LightWAN

Next-Generation

SD-WAN

Beijing Qingwang Technology Co., Ltd.

LightWAN

About LightWAN
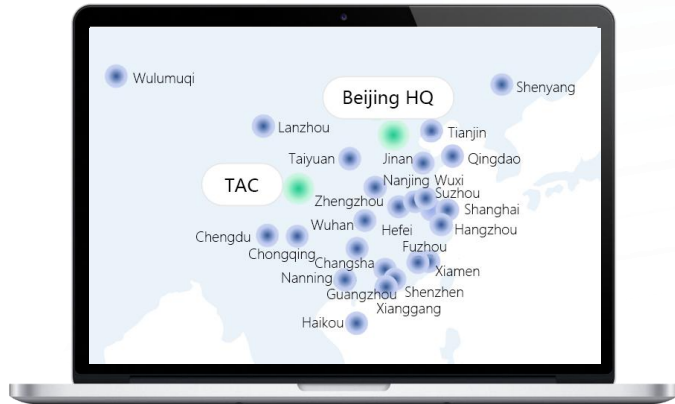
About LightWAN

Founded in 2016

1500+ Enterprise Customers

Rich Global Fortune 500 Enterprise Service Experience

Focusing in China and serving globally

Product mode and operation mode become at one

A full suite of SD-WAN intellectual property and patent technology

Top 1 Service Provider of China SD-WAN Market

Permits for Operation of Value-added Telecommunication Business

Commercial Cryptographic Product Certificate

ISO27001 Information Security Management System Certificate

Network Access License for 5G Wireless Data Terminals

Selling License of Specialized Computer Information System Security Product

Source: *China SD-WAN Infrastructure Market 2021-2022*. IDC.

LightWAN

About SD-WAN

LightWAN

SDH/MSTP -> MPLS -> SD-WAN

SD
Software-defined

Networking
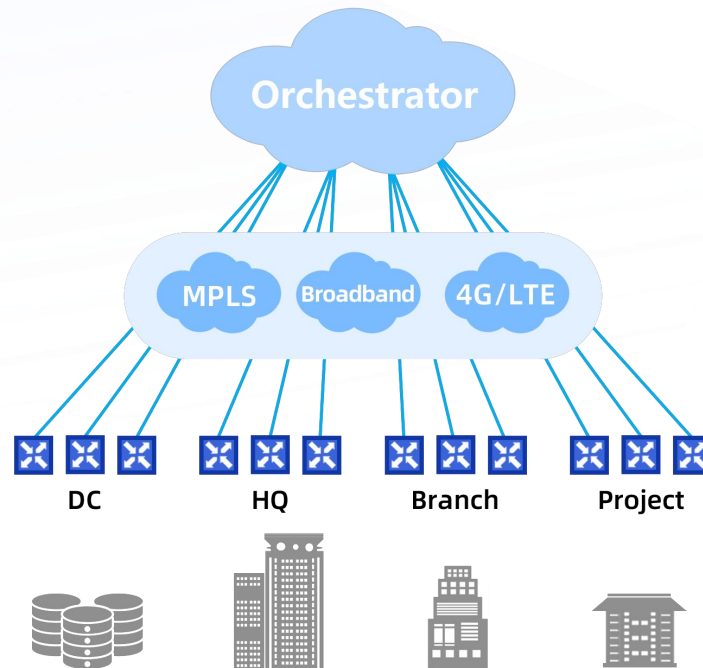Effective Flexible Visualized

WAN
Optimization Technology

Connectivity
Fast Stable Cost-effective

Edge-Based SD-WAN Solution – Focus on SD

LightWAN

- Centralized management and control

- Managed application policies

- Zero-touch provisioning

- Automatic networking

Edge-based SD-WAN solution provides hardware devices and virtualized management platform to help customers build and manage enterprise intranet. The solution can manage over various types of network connections, but it is not able to improve the link quality.

Operation-Based SD-WAN Solution – Focus on WAN Optimization

- Improved transmission efficiency
- High dependability
- High Security

Operation-Based SD-WAN solution focuses on providing network services, offering highly reliable and secured WAN connectivity services.

A Combination of Edge-Based and Operation-Based SD-WAN

LightWAN

Perfect combination of SD-WAN hardware and network service

WAN optimization integrated

Bring **SD-WAN** a Brand New Height

About LightWAN

LightWAN Features

Fast	Reliable	Secure	Flexible	Simple

600+ POP

Intelligent Routing

WAN Optimization

- 600+ POPs are deployed globally to ensure an easy access to LightWAN backbone from anywhere.

- Mature WAN optimization and intelligent routing technologies are integrated to the entire LightWAN backbone to significantly improve network quality and performance.

LightWAN Backbone—Global

Fast　　Reliable　　Secure　　Flexible　　Simple

LightWAN POP　——　LTT

LightWAN Features

Access Redundancy

Access reliability guaranteed by Multi-WAN (including 4G/5G and satellite links) with load balancing and mutual backup policies.
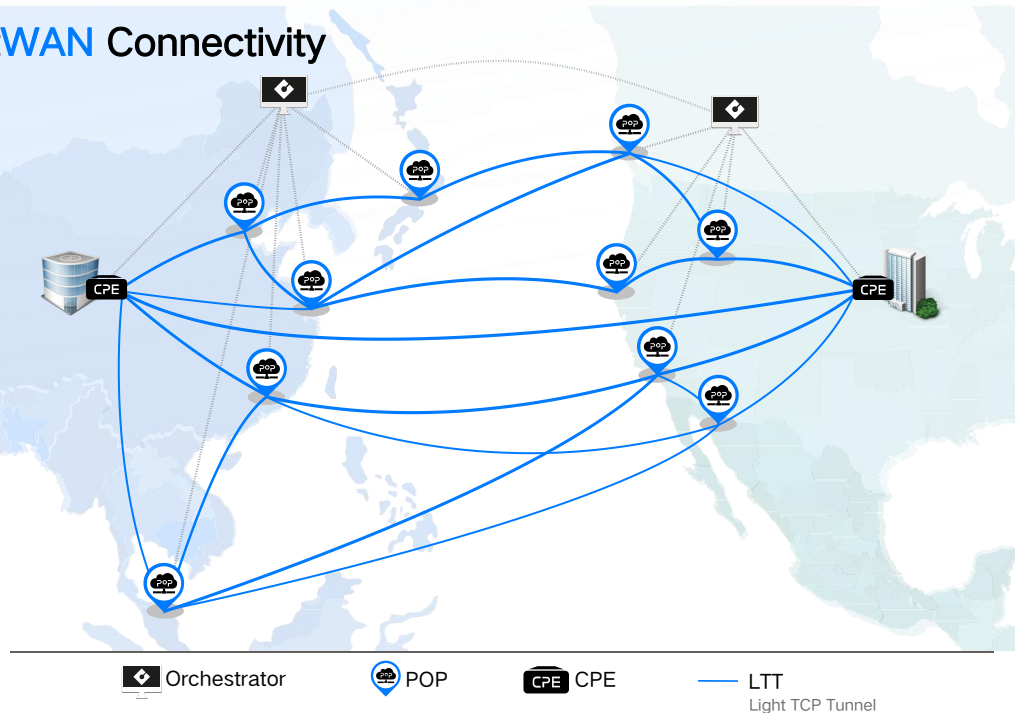
Transmission Redundancy

Packet duplication technology provides a switchover of route with no customer perception in case of network failure.

