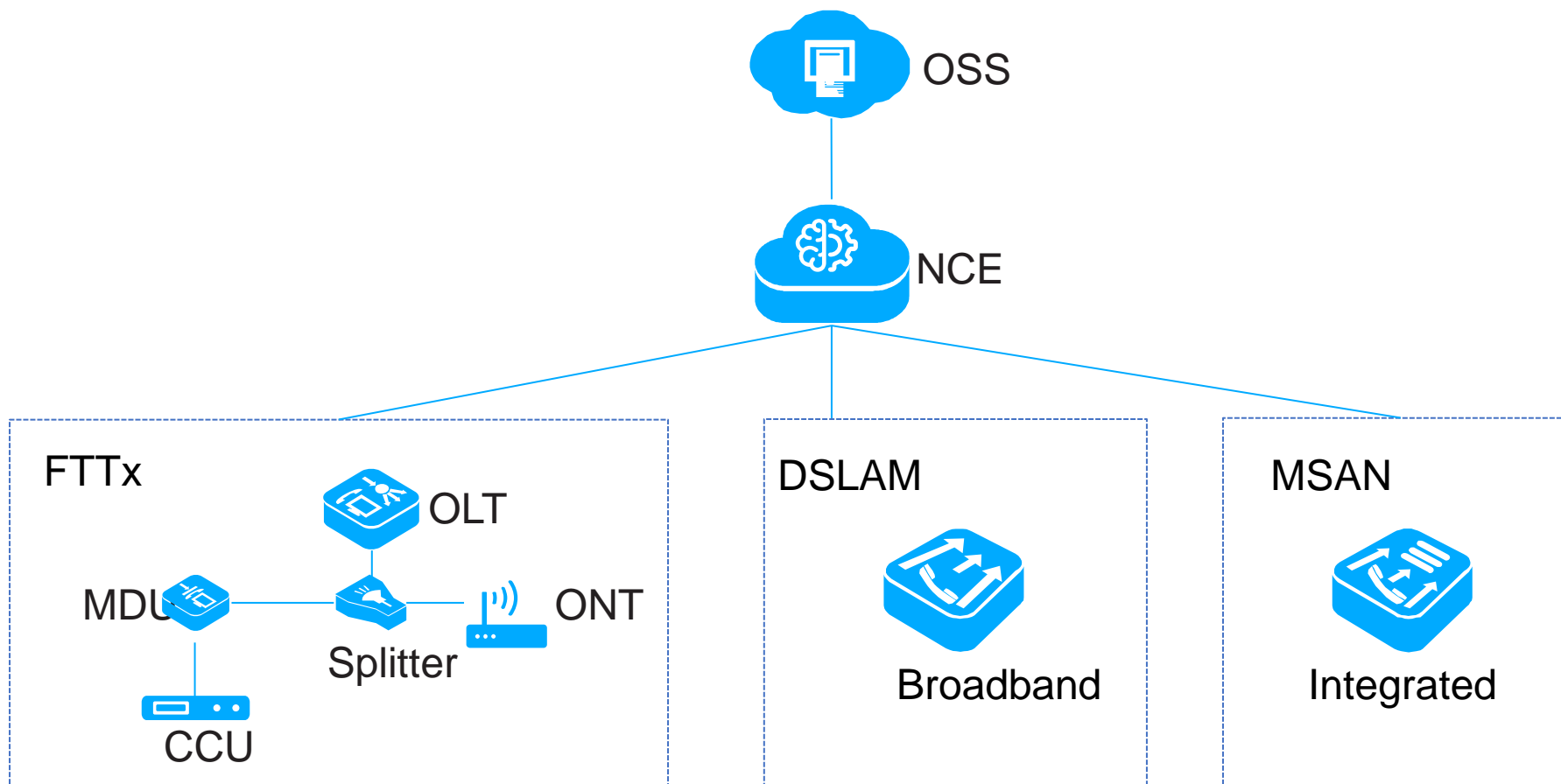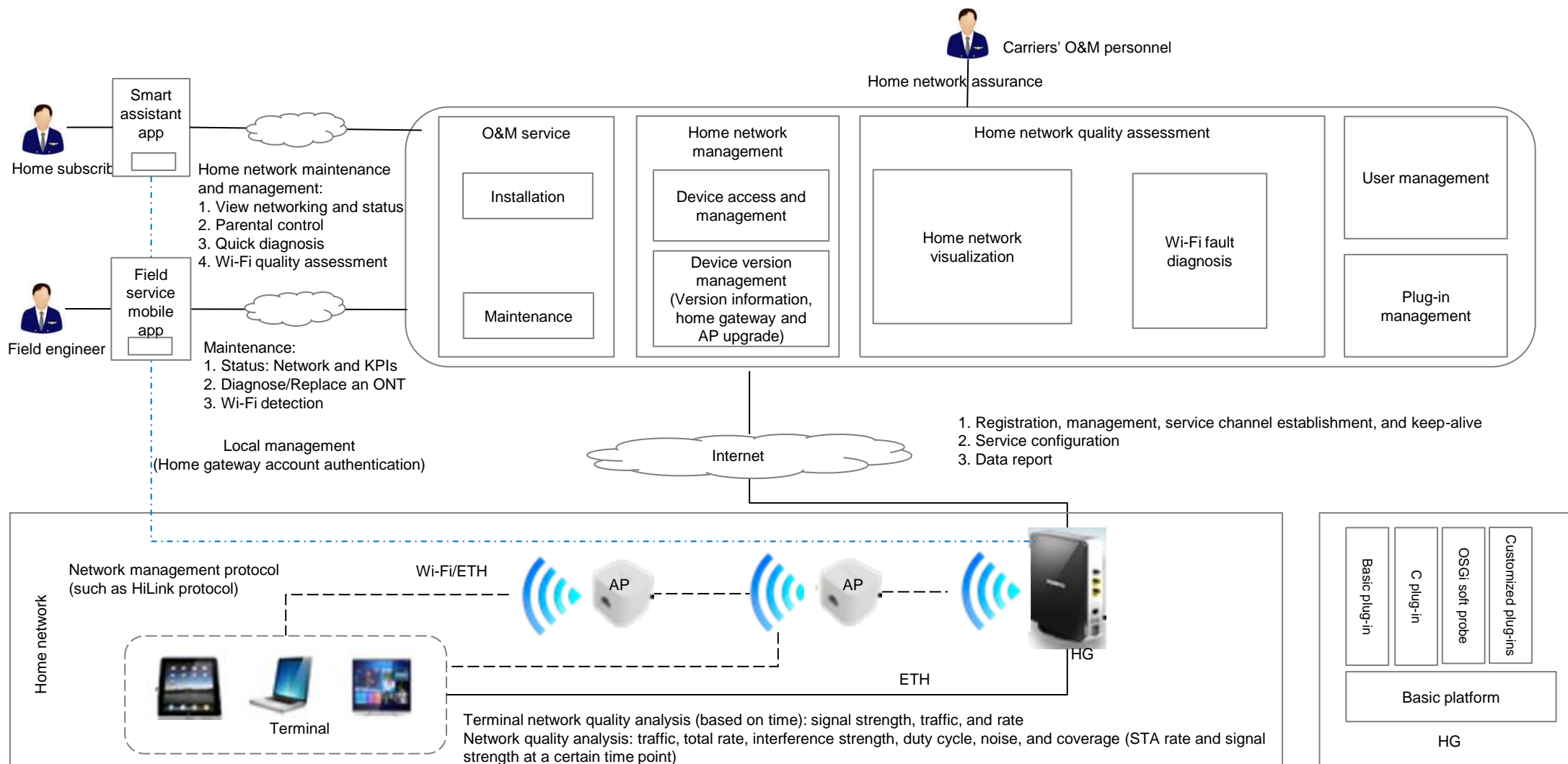
Overview of Access Insight

