



Technical Workshop

NMS and TMS

Universal Management Systems for Fixed Broadband Network

Hanoi, Aug 2022

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Enabling the
Hyper-Connected World

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Agenda

1. FTTx Evolution and Market Demands
2. INAS2.0 Introduction
3. DZS Connect Introduction
4. DZS Connect Success Stories
5. Live Demo
6. Open Discussion



FTTx Evolution and Market Demands

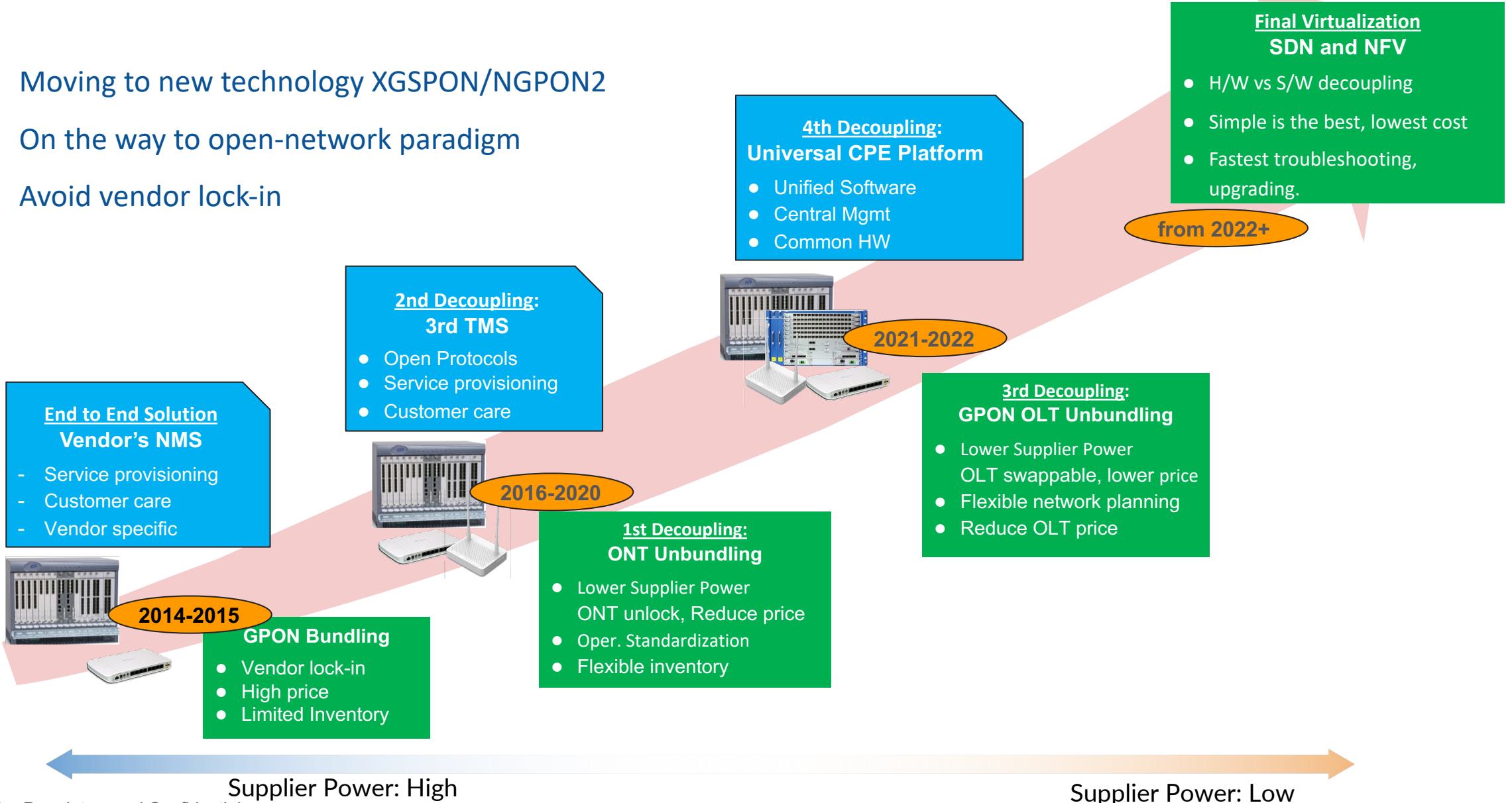
Fiber To The x (FTTx) Decoupling Paradigm



Moving to new technology XGSPON/NGPON2

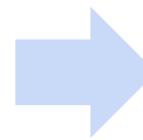
On the way to open-network paradigm

Avoid vendor lock-in



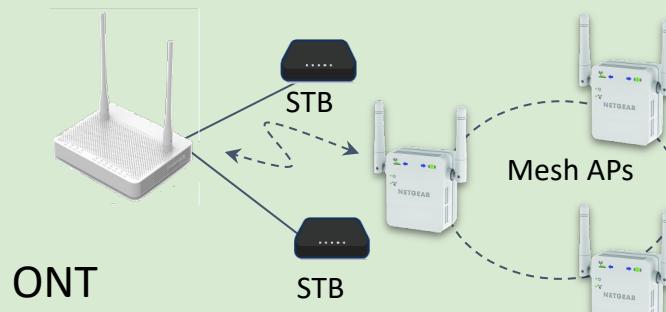
Network is transforming

- Number of Devices is exploding
- Subscriber network is **Home Network**
 - Single device → Multiple devices
 - One level → Multiple level
 - Unmanaged → Manageable



Mgmt Challenges???

- Large Scale and high complexity mgmt
- Highly churn rate due to low satisfactions
- End-to-end **UX measurements**
- Difficult OSS integration



Customer First Focus

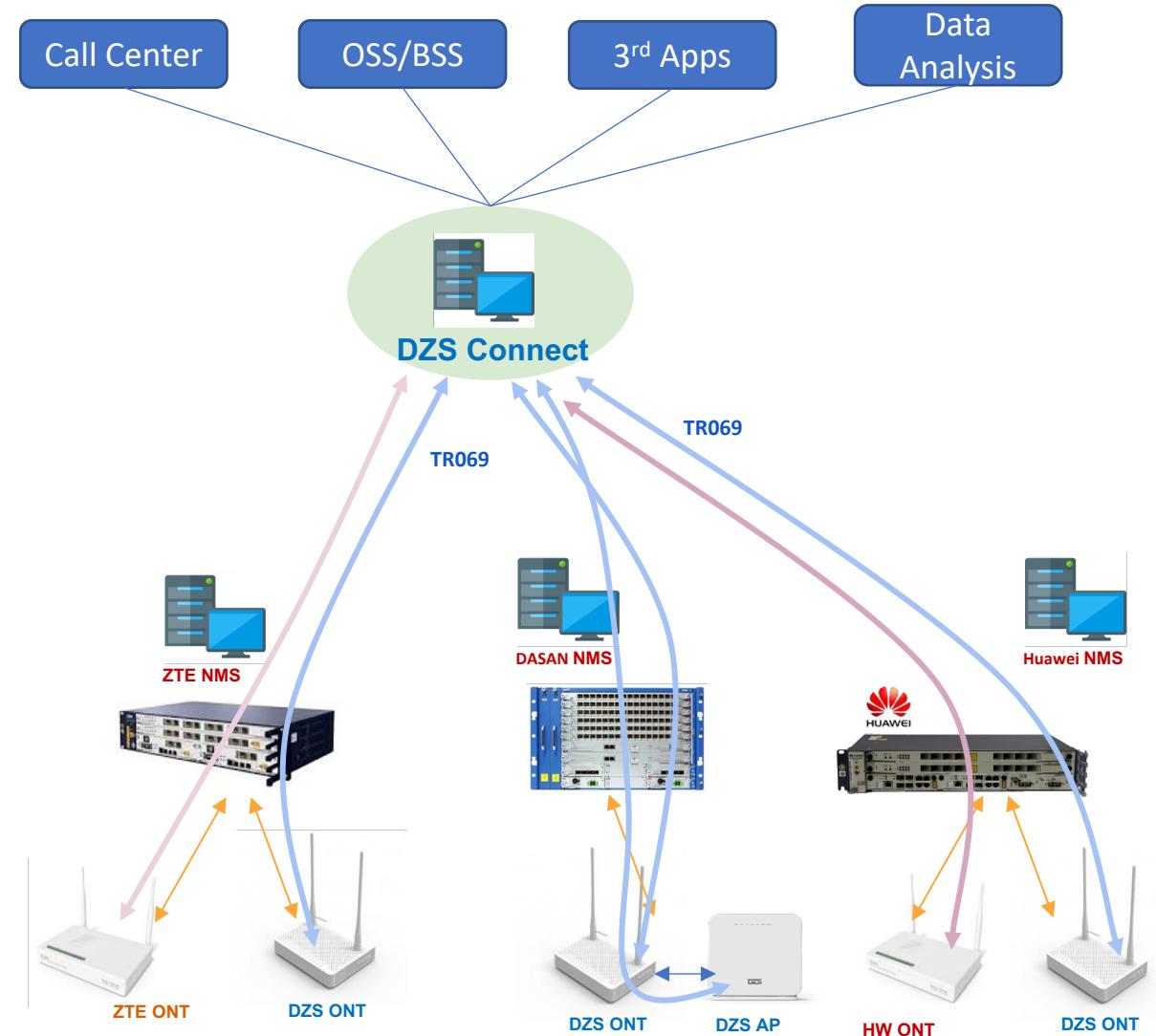
- Understand UX
- Enhance satisfaction
- Cost saving



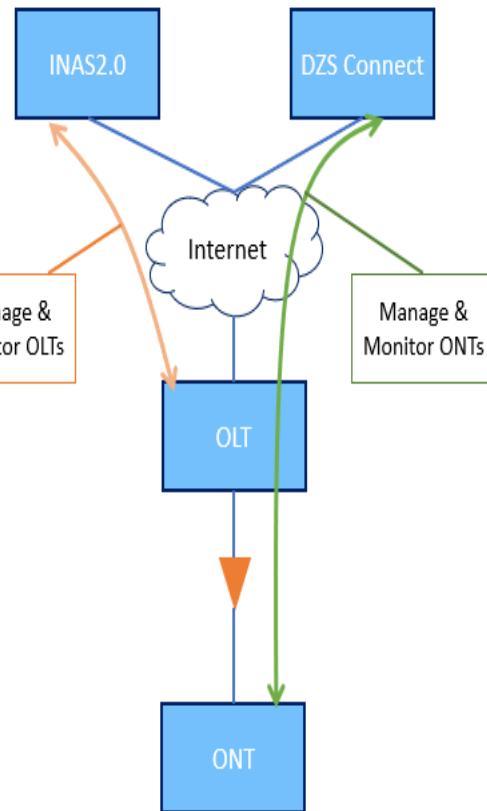
Demands for 3rd ONT mgmt. and Business Analytics Applications