Multi-Path Protection

Distributed path redundancy design ensures fast link switchover to avoid SLA-degraded path.

LightWAN Connectivity

Orchestrator   POP   CPE   LTT
Light TCP Tunnel

LightWAN Features

- Using ShangMi (SM) to address authentication, data integrity, confidentiality, and application security issues in information systems, meeting user security and compliance requirements such as classified protection of cybersecurity and SM security evaluations.

- Based on SM technology, encryption keys are securely stored in hardware cryptographic cards at both ends of the communicating nodes, providing defense against network attacks and malicious disruptions.

- Private tunnel protocols are employed between backbone network and edge nodes, rejecting any unauthorized packet access. By default, no known service ports are open.

- Data packets are transparently accelerated and forwarded through backbone nodes, while end-to-end encryption is implemented between access nodes, making data remains invisible to network operators, thus fully protecting customer's data privacy and security.

- Support for network traffic and DNS auditing, allowing for tracing the path of network traffic.

Commercial Cryptographic Product Certificate

LightWAN PCI-e Card   LightWAN Mini PCI-e Card

LightWAN Features

LightWAN

Fast | Reliable | Secure | **Flexible** | Simple

Customer View

Spoke-Hub

Global HQ Full-Mesh

Legend:
- Orchestrator
- POP
- CPE
- vCPE
- Mobile CPE
- Connectivity
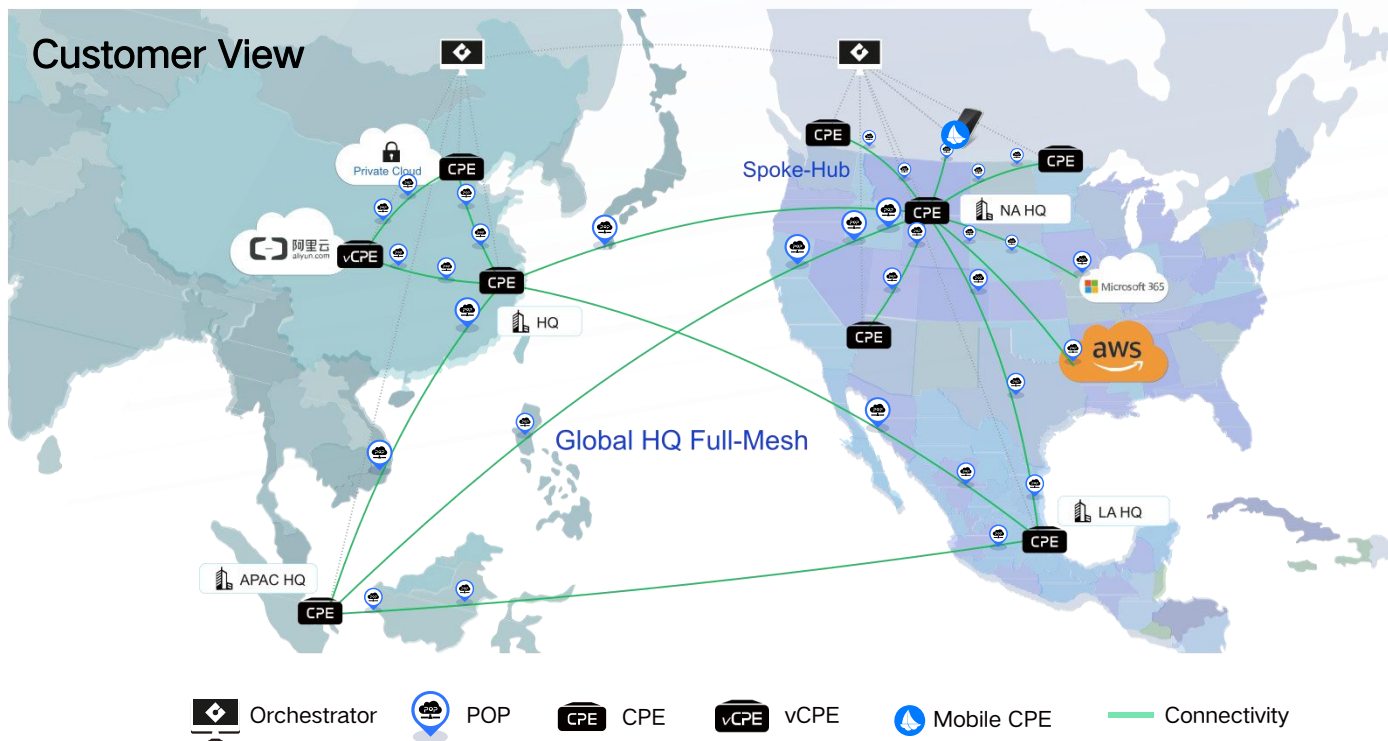
Fast Topology Setup
- Full-Mesh
- Spoke-Hub
- Point-to-Point

Mobile/Home Office

High-Speed and Stable Interconnection among Clouds

Global SaaS Access Acceleration

LightWAN Features

LightWAN

| Fast | Reliable | Secure | Flexible | Simple |

Step 1 Site
PUT SITE ONLINE

Step 2 Topology
CONNECT SITE TO SITE

Step 3 Policy
MANAGE TRAFFICS

- Network turnup process designed according to customer habits

- Visualized management with performance and utilization statistics shown in graphs

Orchestrator

Site Overview

1,000 Total

Active	950	95.0 %
Pending	25	2.5 %
Provisioning	25	2.5 %
Disable	0	0.0 %

Traffic Overview

RX   TX

Mbps

500
400
300
232
200
100
0

15:00   16:00   17:00   18:00   19:00   20:00

Top N

Site   Host

Site Name	RX	TX	
New York Office	1.2	1.0	Gbps
Tokyo Office	128.4	96.2	Mbps
Shanghai Office	80.1	72.9	Mbps
Beijing Data Center	32.4	24.3	Mbps
Melbourne Office	24.0	16.2	Mbps
Washington Office	32.4	24.3	Mbps
Hong Kong Office	80.1	72.9	Mbps
London Branch	32.4	24.3	Mbps
Chicago Office	24.0	16.2	Mbps
Berlin Office	32.4	24.3	Mbps