Access Insight is a value-added app of NCE that is dedicated for the O&M and assurance of existing networks. Compared with traditional device-centric O&M and assurance, Access Insight focuses more on user experience by providing proactive network fault analysis and prediction, fault playback, and visualized and cloud-based troubleshooting.
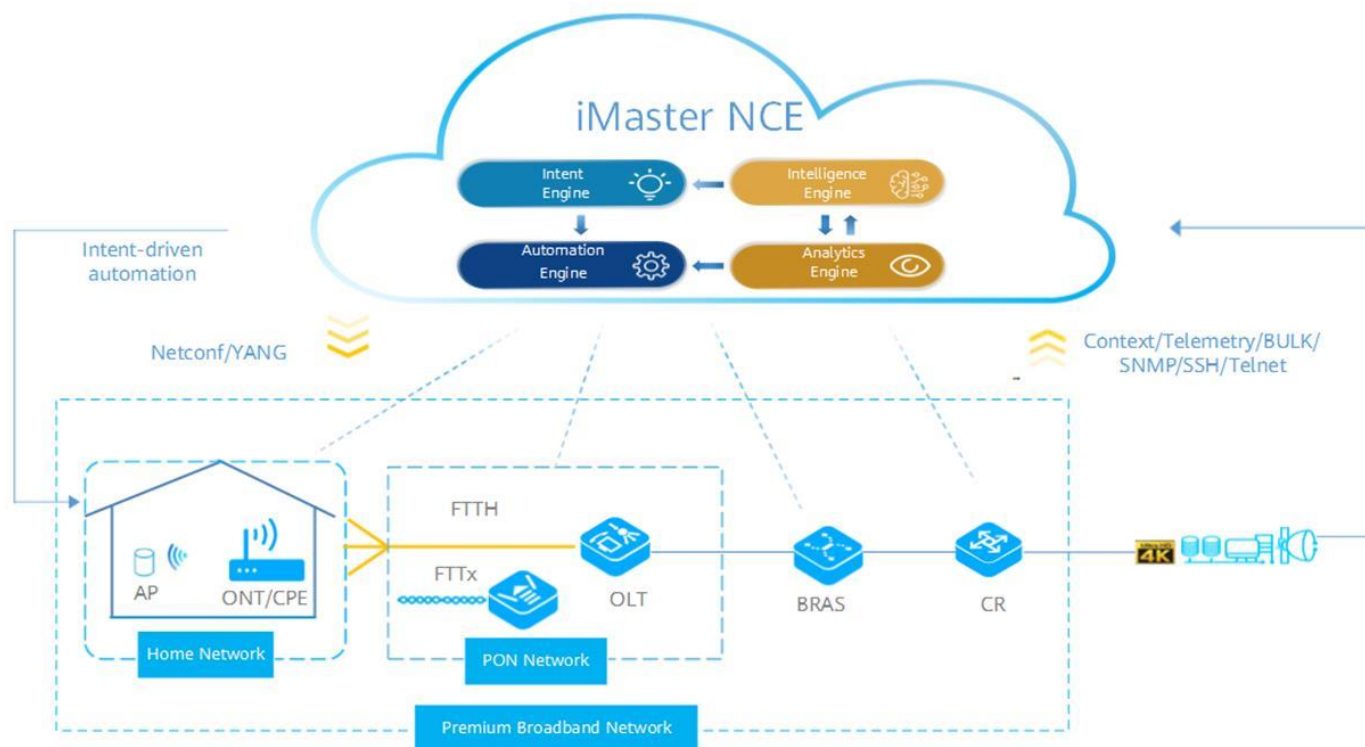
Overview of Home Network

Thank You

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