- **Leverage DZS ONT IOP**
 - Avoid vendor's NMS dependencies (DZS's ONT, then 3rd)
- **Complying with operator requirements**
 - From NMS to TMS
 - Customer Care, Understand customer UX
- **Key advantage selling to Tier2,3,
Building/Enterprise**



DZS Connect and INAS Comparison



No	Point	INAS2.0	DZS Connect
1	Purpose	Solution for manage NEs like: DZS OLT, DZS Switch	Manage CPEs like: ONT, AP
2	Protocol	Using SNMP protocol to exchange message between OLT and Server	- Using TR069 to exchange message between ONTs, APs and Server - In further, it will use USP (enhanced version of TR069)
3	Deployment	- Server – Web Client - Use Specific Hardware or Server on cloud	- Server – Web Client - Use Specific Hardware or Server on cloud
4	OAM	Administrators can be able to: - Manage entire OLTs on the network - Direct configure, troubleshooting on each of OLT separately using SNMP protocol. - Realtime monitor and category severity level of alarm, issue on network. - Full auto provisioning	Administrators can be able to: - Monitor ONT (AP)/subscriber status - View ONT (AP) information like: Model name, WAN IP address, Current Wi-Fi user, LAN configure, Firmware version, PON Rx power... - Manage ONT (AP) firmware (Download/upload firmware) - Diagnostic (Ping, traceroute) through internet
5	Competitor	ZTE Netnumen Huawei U2000 ALU-Nokia AMS	ZTE Easy gateway Fine point Friendly ACS Plume Huawei NCS
6	License	- Basic OS license + Software license - Per node (Switch/OLT) type or (GPON/XGSPON/GE,...) port	- Basic OS license + Software license - Per number of ONT & CPE
7	Application	- INAS server and INAS client can access through Web Browser - Can create many group user and level for each of user	- User can access through Web browser - Can create group user and level for each of user
8	Upgrade	- Can be upgrade very easy on cloud - Simple to manage	- Can be upgrade very easy on cloud - Simple to manage
9	Integrated	- North bound interface, OSS and external system using TL1, SOAP, REST, SNMP	- Flexible to install more protocol to integrated external application (SNMP, TL1)
10	Network monitor	- Be able to monitor entire network. - To know how many OLT on network, How many OLT are facing issue. - Quick check OLT status, OLT heath check	- Be able to monitor entire customer on the network. - Can know exact status of specific customer - Able to statistic how many customer has join and leave on network



DZS INAS 2.0

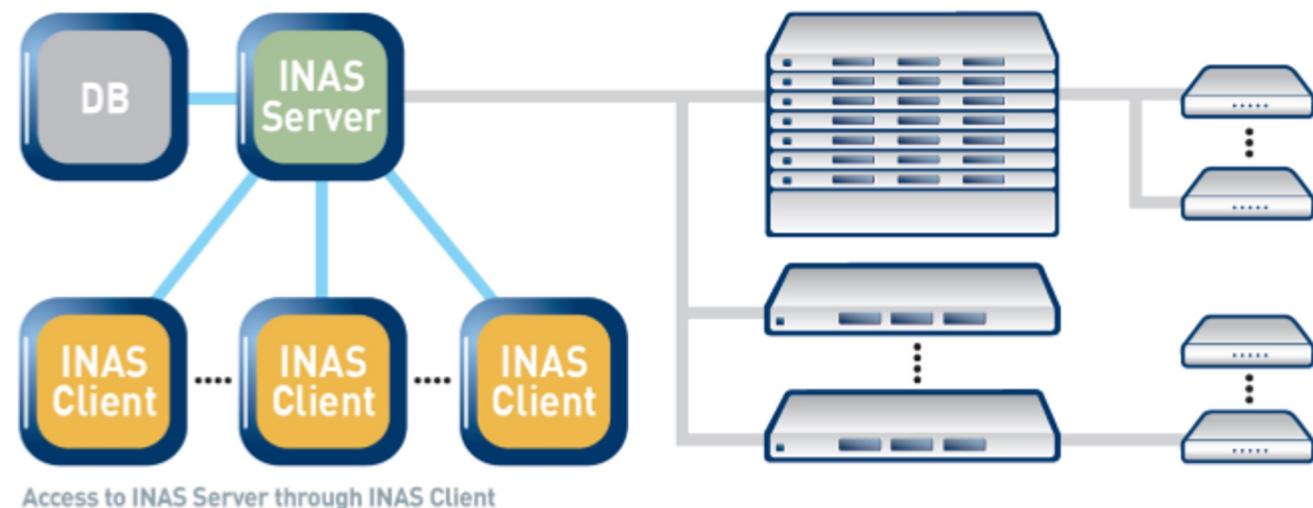
Network Management System Introduction

DZS EMS(INAS2.0) Introduction

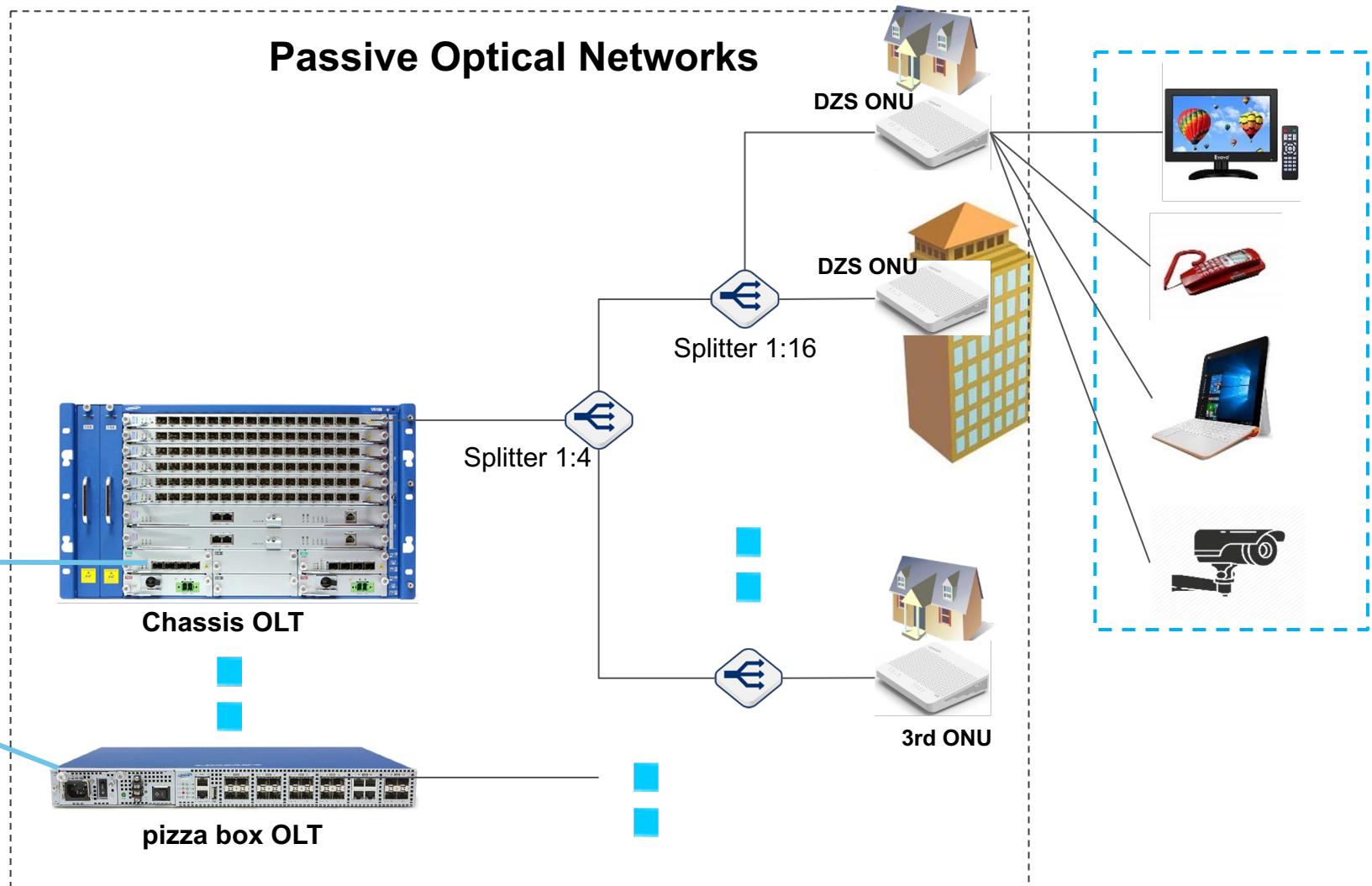
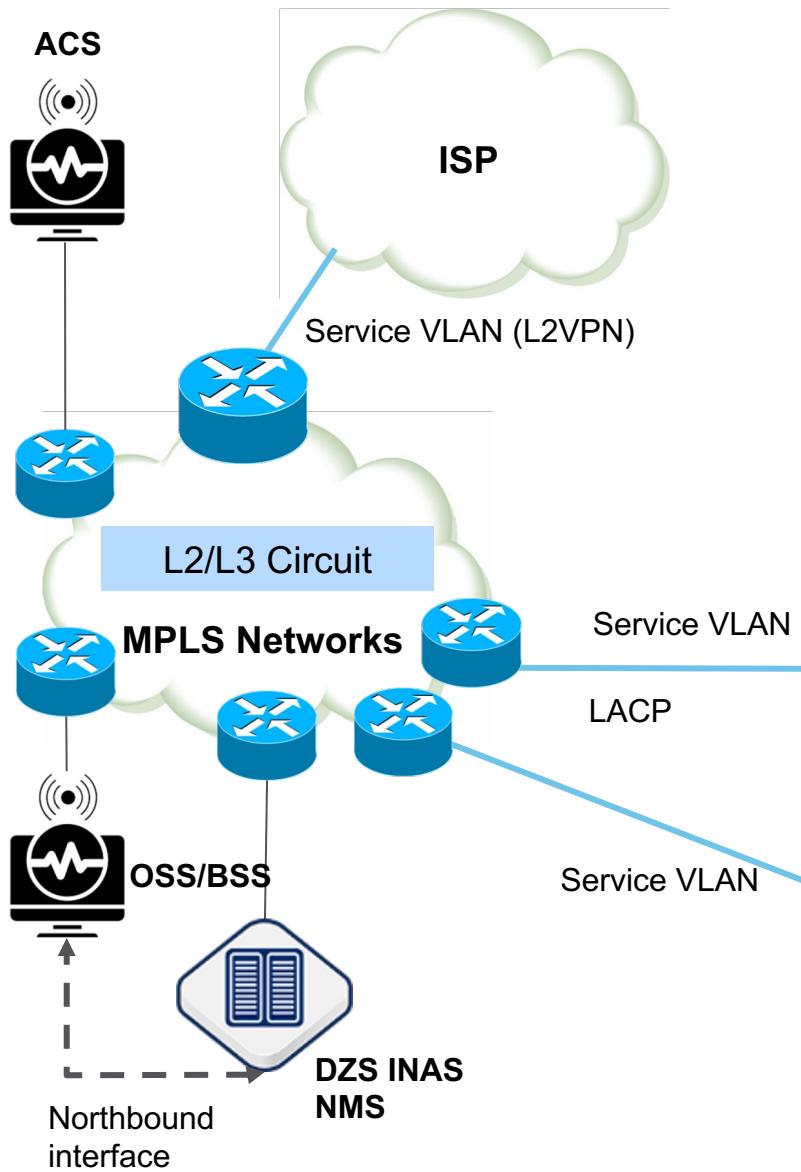