World Map

Region   Site

Global CPE-based Network View

Moscow (6)
Los Angeles (8)
Washington (2)
Beijing (16)
Shanghai (4)
Guangzhou (8)

- Active
- Pending
- Provisioning
- Disable

Site Traffic — Beijing Data Center

Mbps   RX

300
225
150
75
0

TX

200
150
100
50
0

15:00   15:10   15:20   15:30   15:40   15:50

Policy — Beijing Data Center – London Branch

Troughput   Latency   Jitter   Packet Loss

Kbps   RX   TX

	RX		TX
Beijing..._Hangzho...	162.12		86.12
Beijing..._London...	112.23		151.47
Shangha..._Tokyo...	162.12		86.12
Hongkon..._Guangzh...	112.23		151.47
New York..._Washin...	162.12		86.12

Alert — Last 6 Hours

Event	Alert Object	Level
CPE Pending	Tokyo–CPEDeviceModel–Test...	Alert
Link Down	Shanghai–DeviceModel_WAN1–...	Warning
CPE Pending	Tokyo–CPEDeviceModel–Test...	Notice
Link Down	Guangzhou–DeviceModel_WAN...	Alert
CPE Pending	Tokyo–CPEDeviceModel–Test...	Warning
Link Down	Beijing–DeviceModel_WAN1–...	Alert
CPE Pending	Tokyo–CPEDeviceModel–Test...	Warning

Topology	Policy	Host	WAN	Bandwidth		
					RX	TX
120	128	1,024	1,024	↓ 800.25	↓ 400.25	
				↑ 200.30	↑ 100.35	
Total	Total	Total	Total	Total (Mbps)	Subscription (Mbps)	

Orchestrator

Site Overview >

1,000 Total

- Android — 500 — 50.0 %
- iOS — 300 — 30.0 %
- Windows — 50 — 5.0 %
- macOS — 50 — 5.0 %
- Linux — 50 — 5.0 %
- Others — 50 — 5.0 %

Traffic Overview >

● — RX   ● — TX

Mbps
500
400
300
200
100
0

232

15:00 16:00 17:00 18:00 19:00 20:00

Top N >

Site | Host

Site Name	RX ▾	TX ▾	
New York Office	1.2	1.0	Gbps
Tokyo Office	128.4	96.2	Mbps
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Beijing Data Center	32.4	24.3	Mbps
Melbourne Office	24.0	16.2	Mbps
Washington Office	32.4	24.3	Mbps
Hong Kong Office	80.1	72.9	Mbps
London Branch	32.4	24.3	Mbps
Chicago Office	24.0	16.2	Mbps
Berlin Office	32.4	24.3	Mbps

World Map

Region ▾   Site ▾

Global Mobile CPE Access View

● Online 800
● Offline 200

Site Traffic — Beijing Data Center

Mbps   RX
300
225
150
75
0

200
150
100
50
0
                                                 TX

15:00 15:10 15:20 15:30 15:40 15:50

Policy > Beijing Data Center – London Branch

Troughput | Latency | Jitter | Packet Loss

Kbps   ● RX ● TX

Beijing..._Hangzho...	162.12		86.12
Beijing..._London...	112.23		151.47
Shangha..._Tokyo...	162.12		86.12
Hongkon..._Guangzh...	112.23		151.47
New York..._Washin...	162.12		86.12

Alert — Last 6 Hours ⌄

Event	Alert Object	Level
CPE Pending	Tokyo–CPEDeviceModel–Test...	🔔 Alert
Link Down	Shanghai–DeviceModel_WAN1–...	🔔 Warning
CPE Pending	Tokyo–CPEDeviceModel–Test...	🔔 Notice
Link Down	Guangzhou–DeviceModel_WAN...	🔔 Alert
CPE Pending	Tokyo–CPEDeviceModel–Test...	🔔 Warning
Link Down	Beijing–DeviceModel_WAN1–...	🔔 Alert
CPE Pending	Tokyo–CPEDeviceModel–Test...	🔔 Warning

Topology >
120 Total

Policy >
128 Total

Host >
1,024 Total

WAN >
1,024 Total

Bandwidth >   ● RX ● TX
↓ 800.25   ↓ 400.25
↑ 200.30   ↑ 100.35
Total (Mbps) ⓘ   Subscription (Mbps) ⓘ

CPE   Mobile

Site Overview ›

1,000 Total

● Active	950	95.0 %
● Pending	25	2.5 %
● Provisioning	25	2.5 %
● Disable	0	0.0 %

Traffic Overview ›

— ● — RX   — ● — TX

Mbps
500
400
300
232
200
100
0
15:00 16:00 17:00 18:00 19:00 20:00

Top N ›   Site   Host

Site Name	RX ▾	TX ▾	▾
Beijing Data Center	1.2	1.0	Gbps
Beijing Haidian Office	128.4	96.2	Mbps
Shanghai Branch	80.1	72.9	Mbps
Guangzhou Office	32.4	24.3	Mbps
Hangzhou R&D Center	24.0	16.2	Mbps
Xi'An R&D Center	32.4	24.3	Mbps
Wuhan Office	80.1	72.9	Mbps
Hongkong Branch	32.4	24.3	Mbps
Shenzhen Office	24.0	16.2	Mbps
Tianjin Branch	32.4	24.3	Mbps

China   Region ▾   Site ▾

China CPE-based Network View

Beijing (240)

+
−

● Active
● Pending
● Provisioning
● Disable

Topology ›	Policy ›	Host ›	WAN ›	Bandwidth › RX ● TX ●
120 Total	128 Total	1,024 Total	1,024 Total	↓ 800.25 ↓ 400.25 ↑ 200.30 ↑ 100.35 Total (Mbps) Subscription (Mbps)

Site Traffic   Beijing Data Center

Mbps   RX
300
225
150
75
0
15:00 15:10 15:20 15:30 15:40 15:50

TX
200
150
100
50
0
15:00 15:10 15:20 15:30 15:40 15:50

Policy ›   Beijing Data Center – Guangzhou Branch

Troughput   Latency   Jitter   Packet Loss

Kbps   RX ● TX ●

Beijing..._Hangzho...	162.12		86.12
Beijing..._Shenzhe...	112.23		151.47
Shangha..._Hongk...	162.12		86.12
Beijing..._Guangzh...	112.23		151.47
Beijing..._Nanjing...	162.12		86.12

Alert   Last 6 Hours

Event	Alert Object	Level
CPE Pending	BeijingDC–CPEDeviceModel–...	🔔 Alert
Link Down	Shanghai–DeviceModel_WAN1–...	🔔 Warning
CPE Pending	Guangzhou–CPEDeviceModel–...	🔔 Notice
Link Down	Guangzhou–DeviceModel_WAN...	🔔 Alert
CPE Pending	Hangzhou–CPEDeviceModel–T...	🔔 Warning
Link Down	Beijing–DeviceModel_WAN1–...	🔔 Alert
CPE Pending	Tianjin–CPEDeviceModel–Test...	🔔 Warning

