A Centrally Orchestrated SD-WAN Building a Green Ecosystem

--ZTE-SD-WAN Solution
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1. SD-WAN is on the Way

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SD-WAN is on the Way

- Agility: Real-time network service on demand
- Easiness: Self-service via customer PORTAL
- Flexibility: Add/delete & scale up/down application on demand
- Reliability: Carrier class secure and reliable
- Mobility: Mobile office automation, connect to service anywhere, any time
# Target Customers and Key Requirements of SD-WAN

<table>
<thead>
<tr>
<th>SME and start-up companies</th>
<th>Chain enterprises</th>
<th>Enterprises cross carriers</th>
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<td>They have small scale, high cost pressure. Most of them are technically innovative companies and gather in commercial buildings or entrepreneurial base. They need cheap cloud resource and fast internet.</td>
<td>They have a large number of branches with wide distribution, and have a lot of tunnels under HQ. Overlay network is used for most of ordinary services, which reduces the cost of enterprise and realizes the layer 2 management.</td>
<td>An enterprise leases multi-carriers’ network, overlay network can shield the underlay network and solve network interconnection problem.</td>
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### Key requirements

1. **Faster deployment and adjustment**
   
   Rapidly deploy or adjust services based on requirements.

2. **Easier management**
   
   The workplace is migrated frequently, but the network configuration remain unchanged.

3. **Lower cost**
   
   Lower price, security tunnel, but do not need exclusive physical tunnel.
Product Form of SD-WAN

Product form
1. A terminal device placed on the user premise, while providing VPN capability;
2. In B2C scenario, each CPE is obtained from carriers and connect to carriers’ network directly;
3. In B2B2C scenario, each CPE is obtained from building property or carriers and connect carriers’ network through aggregation equipment of building.

Procedures
- Self-service, single payment
- Send CPE to customers
- Users scan QR code to accomplish authentication
- SDN controller sends configuration to equipments
- Customers management service through portal after configuration accomplishment
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ZTE SD-WAN Solution Deployment Architecture

Integration of SDN and NFV technology and SD-WAN bring win-win for enterprises and carriers.

Micro-Cloud Gateway M6000-1S
- ICT deep integration, dedicated forwarding hardware, and general X86 sub-board support SDN and NFV

Customer Benefits
- Lower CAPEX for enterprises
- Lower OPEX for enterprises
- Easier service deployment and less deployment time for enterprise
- Higher revenues for carriers
Premise Equipment Zero Touch Process

1. uCPE gets ACS and WAN controller IP addresses via DHCP option or pre-configuration
2. uCPE creates connection with ACS and WAN controller
3. ACS sends basic network configuration after uCPE passed authentication
4. WAN controller sends configuration to uCPE to establish VxLAN tunnel
5. DC controller sends configuration to DC GW to establish VxLAN tunnel
6. Then VIM can manage X86 board through VxLAN tunnel
SD-WAN Provides Elastic Network

- **Bandwidth**: 10M, 50M, 100M
- **QoS**: SVIP, VIP, Ordinary
- **Protection**: YES, NO

Service aware
- VPN
- Service CO
- Access network

- SD-WAN
- Traffic Monitor
- Traffic Optimization
- Traffic analysis

- Bandwidth: 50M
- QoS: Ordinary
- Protection: YES

Tunnel
- Video Conference
- Financial System

Enterprise
- router
- OVS
- X86 server

uCPE
- Service aware

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SD-WAN Achieves Easier VNFs Deployment for Users

1. Selecting services
2. Hardware configuration
3. Service configuration
4. Site selection
5. Service deployment completed
SD-WAN Achieves Auto-deployment of VNFs

1. Users select VNF at portal. The image doesn’t need to be downloaded if it’s stored locally. On the contrary, the image should be downloaded if it’s stored on the server.

2. VIM sends commands to hypervisor to allocate VM for VNF, VM starts up and downloads OS (such as centos) and VNF image from image server.

3. VNF sends DHCP request to DHCP server in CO and gets IP and management IP, then VNF can be online.

4. SDN controller sends commands to uCPE and lets user service flow pass through VNF, and forwards service flow through service tunnel.

There are two tunnels, one for VNFs services and the other for equipment management.
VNFs Performance Guarantee Solution

1. Users select VNF at portal
2. VNFM deploys VNF to reference cloud resource in various network conditions to ensure that VNF works normally and establishes a performance baseline;
3. At the same time, resource verification tool verifies if target NFVI is ready for VNF deployment.
4. When the target NFVI is ready for VNF deployment, the VNFM deploys the VNF to target NFVI and executes VNF testing to validate that the VNF is running with expected performance in the target NFVI.
5. SDN controller sends traffic redirection policy to make VNF work with traffic.
SFC Deployment Workflow

1. Request
2. Select VNFs
3. Define SFC Workflow
4. Call NFVO to Setup VNFs
5. Allocate VM
6. Install VNF
7. Call SDNO to Create Network Service
8. Create SFC network
9. Create WAN network service

Global Service Orchestrator
NFV MANO
VIM (TECS)
VNFM
NFVO
SDN Control
DC Network Controller
WAN Network Controller
SDNO

VNFs Software
Hypervisor
Physical Server

Virtual Network
WAN Network Service
Physical Network elements
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SD-WAN has Service-aware Capability

Get application usage and performance information in your entire network

Assure users’ experience by adjusting each application flow in a real-time way

Accelerate delay-sensitive applications and reduce bandwidth consumption

Dynamically unify the management of your hybrid network and automatically select the best among many paths

Adjust network size based on budget and services requirements
Multi-service Management and Centralized Network Control

“Centralized”
Centralized management of uCPE, NFVI, and VNFs

“Automatic”
Devices are configured by management system and End to end orchestration for VNFs

ElasticNet
Centralized Management Platform

SD-WAN

Main HQ Office

Public internet

Public Cloud

Access network

Branch Office

Branch Office

Branch Office

Branch Office
Service-awareness and Network Timely Response

“Awareness”
Real-time monitoring of the network and services performance as well as customers requirements

“Response”
Network dynamic response of service changing and network changing

ElasticNet Centralized Management Platform

SD-WAN

Main HQ Office
Public internet
Public Cloud

Branch Office
Branch Office
uCPE

CO
Access network
CO
gateway

Service CO
Access network
SD-WAN Needs an Open Ecosystem
Conclusion

*SD-WAN is introducing new changes to enterprises’ service deployment*

*SD-WAN adapts to the rapid development of new services*

*SD-WAN adapts to future network development*

*SD-WAN brings win-win for carriers and enterprises*

*SD-WAN needs an open ecosystem*
Thank You