❖ INAS Overview

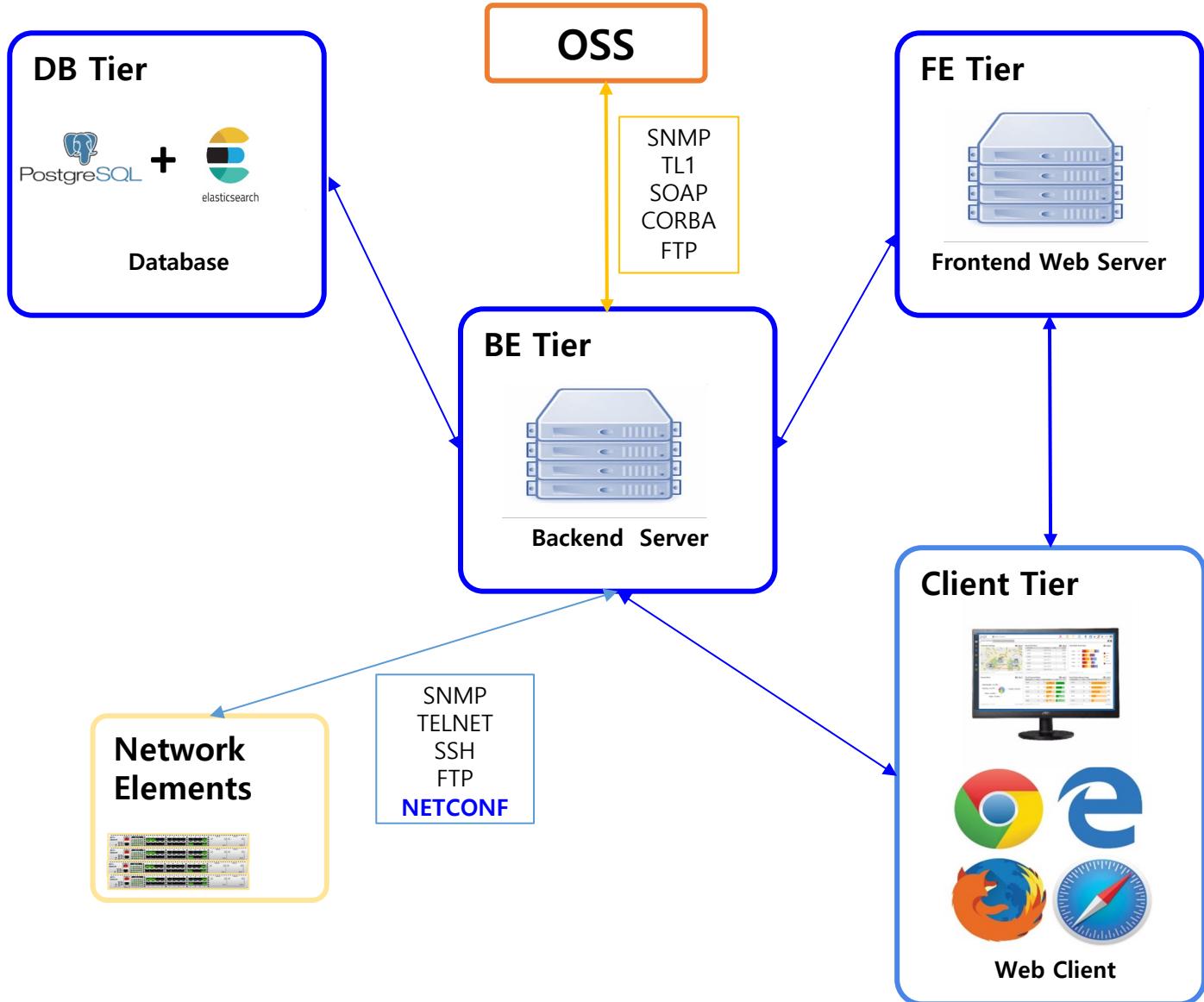
- The Integrated Network Administrator System (INAS) Element Management System (EMS) is a comprehensive network management system with an intuitive graphical user interface. INAS is a software which supports Windows and Linux platform.
- The Dasan's EMS allows you to control your network to efficiently discover your network, roll out new equipment, provision and activate services, as well as diagnose key issues. Using IP-based management for network discovery in real-time, the EMS detects network failures, and helps to monitor and maintain a stable network environment. It also provides the real-time fault management and configuration for all SNMP available nodes, and displays the status of their port, slot and power.
- Benefits:
 - Optimize network usage
 - Reduce operating costs
 - Implement new services quickly and easily



XPON Deployment Model



INAS 2.0 Architecture

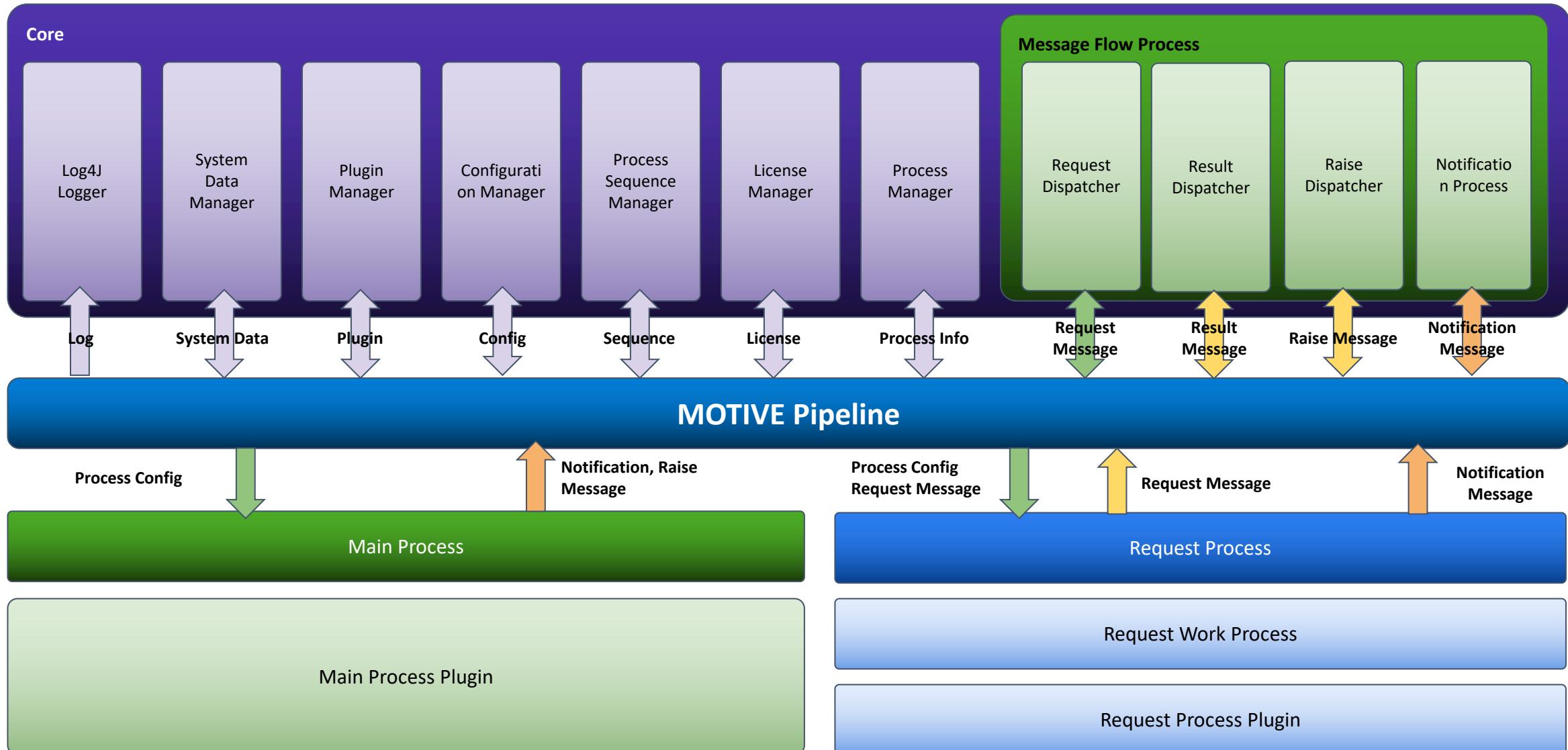


- Flexible Deployment Architecture to fit small to very large networks
- Distributed Deployment for high performance and high scalability
- OS - **Linux**
- DB - Current(Postgres) + Future(Elasticsearch)
- Angular framework and HTML 5 based web client
- Optimum Browser - Chrome
- Protocol - Future(NETCONF)