Orchestrator

Site Overview >

1,000 Total

- Android   500   50.0 %
- iOS   300   30.0 %
- Windows   50   5.0 %
- macOS   50   5.0 %
- Linux   50   5.0 %
- Others   50   5.0 %

Traffic Overview >

RX   TX

Mbps
500
400
300
232
200
100
0
15:00   16:00   17:00   18:00   19:00   20:00

Top N >

Site	Host

Site Name	RX ▾	TX ▾	
Beijing Data Center	1.2	1.0	Gbps
Beijing Haidian Office	128.4	96.2	Mbps
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Guangzhou Office	32.4	24.3	Mbps
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Wuhan Office	80.1	72.9	Mbps
Hongkong Branch	32.4	24.3	Mbps
Shenzhen Office	24.0	16.2	Mbps
Tianjin Branch	32.4	24.3	Mbps

中华人民共和国   Region ▾   Site ▾

China Mobile CPE Access View

- Online 800
- Offline 200

Topology >	Policy >	Host >	WAN >	Bandwidth >	RX TX
120 Total	128 Total	1,024 Total	1,024 Total	↓ 800.25 ↑ 200.30 Total (Mbps) ⓘ	↓ 400.25 ↑ 100.35 Subscription (Mbps) ⓘ

Site Traffic   Beijing Data Center

Mbps   RX
300
225
150
75
0

TX
200
150
100
50
0
15:00   15:10   15:20   15:30   15:40   15:50

Policy >   Beijing Data Center – Guangzhou Branch

Troughput   Latency   Jitter   Packet Loss

Kbps   RX TX
Beijing..._Hangzho...	162.12		86.12
Beijing..._Shenzhe...	112.23		151.47
Shangha..._Hongk...	162.12		86.12
Beijing..._Guangzh...	112.23		151.47
Beijing..._Nanjing...	162.12		86.12

Alert   Last 6 Hours ∨

Event	Alert Object	Level
CPE Pending	BeijingDC–CPEDeviceModel–...	🔔 Alert
Link Down	Shanghai–DeviceModel_WAN1–...	🔔 Warning
CPE Pending	Guangzhou–CPEDeviceModel–...	🔔 Notice
Link Down	Guangzhou–DeviceModel_WAN...	🔔 Alert
CPE Pending	Hangzhou–CPEDeviceModel–T...	🔔 Warning
Link Down	Beijing–DeviceModel_WAN1–...	🔔 Alert
CPE Pending	Tianjin–CPEDeviceModel–Test...	🔔 Warning

Various Ways to Access LightWAN

CPE

vCPE

Mobile CPE

LightWAN – Light Speed SD-WAN

Orchestrator   POP   CPE   vCPE   Mobile CPE   LTT
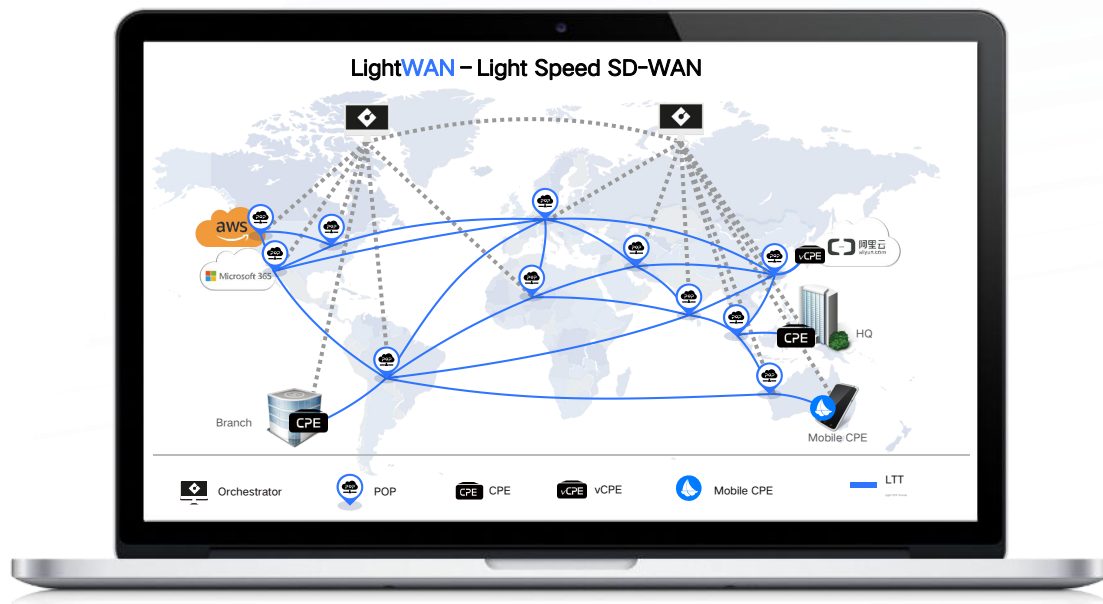
CPE
Internet, leased line, 4G/5G, etc.

vCPE
Mainstream virtualization platform (VMWare, KVM, Hyper-V, Zen…) and cloud environment (AWS, Alibaba Cloud …)

Mobile CPE
Windows, macOS, Android, iOS, UOS, Harmony OS, and Kylin

Various Ways to Access LightWAN

LightWAN

CPE | Hardware CPE

vCPE

Mobile CPE

Mini Desktop

Desktop

1U Rackmountable

2U Rackmountable

LW1000 Series

4G/Wi-Fi

LTT performance: 20Mbps

LW2000 Series

4G/5G/Wi-Fi

LTT performance: 30-250Mbps

LW3000 Series

Bypass/SFP Optional

LTT performance: 100Mbps-1.5Gbps

Hardware made form China (ITAI)

Loongson / FeiTeng / Hygon

LW7000 Series

Bypass/SFP Optional

LTT performance: 1.5-5Gbps

Hardware made form China (ITAI)

Loongson / FeiTeng / Hygon

Various Ways to Access LightWAN

CPE | Deployment: router/bridge

vCPE

Mobile CPE
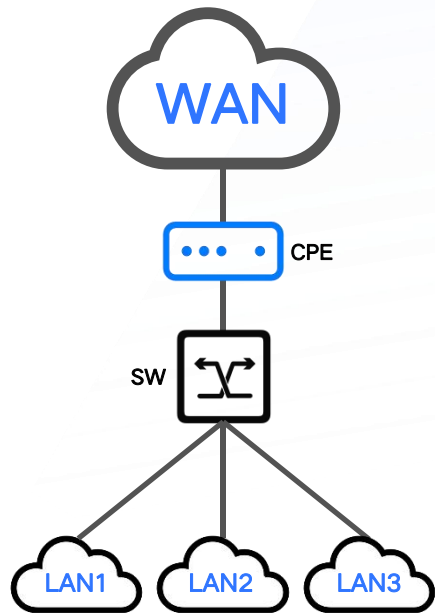
Router Mode

Bridge Mode

www.lightwan.com.cn

Various Ways to Access LightWAN
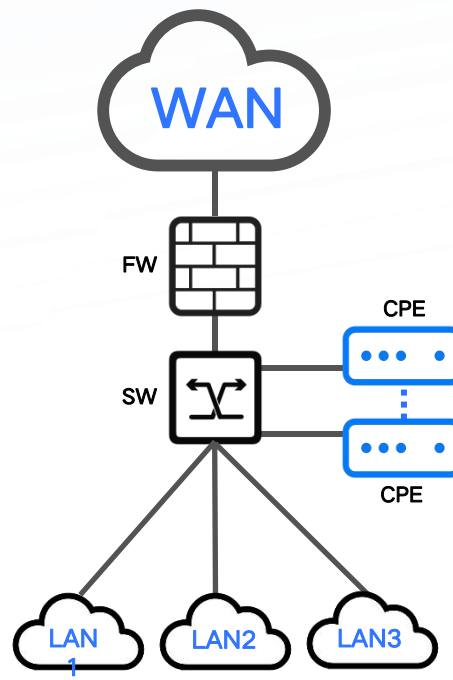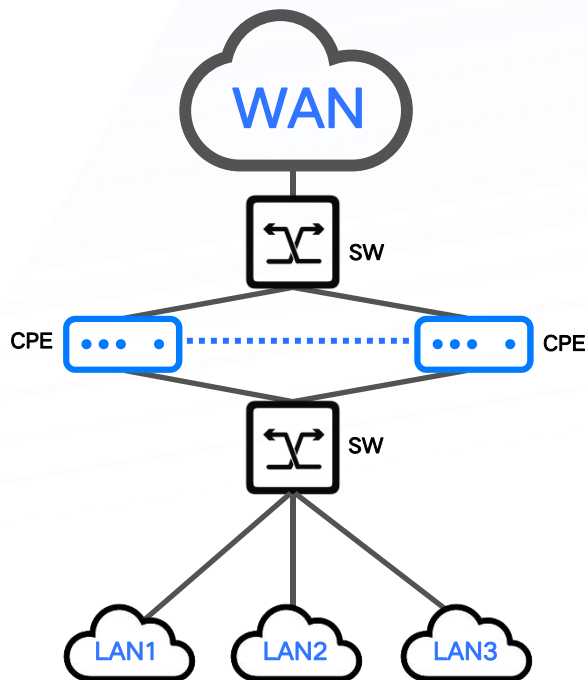
Various Ways to Access LightWAN

CPE | vCPE | Deployment: public cloud/virtual server | Mobile CPE

WAN

Elastic Cloud Server
Elastic IP

vCPE   vCPE

Virtual Switch

Cloud Server   Cloud Server   Cloud Server
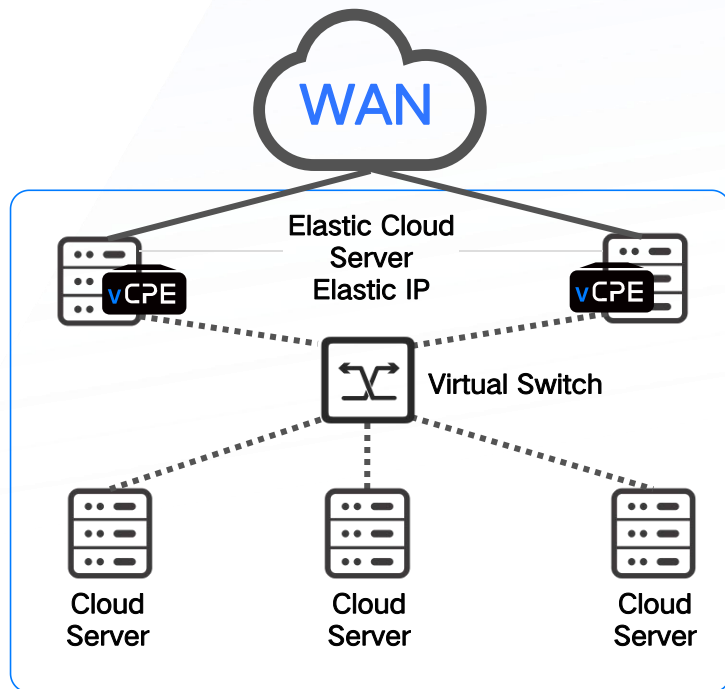
Virtual Private Cloud (VPC)

WAN

Gateway

Virtual Network Node

Virtual Resource Pool

vCPE   vCPE

Virtual Machine   Virtual Machine   Virtual Machine   Virtual Machine
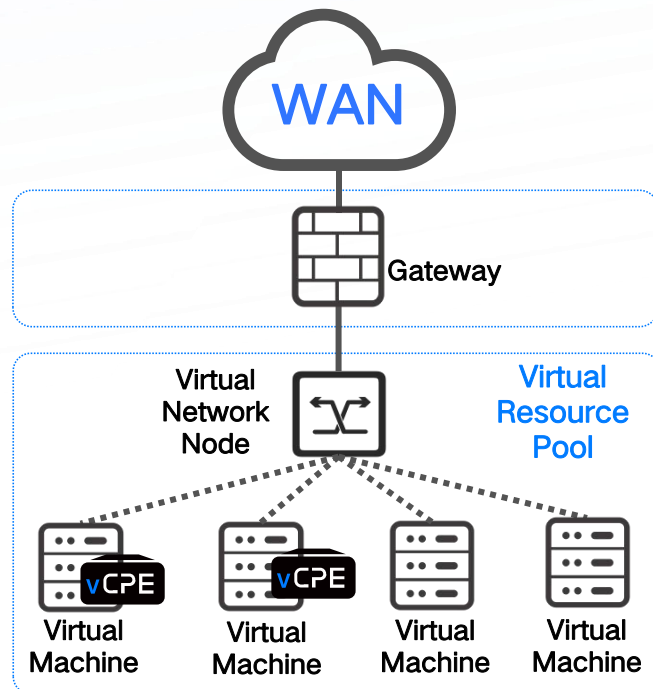
Virtualization Platform (VMware/KVM/Xen/Hyper-V)