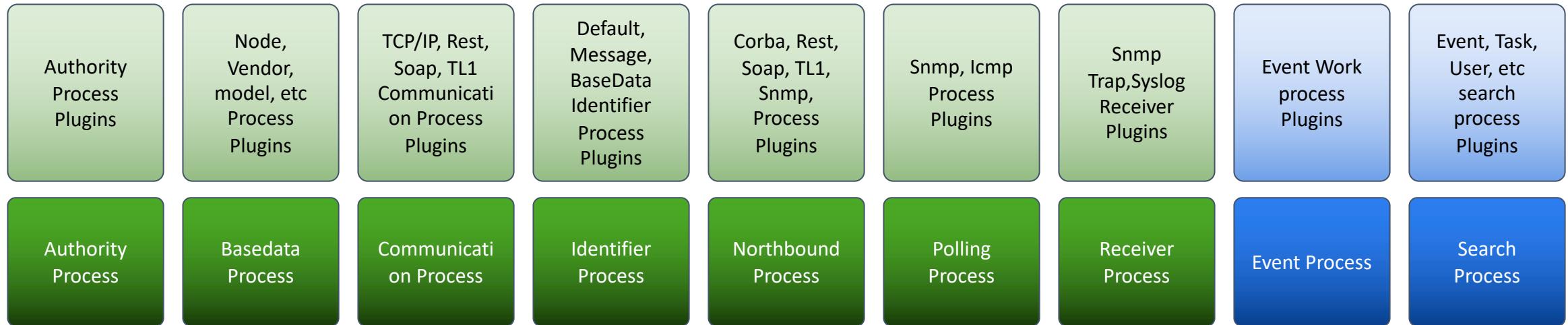
INAS 2.0 System Environment



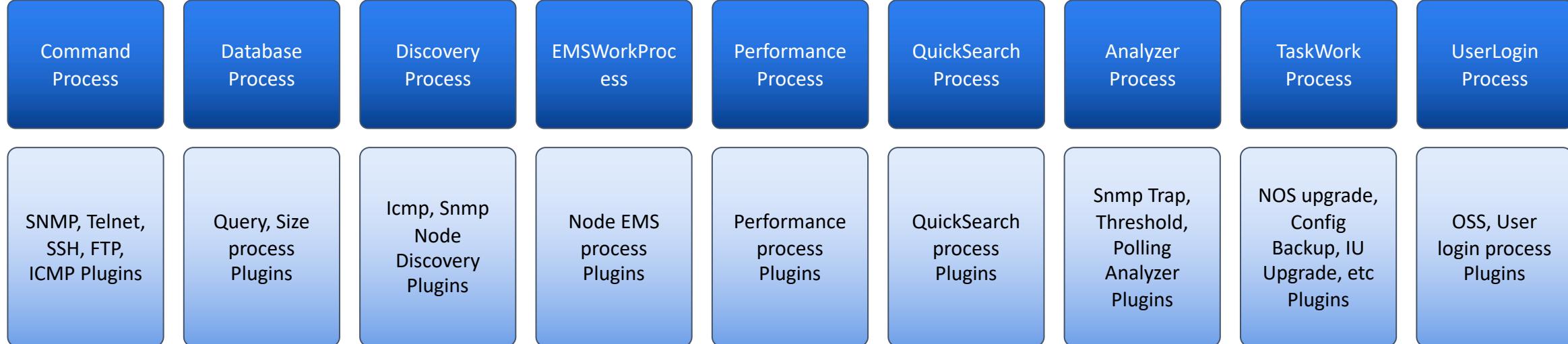
INAS 2.0 Motive Framework Block Diagram



INAS 2.0 Functional Block Diagram (Main Function)



MOTIVE Pipeline



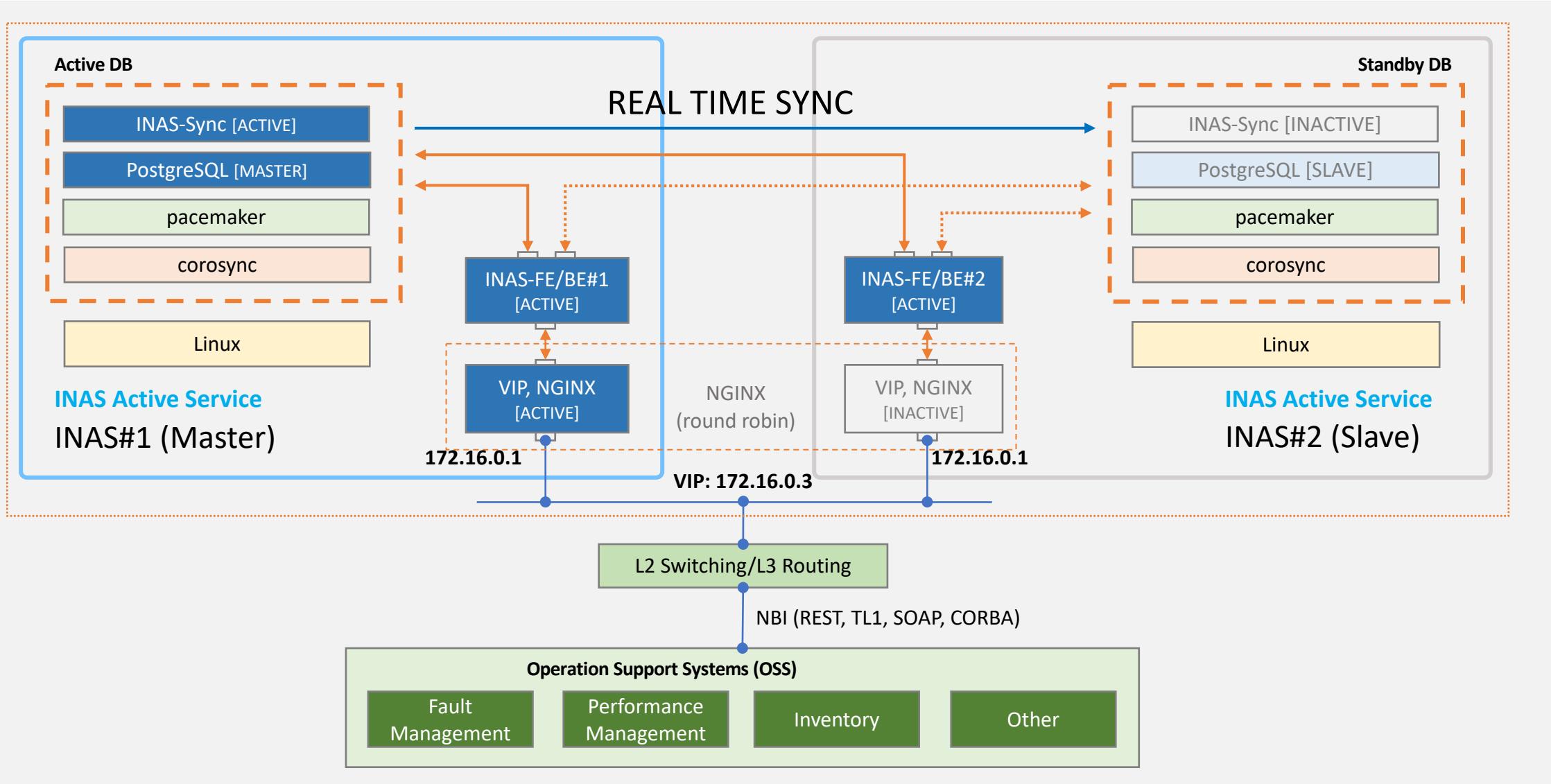
Key Benefits:

1. Database Data replication works in real-time (between ActiveDB and StandbyDB)
2. Improved performance by supporting Active/Active method of BE server, which is the main service of INAS
3. Multiple BE/FE servers manage the NE & User separately.
4. System logs/NE Syslog and alarms are automatically synchronized from the active server to the standby server, ensuring users can have real-time remote access to the System logs/NE syslog and alarms.

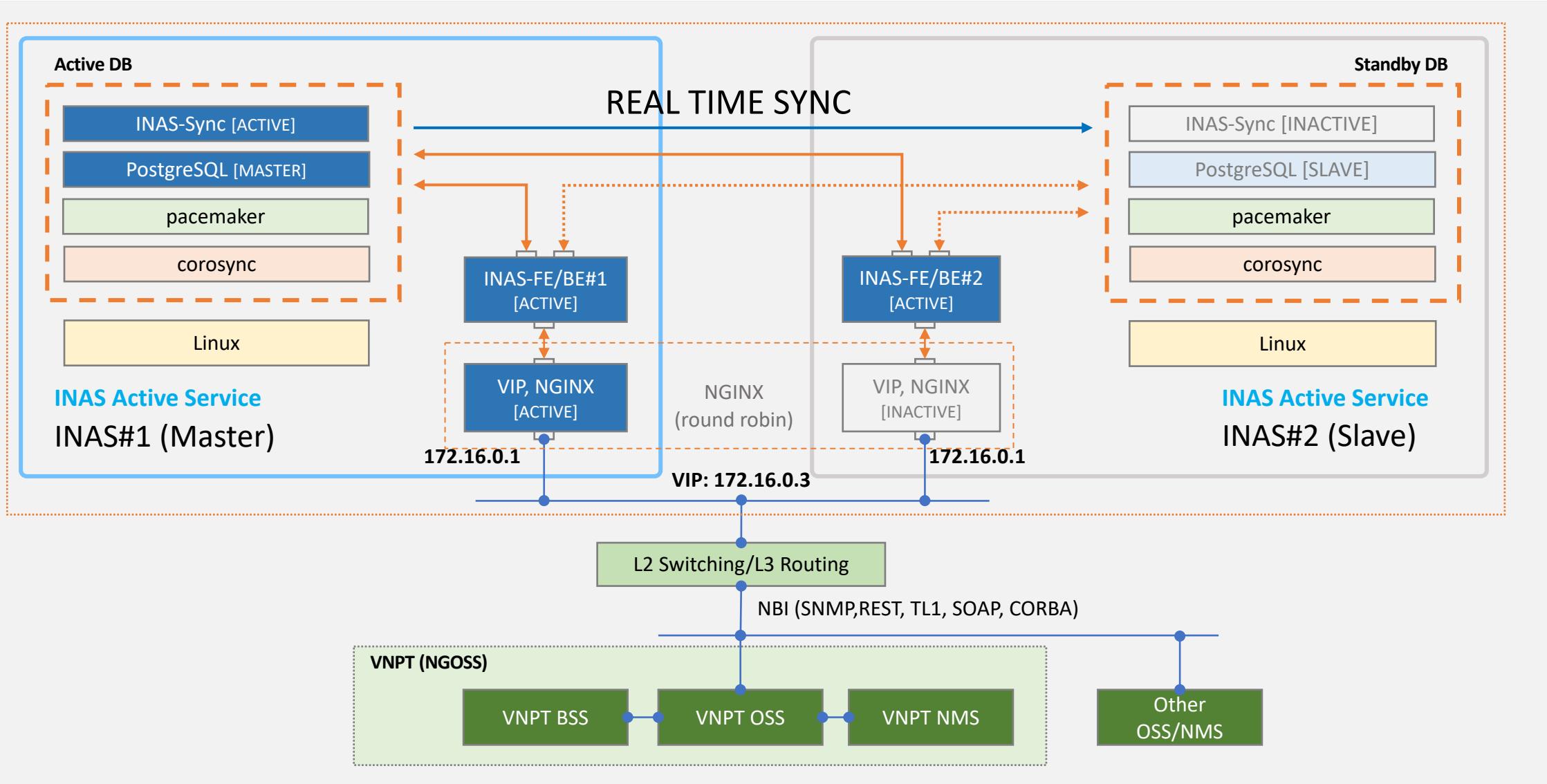
Operations:

1. From INAS client, http/https going to VIP (VIP (Virtual IP address) represent for Master Server). The NGINX Active on the Master Server, will distribute the request as round-robin to INAS FE/BE#1 and INAS FE/BE#2
2. INAS FE/BE#1, INAS FE/BE#2 are always active, and connect to the ActiveDB using VIP (redirect to the Master Server)
3. When doing the switch-over from Server#1 to Server#2, the Master role (VIP Master, NGINX active, ActiveDB) will handover from Server#1 to Server#2.