www.lightwan.com.cn

Various Ways to Access LightWAN

CPE **vCPE** **Mobile CPE** **Mobile Terminal**
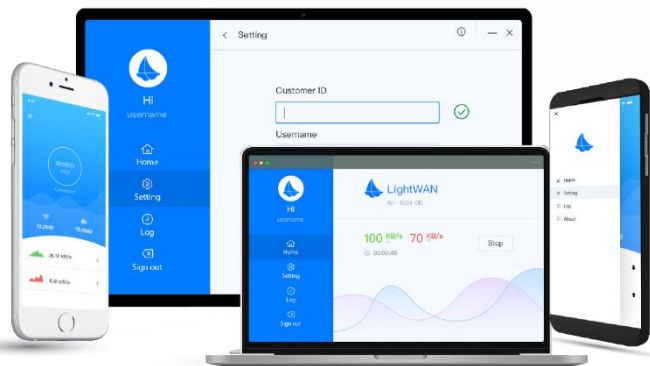
l Two-factor Authentication: User/Pass + OTP or User/Pass + SMS

l User Authentication: interfacing with customer owned LDAP, Radius server; support SSO Single Sigh-On

l Centralized Management: Support user management for flexible configuration, access control, and bandwidth management. Account grouping support reading OU from LDAP

l Security test of running environment is supported with Windows; support SD-WAN network sharing via hotspot; Unattended Installation supported with Windows

Support with Android, iOS, Windows, macOS, Harmony OS, UOS, Kylin (ITAI):
Meet the increasing WFH (work-from-home) demand in enterprise networking.

LightWAN vs. Leased Line

LightWAN

	LightWAN	Leased Line
Basic Resources	Quality Internet + leased lines	Leased lines
Optimization Technology	Transmission and routing optimization	×
Coverage	Global Coverage	Fixed Area
Network Visualization	√	×
Delivery Cycle	Delivered in one day	Delivered in 1- 6 months
Free Trial	√	×
Mobile Office	√	×
Charging Mode	Bandwidth-based charge per year/month	Bandwidth-based charge per year/month
Dedicated POPs	√	×
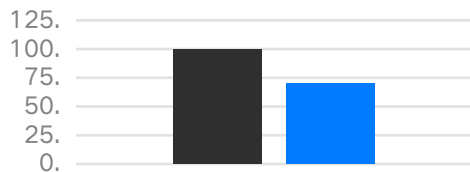
Cost saving

30%

LightWAN solutions save customer at least 30% cost compared with leased lines.

Technical Service System

Introduction of Technical Service System

On-site technical support

- Network investigation
- Fast deployment of LightWAN CPE, client
- Troubleshooting
- Hardware upgrade and replacement

Remote response and diagnosis

- 24/7 customer hotline services
- Problem diagnosis
- Troubleshooting

Regular inspections and visits

- Assessing LightWAN product stability, availability, security
- Give a solutions and recommendations
- Provide inspection report

Technical document support

- Installation instructions
- Operation manual
- Upgrade instructions
- Routine maintenance manual

System upgrade

- Notice updated version with new features
- Notice optimized performance
- Free update during service period
- Technical training

Customer Service Center

LightWAN

24/7 Service Hotlines

North America
888-473-1388

South Korea
003-0864-0156

Others
+86-29-81157308

Mainland China
400-606-6118

24/7 Remote Diagnosis
- Telephone response service；Remote problem diagnosis；Remote troubleshooting
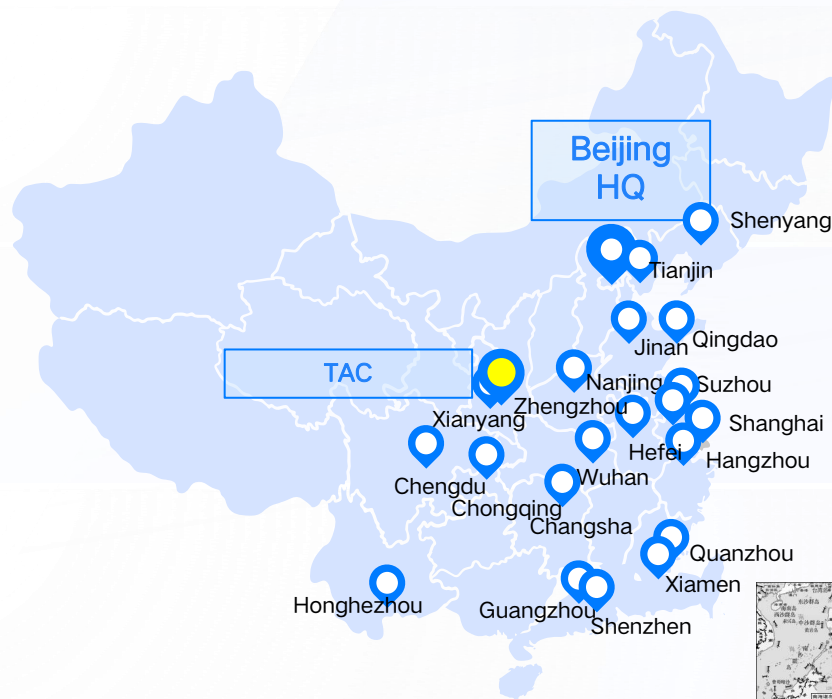
24/7 Platform Inspection
- Inspection on service stability, availability and security. Providing problem solutions and network recommendations.
- Services performance tuning.

Instant Message (IM) Response
- Immediate response to service queries. Dedicated technical support providing exclusive services. Proactive services: regular care, early alert services, etc.

Service Area in Mainland China

LightWAN

Beijing HQ

TAC

Shenyang
Tianjin
Jinan Qingdao
Nanjing Suzhou
Zhengzhou
Xianyang Shanghai
Hefei Hangzhou
Chengdu Wuhan
Chongqing
Changsha
Quanzhou
Xiamen
Honghezhou
Guangzhou
Shenzhen

Technical Engineer Teams
- Located in 22 cities in China

Partners and Service Resources Cover Prefecture-Level Cities
- 150+ certified service engineers
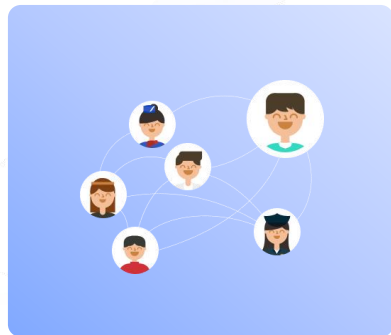- 20+ certified senior engineers

Spare Parts Centers
- 17 Spare Parts Centers in China

Global Service Areas

- On-site implementation and logistics services available

Finland
Sweden
Russia
UK
Germany
Ireland Poland
Netherlands
Belgium Czech Republic
Luxembourg
France Hungary
Switzerland
Italy
Spain Turkey
Kazakhstan
Japan
South Korea
Egypt
Niger Pakistan Myanmar
Chad UAE India Laos
Saudi Arabia Thailand Vietnam
Ghana Djibouti Cambodia Philippines
Nigeria Malaysia Brunei
Cote d'Ivoire Singapore
Congo Kenya Indonesia
Tanzania
Mauritius
South Africa
Australia
New Zealand
Canada
USA
Mexico
Brazil
Chile

Solutions & Successful Cases

LightWAN

LightWAN Solutions

Enterprise Networking

Hybrid HQ-Branch
interconnection
Accessing data
center/cloud
PC/mobile client access
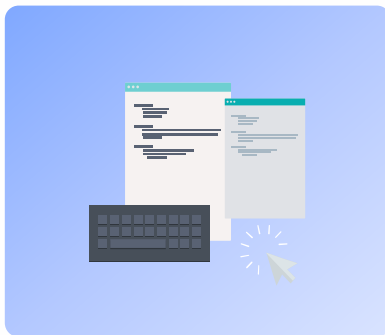
SaaS Access Express

Accelerating access to SaaS
applications (Office365,
Salesforce, Oracle, Workday)
Accelerating access to
enterprises' own applications

IoT/IIoT

IT/OT integration
Remotely manage hardware
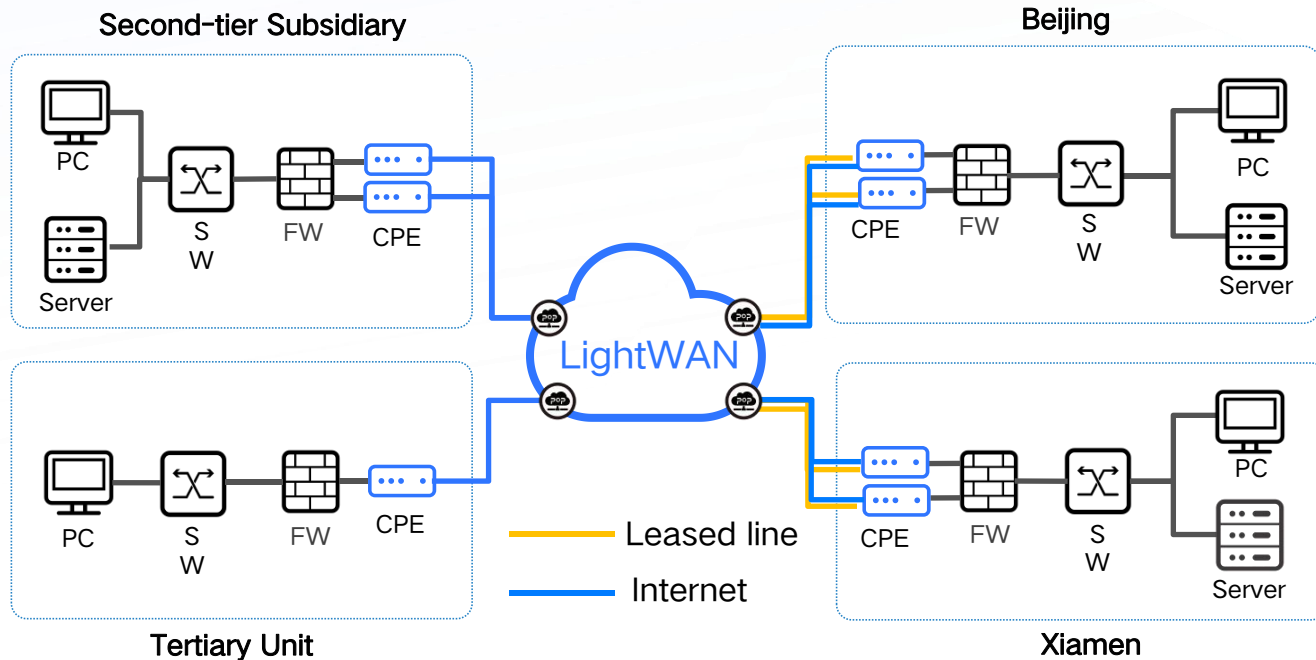devices and intelligent inspection
5G networking and SD-WAN
redundant links

Networking for Enterprise
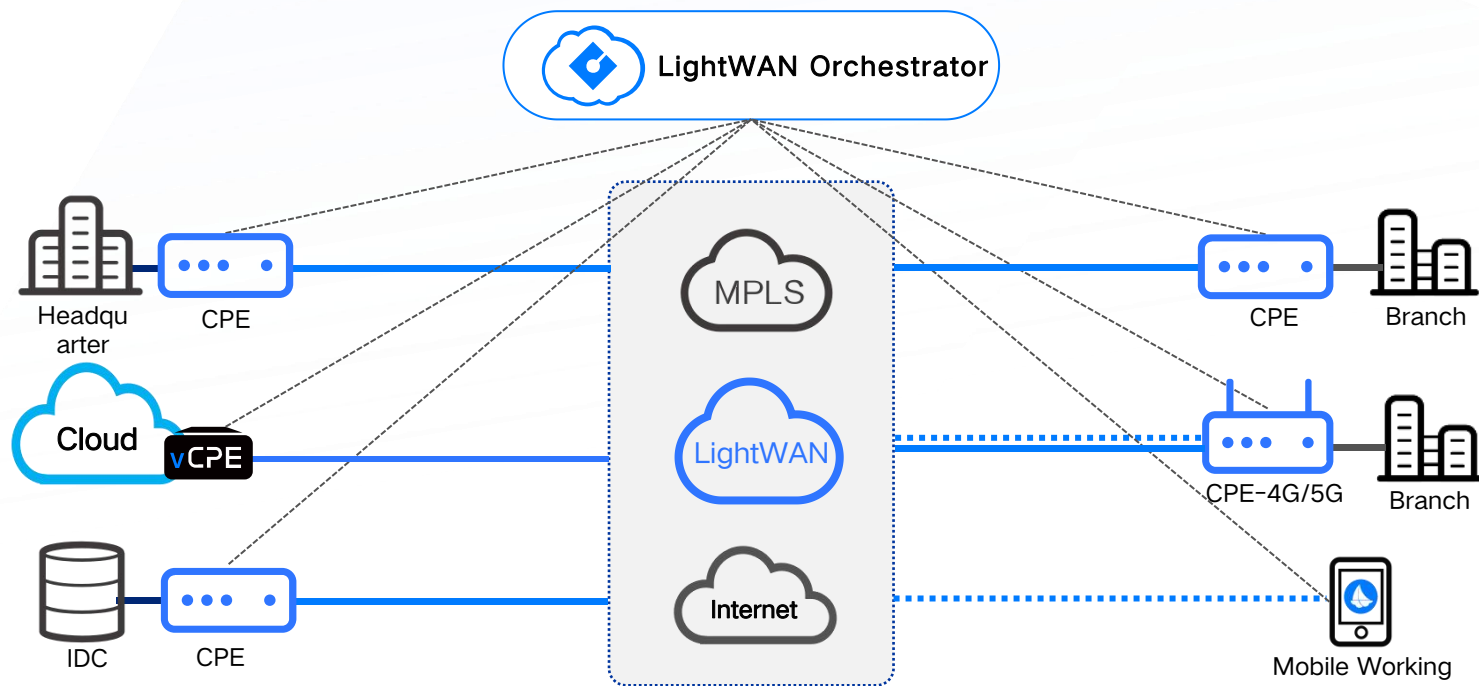
Networking for a Central State-Owned Enterprise