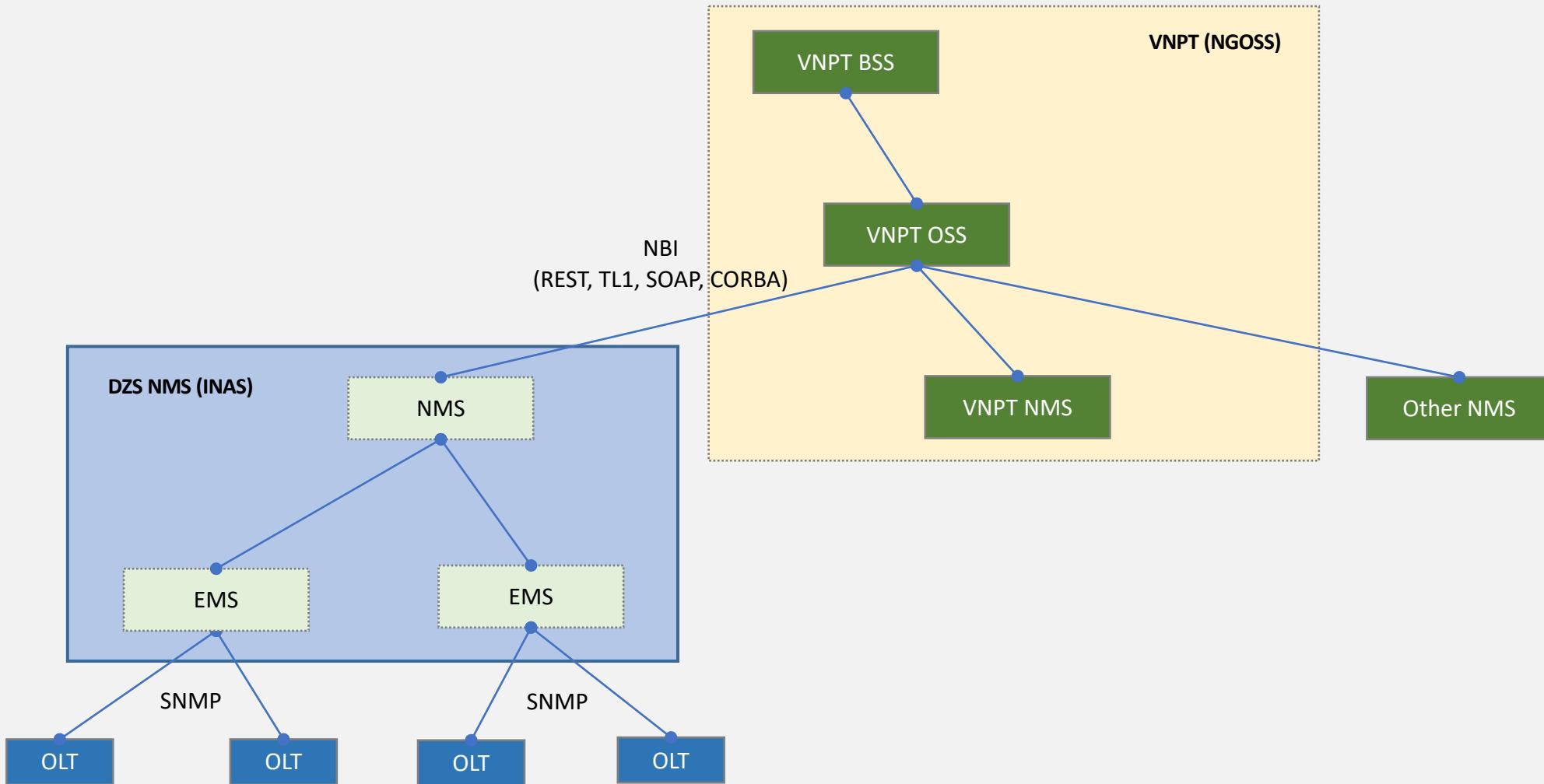
INAS 2.0 - Operation Support Systems (OSS)



INAS 2.0 – VNPT (NGOSS)



INAS 2.0 – VNPT (NGOSS) & OTHER NMS VENDOR





DZS Connect

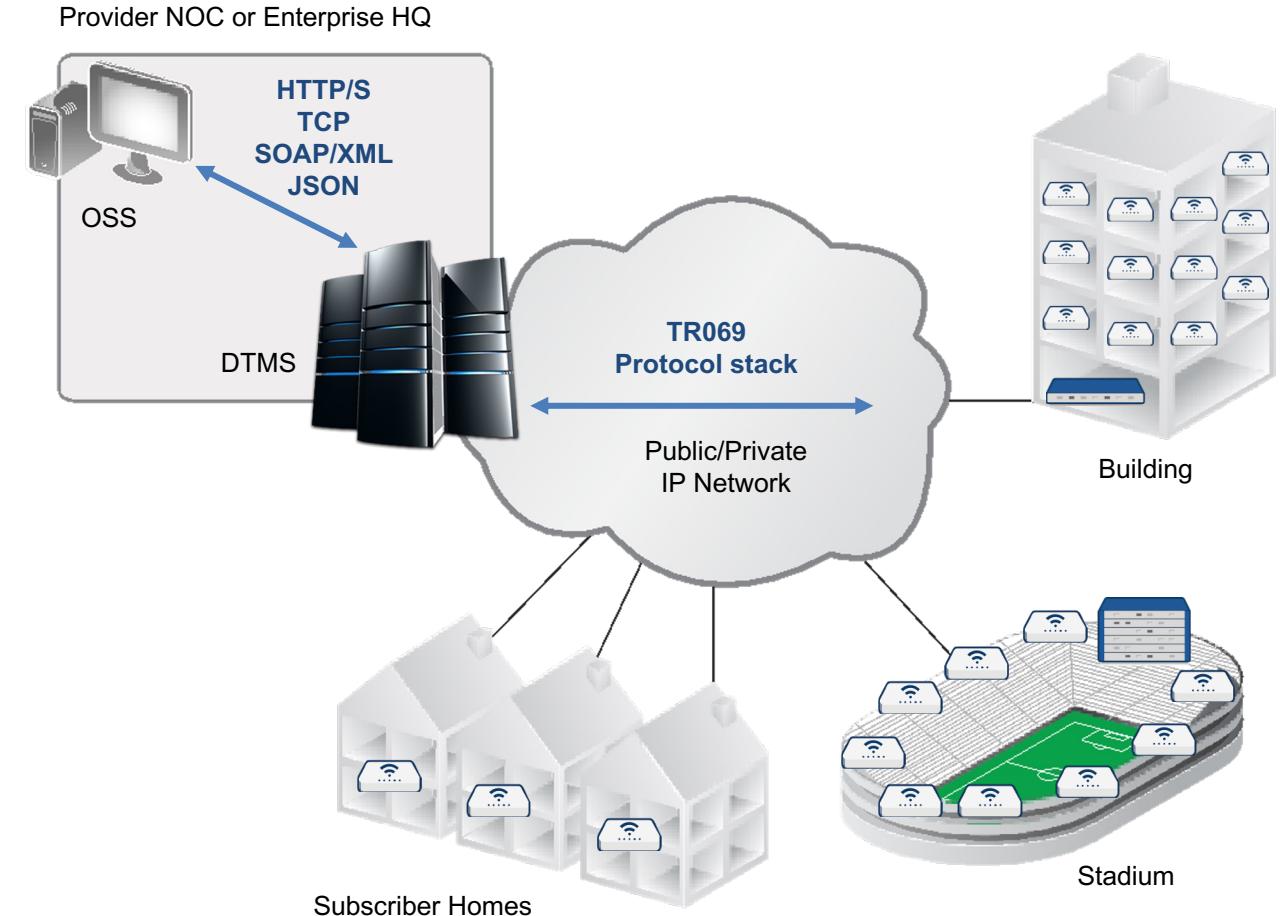
DZS Terminal Management System Introduction

DZS Connect Overview

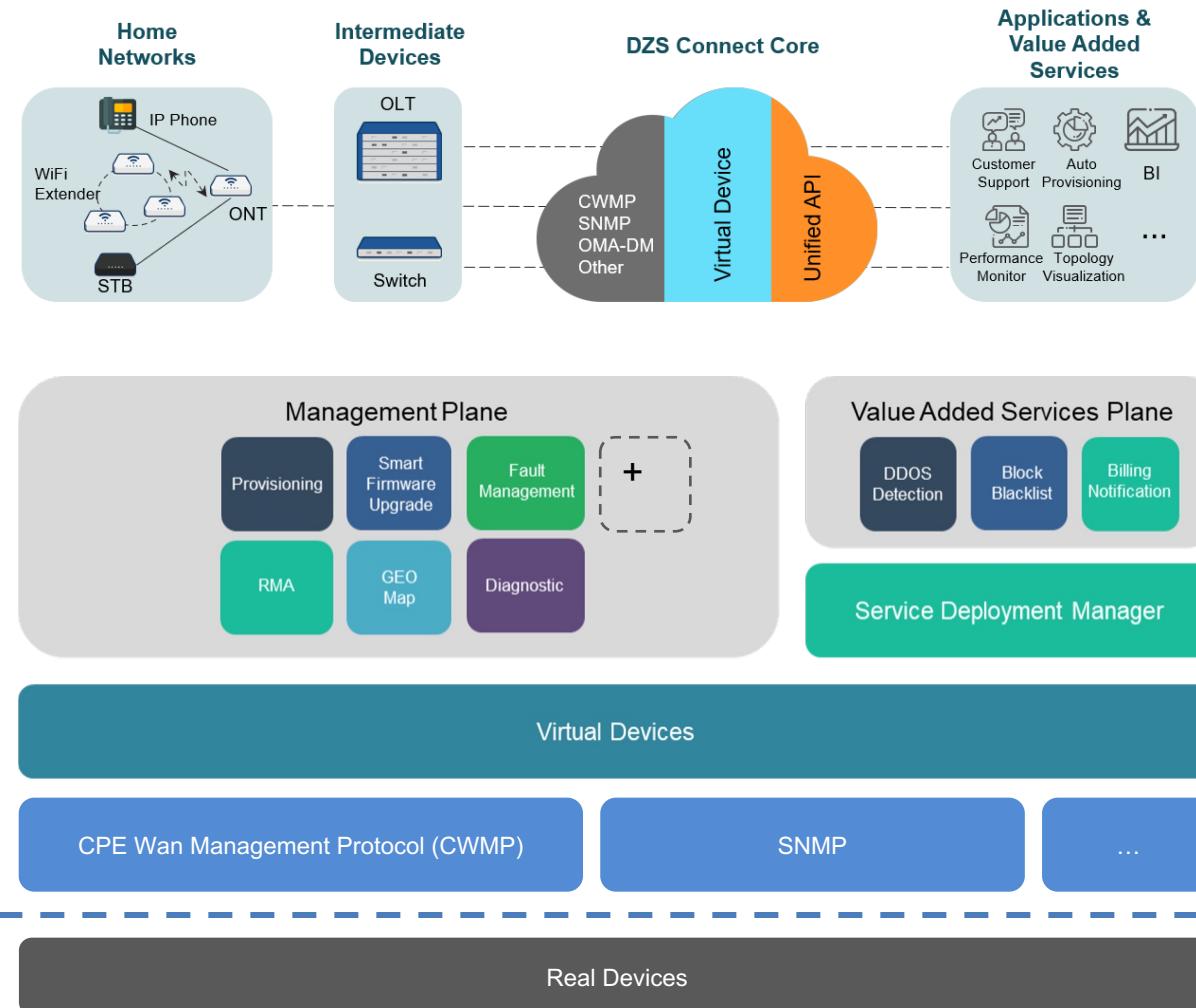


DZS Connect is a Terminal Management System, which helps operator to optimize OPEX and improve customer satisfaction for DZS GPON network.

- **Remote Configuration:** Operator can do provisioning (Wifi SSID/Password, channel; LAN; Port forwarding, ... etc) for the ONT/AP from the NOC
- **ONT/AP Service Monitoring:** Operator can monitor ONT/AP service as the concurrent client are connected via LAN, WiFi, the CPU, Memory status, ... etc
- **Remote Tech support:** Operator can Improve customer satisfaction by remotely solving technical issues from the Call Center without request customer login to ONT/AP web.
- **Firmware Management:** Selectively do firmware upgrade based on area, model, schedule upgrade, mass upgrade.
- **Alarm/Report:** Export Report of network status.



DZS Connect Architecture v2.0



■ Technologies Stack

- Front-end: Vue.js, NGINX, ESLint, Element, ECHARTS
- Database: MySQL, MongoDB, Redis
- Back-end: JPA, Spring boot, WebSocket, Docker, Swagger, RabbitMQ, SLF4J

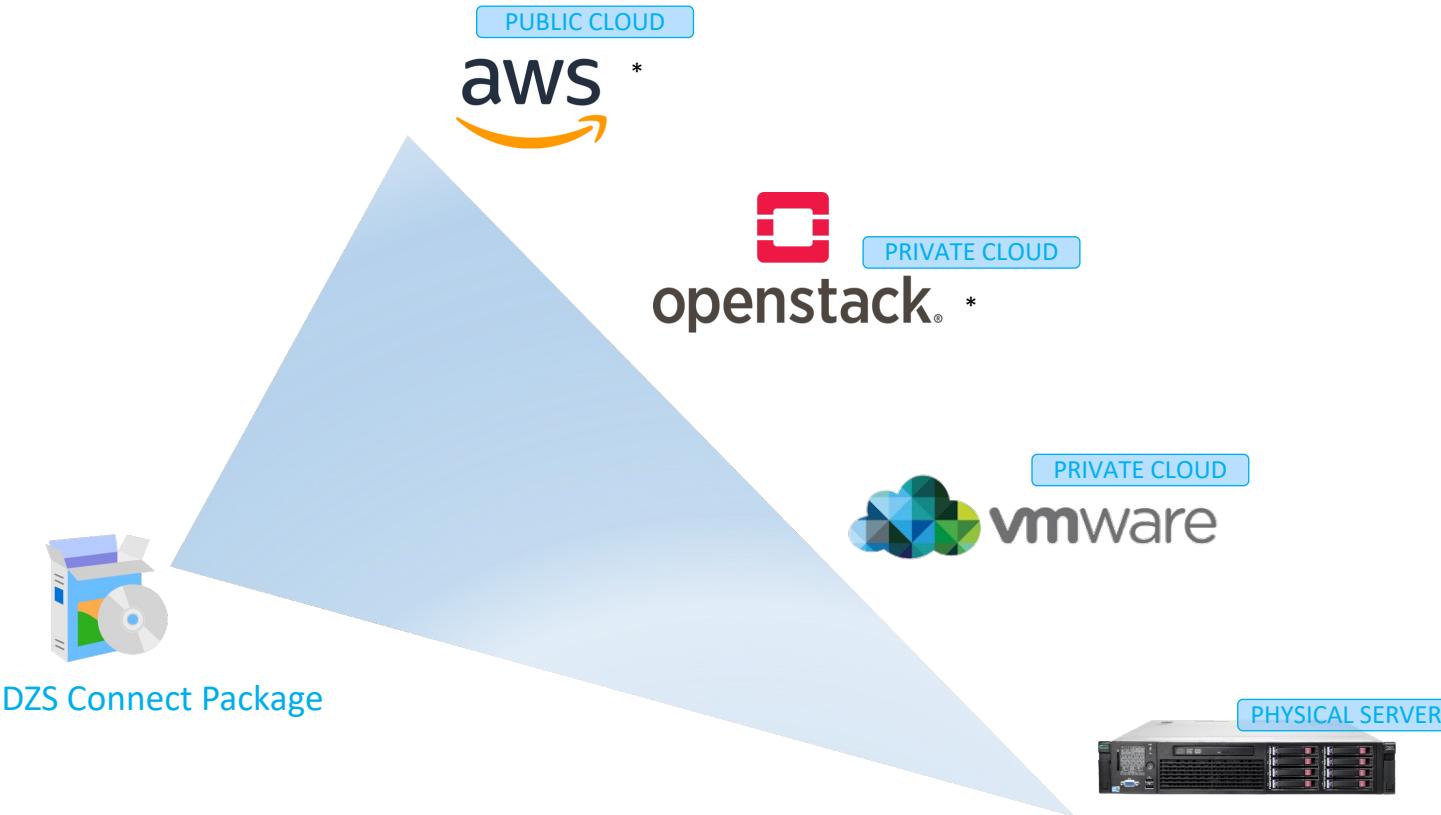
■ Key features:

- Zero-touch provisioning for ONT, CPE, Mesh AP
- Remote Configuration for ONT, CPE, Mesh AP
- Remote Firmware Upgrades for groups of devices
- Task Management
- Home Wi-Fi Management
- Device Management
- Backup & Restore configuration for ONT, CPE, Mesh AP
- Diagnostic & Analysis
- Device Monitoring & Statistics
- File Management
- User & Role Management
- REST API Supports.

■ Completed features:

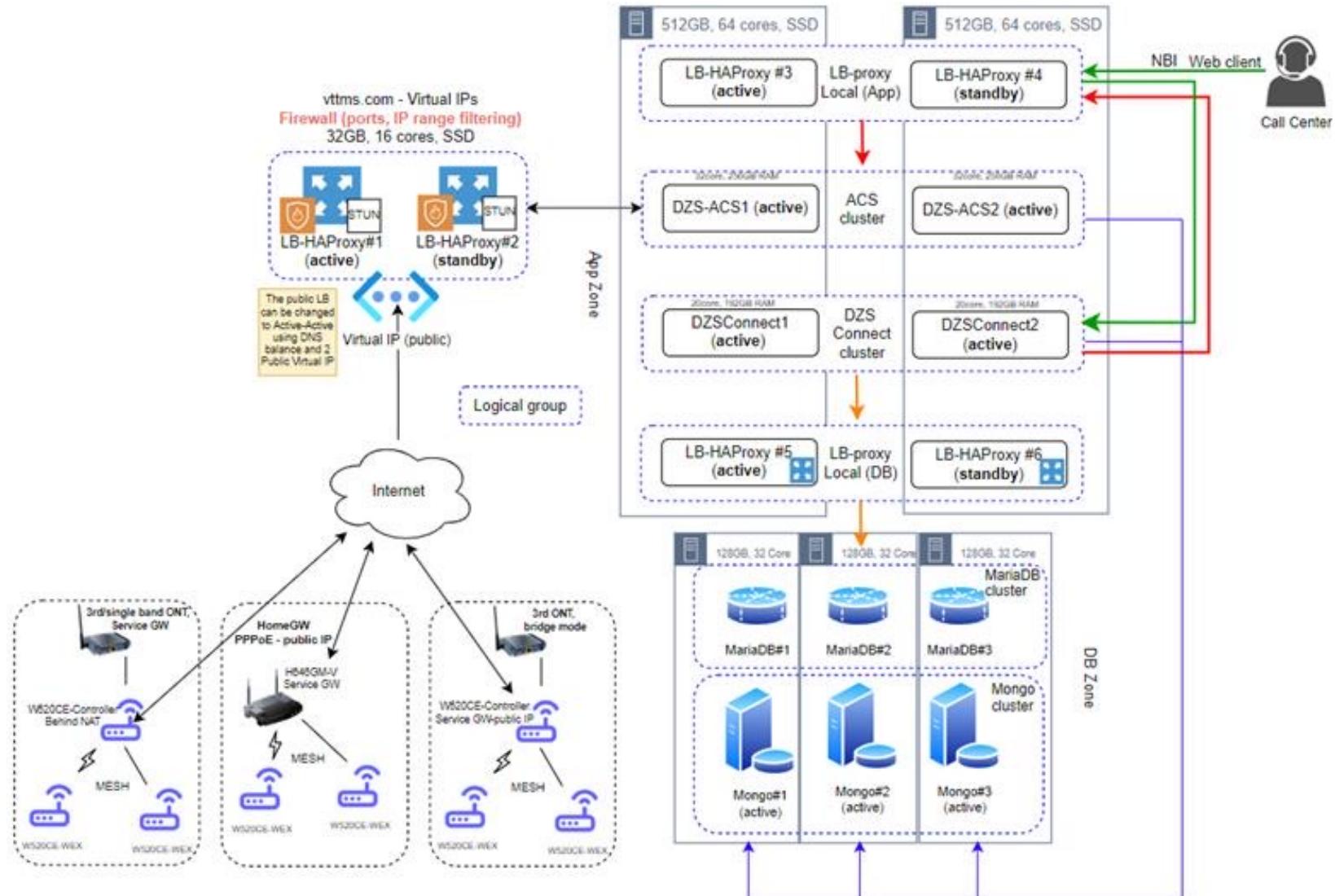
- Device Management and Provision
- Detail ONT/ AP Configuration: WLAN, LAN, PON, WAN, Firmware Upgrade, Diagnostic
- Group Management
- Task Management
- Other management: user, role & firmware

DZS Connect Deployment Options



It could run on virtualized
and physical environment.

DZS Connect Deployment Model





DZS Connect- Success Stories

Use-case 1: Real Estate Owner – Mega Smart Urban Zones



Building Projects:

- Vinhomes Grand Park (HCMC, 43k apartments)
- Vinhomes Smart City (HN, 34k apartments)
- Vinhomes Ocean Park (HN, 42k apartments)

Services:

- Internet
- IPTV
- VoIP
- IoT (IP camera, Access control, Public wifi)
- Multiple ISP



No	Devices
1	GPON OLT: V8102
2	GPON ONT: H660EW, H646GM-V 802.11b/g/n/ac WiFi ONT
3	DTMS 1.x



V8102
Chassis GPON OLT

H660EW
GPON OLT



DTMS/
INAS

Use-case 1: Real Estate Owner – Mega Smart Urban Zones



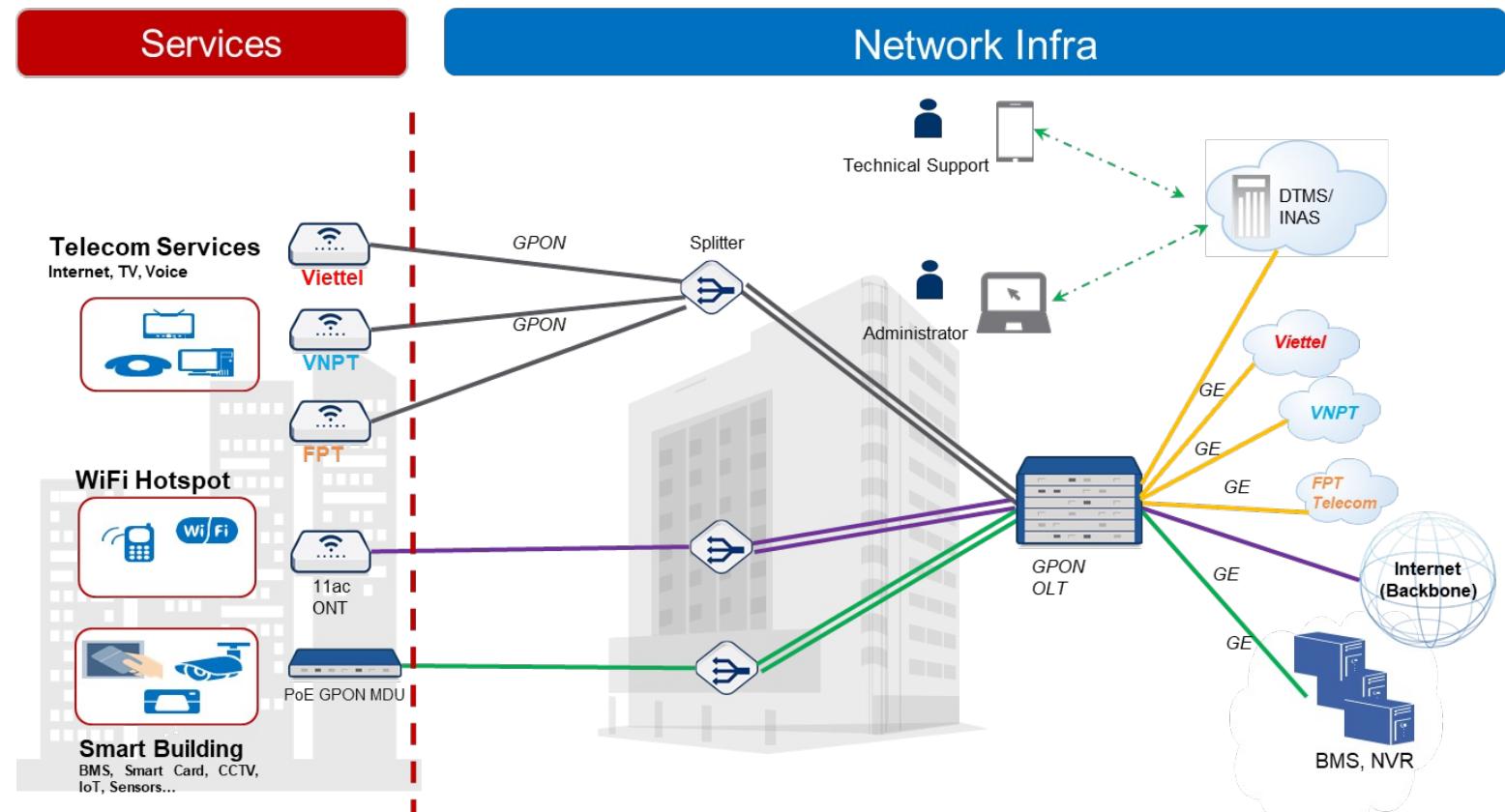
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- Vinhomes Ocean Park (HN, 42k apartments)

Services:

- Internet
- IPTV
- VoIP
- BloT (IP camera, Access control, Public wifi)
- Multiple ISP

No	Devices
1	GPON OLT: V8102
2	GPON ONT: H660EW, 802.11n WiFi ONT
3	DTMS 1.x



DTMS Key functions:

- Service Provisioning
- Service monitoring
- Separate ONT between ISP (Multi-ISP model)
- Customer care
- Inventory and Report

Use-case 2: Government Campus | Seamless WiFi Network



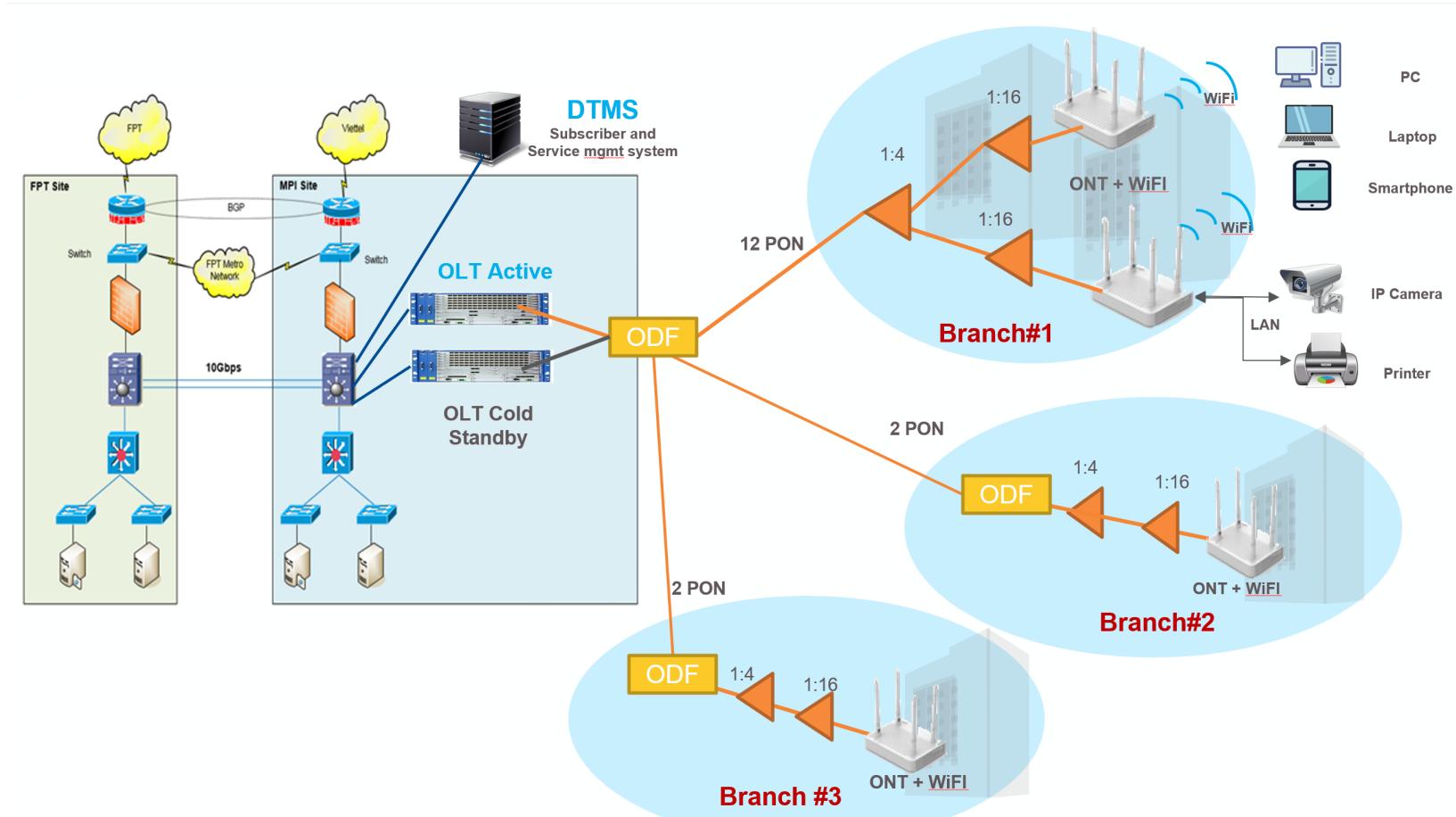
Campus Project:

- 1 HQ, 3 branches
- Fully Wireless Network
- Central user authentication (802.1x)
- Separated user/separated network (DVA)
- IP/Policy mobility

Services:

- Internet
- Data
- IoT (IP camera, Access control, Public wifi)

No	Devices
1	GPON OLT: V8102
2	GPON ONT: H660GM, Dual-band WiFi 5 ONT
3	DTMS 1.x



DTMS Key functions:

- WiFi user monitoring: User/VLAN/Which AP/WiFi Signal/Tx-Rx throughput
- Network monitoring (ONT: On/Off, Optics signal: Good/Bad/Lost)
- Alarms
- Inventory and Report

Use-case 2: Government Campus | Seamless WiFi Network



User/Vlan/Connectivity/traffic monitoring

Wireless LAN wlan0 Information

Enabled	Yes
Status	Up
SSID	wMPI-NET-P6C-1
Password	*****
Hidden SSID	No
Channel	9
Auto Channel	true
Byte Sent	860563
Byte Received	557174

Updated a few seconds ago

Wireless LAN wlan1 Information

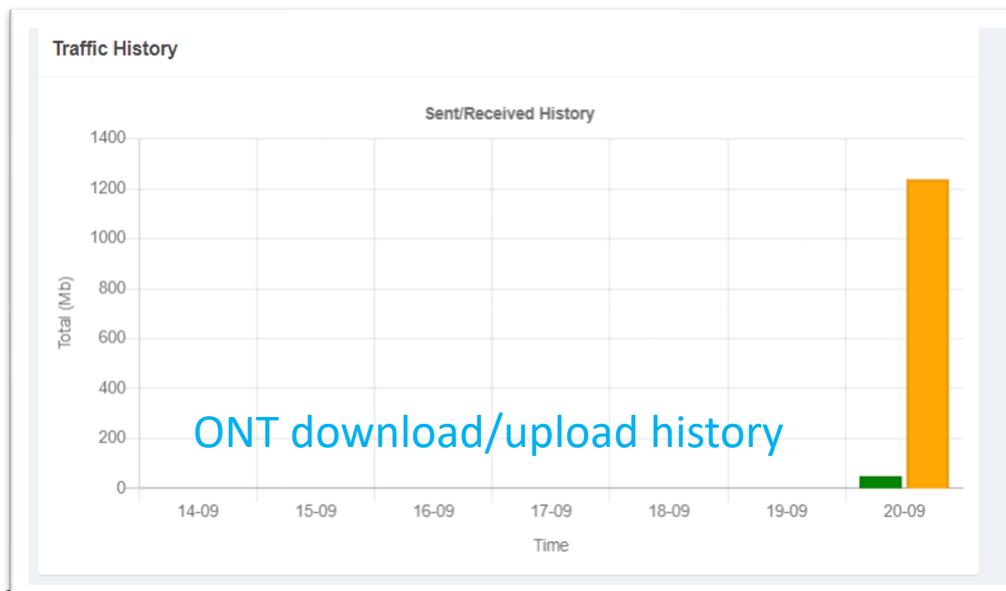
Enabled	Yes
Status	Up
SSID	wMPI-GUEST-P6C-1
Password	*****
Hidden SSID	No
Channel	9
Auto Channel	true

Wifi client xác thực bằng key phrase

Associated Device

No.	User Name	VLAN ID	MAC Address	TX Rate	Client Signal	Connected Time	Total Byte Sent	Total Byte Received
1	test9	9	34:8A:7B:72:27:94	16	-66	38	76093	58830

Wifi client xác thực qua Radius



Location label / tagging

Topo Management

Add Save

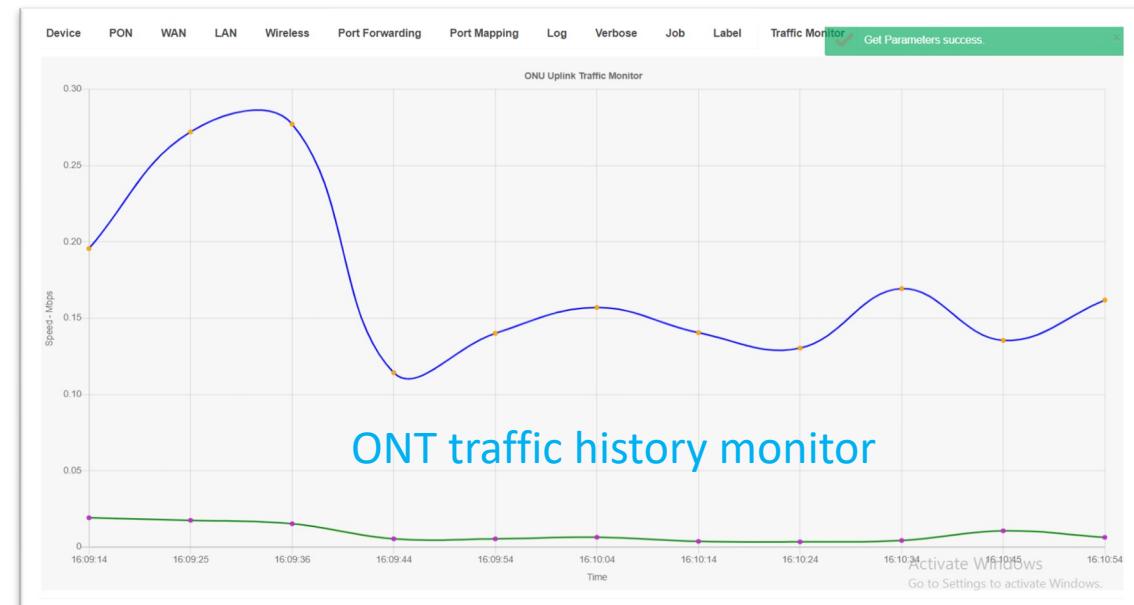
Expand Collapse

- + MPI
- + 6B Hoang Dieu
- + Nha C
- + Phong 6
- + Nha A
- + Nha A1
- + Nha B
- + Nha D
- + Nha E
- + Nha F
- + Nha G
- + 65 Van Mieu
- + 68 Phan Dinh Phung
- + D25 Cau Giay

MPI

Add Device

#	State	Serial Number	Label	Last Inform
1	Green	DSNW25661110	HoangDieu NhaC Phong 6	a minute ago
2	Green	DSNW25661120	Hoang Dieu NhaC Phong 6	a minute ago



Use-case 2: Sai Gon Sky Garden Service Apartments



Hotel Project:

- Service Apartment
- Renovated from ADSL to GPON

Services:

- Internet (LAN/WiFi)
- CATV (separated)
- Analog Phone (separated)

No	Device
1	GPON OLT: V5808
2	GPON ONT: H660EW 802.11n WiFi ONT



Use-case 2: Sai Gon Sky Garden Service Apartments



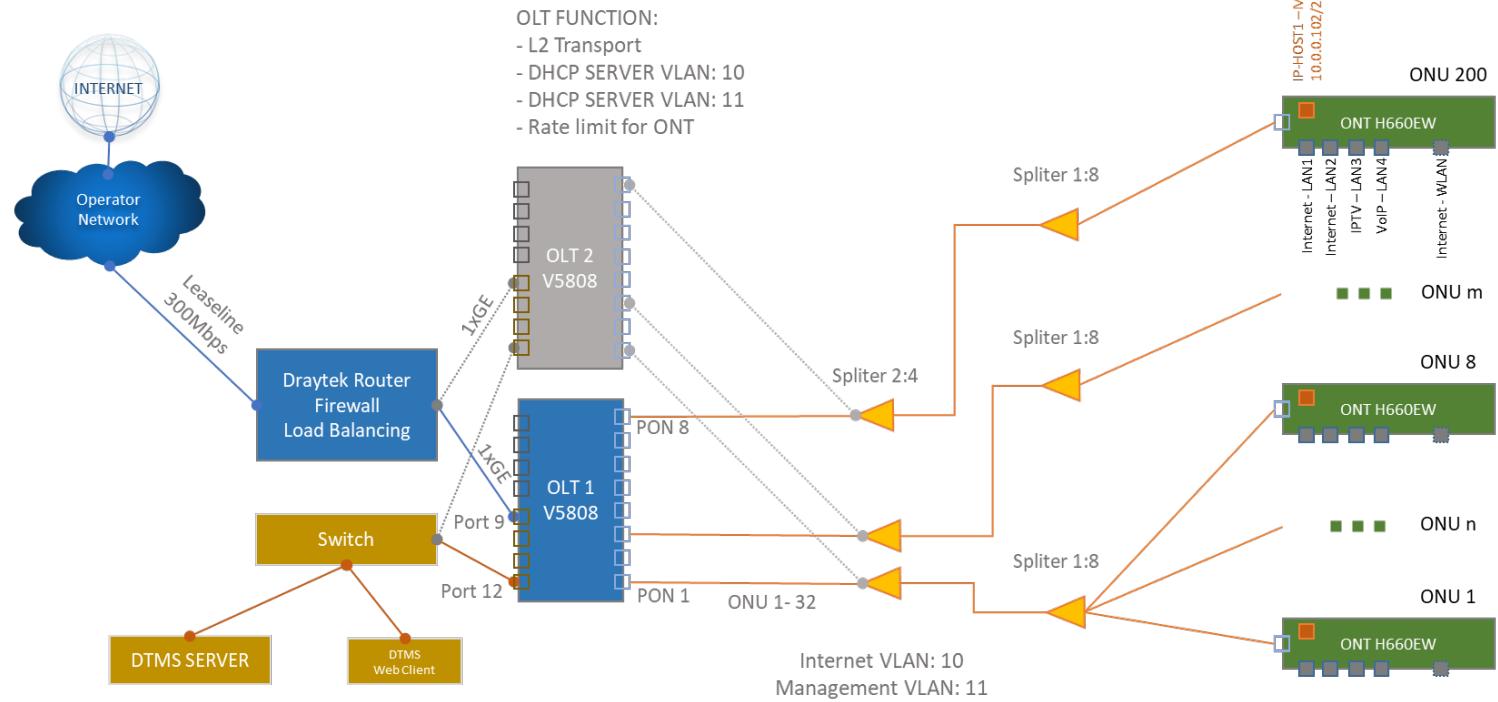
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- Service Apartment
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Services:

- Internet (LAN/WiFi)
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- Analog Phone (separated)

No	Device
1	GPON OLT: V5808
2	GPON ONT: H660EW 802.11n WiFi ONT



DTMS Key functions:

- Service Provisioning
- Service monitoring
- Remote Technical Support
- Inventory and Report

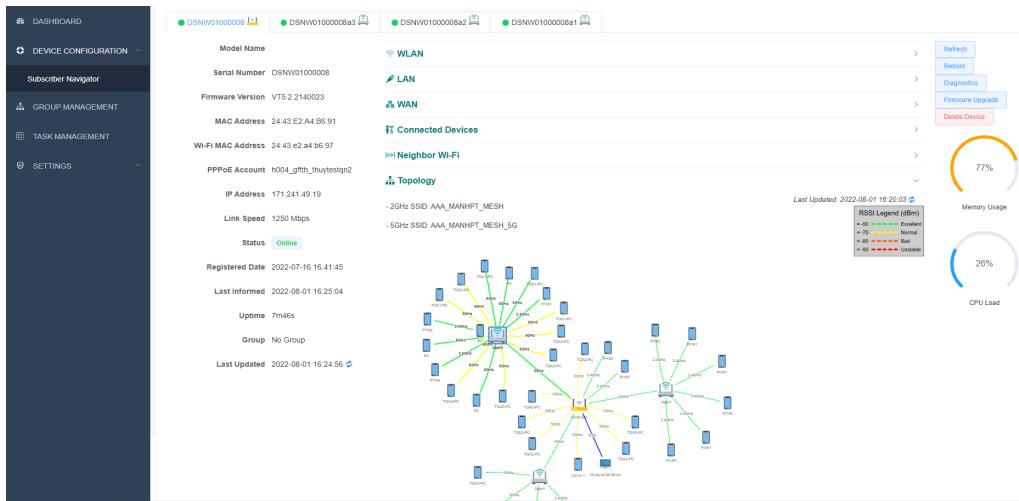


DZS Connect – Live Demo

Live Demo - Scenarios



- Search
- Device Management
- Topology View
- Task Management
- etc



This screenshot shows the 'Details Subscriber' page for a device with Model Name W520CE, Serial Number DSNW01000008a1, Firmware Version V7.5.2.2140023, and Wi-Fi MAC Address 24:43:E2:B4:13:37. The page includes a summary table with columns: #, Client Name, IP Address, MAC Address, RSSI (dB) (sorted by desc), Speed (Mbps) (sorted by desc), Average Bandwidth, Connection Type, and Status. The table lists 8 entries. Below the table are sections for IP Address (192.168.1.11), Link Speed (866 Mbps), Backhaul (5G), and Backhaul Signal (-34 dBm). The status is shown as Online. The page footer includes a copyright notice: v2.0 Copyright © DZS All rights reserved.

This screenshot shows the 'Details Device' page for a subscriber with Model Name DSNW01000008, Serial Number DSNW01000008a1, Firmware Version V7.5.2.2140023, and MAC Address 24:43:E2:A4:B6:91. The page includes a summary table with columns: #, SSID (sorted by desc), BSSID, Signal Power (dBm) (sorted by desc), Noise (dBm), and Channel. The table lists 10 entries. Below the table are sections for IP Address (171.241.49.19), Link Speed (1250 Mbps), Status (Online), Registered Date (2022-07-16 16:41:45), Last Informed (2022-08-01 16:23:04), Uptime (7m46s), Group (No Group), and Last Updated (2022-08-01 16:24:56). To the right are two circular performance indicators: Memory Usage at 77% and CPU Load at 26%. A legend for the BSSIDs shows colors corresponding to signal strength: green (Excellent), yellow (Good), orange (Fair), red (Bad), and dark red (Unusable).

Open Discussion!





Thank You

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HYPER



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Hyper-Connected World