Customer Requirements

- Branch networking
- Rapid and flexible deployment
- Ensure data security and application access efficiency
- Visualized management of network

Customer Benefits

- Rapid and efficient networking
- Centralized management and control
- Improved O&M efficiency
- Visualized management and monitoring

Second-tier Subsidiary

PC

Server

SW

FW

CPE

Beijing

CPE

FW

SW

PC

Server

LightWAN

Tertiary Unit

PC

SW

FW

CPE

Xiamen

CPE

FW

SW

PC

Server

— Leased line

— Internet

Networking for an Automobile Group

Customer Requirements

- Network interconnection between the Group and more than 300 investment companies and cooperative units;

- Network interconnection between data centers and clouds;

- Without deploying any hardware devices, global partners are able to access business system after authorization.

- Unified management of leased lines and Internet links

- Reduce networking cost

Customer Benefits

- Build up and facilitate a Group dedicated network 3.0 globally with LightWAN

- Group's intelligent O&M guaranteed by visualized management of network and smart traffic steering

- Reduce 30% cost on lease lines
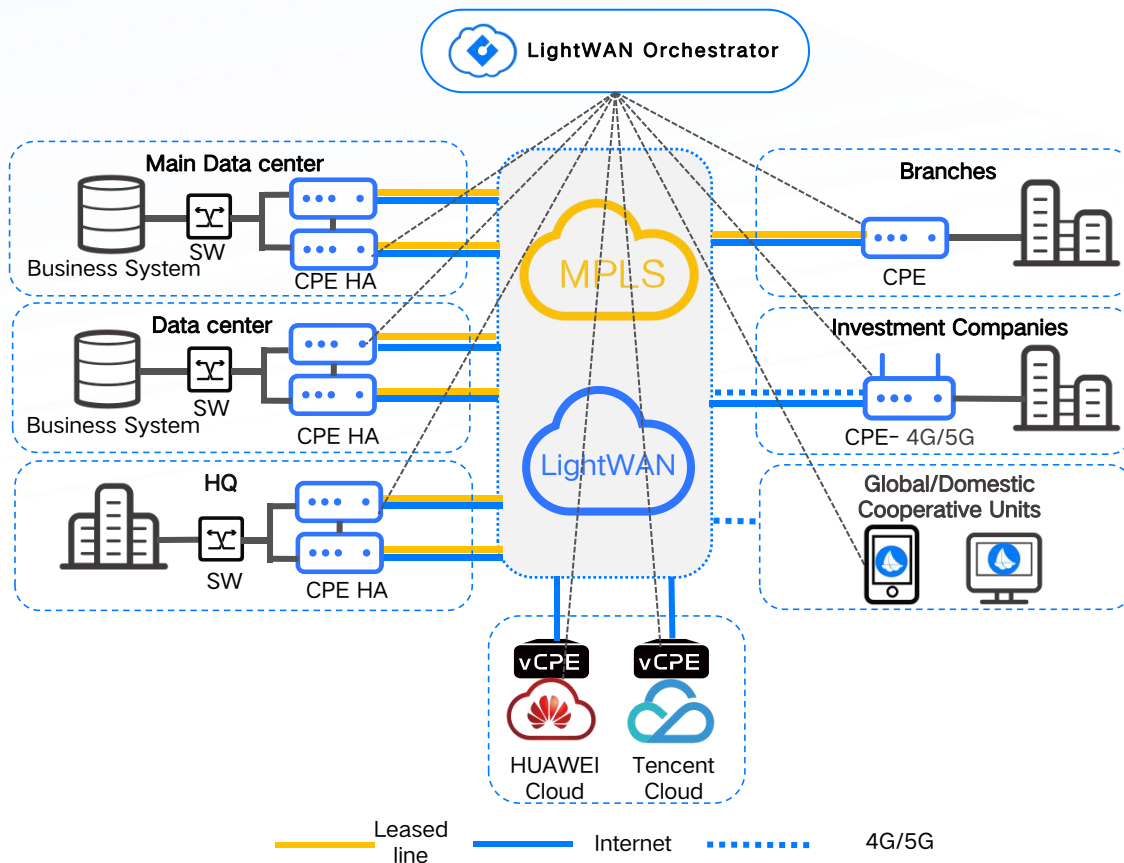
Cross-Border Networking for a Manufacturer

LightWAN

Customer Requirements

- Allowing branches overseas to access OA and ERP systems at headquarters
- Lowering the cost of cross-border MPLS
- Simplifying O&M operations
- Ensuring business system access efficiency and staff experience

Customer Benefits

- Improved link quality and work efficiency
- Deployed in one day
- Visualized management and lowered O&M cost
- Lowered cost of cross-border leased line
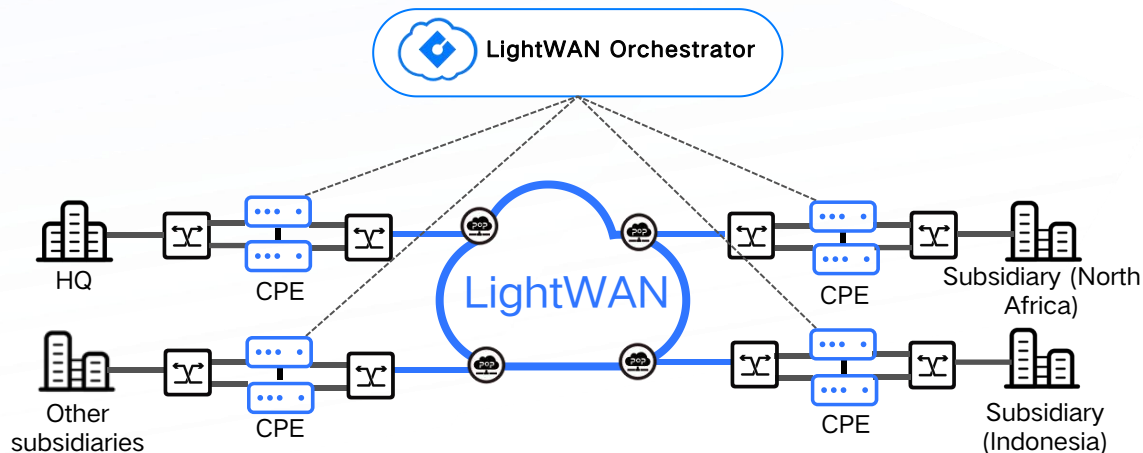
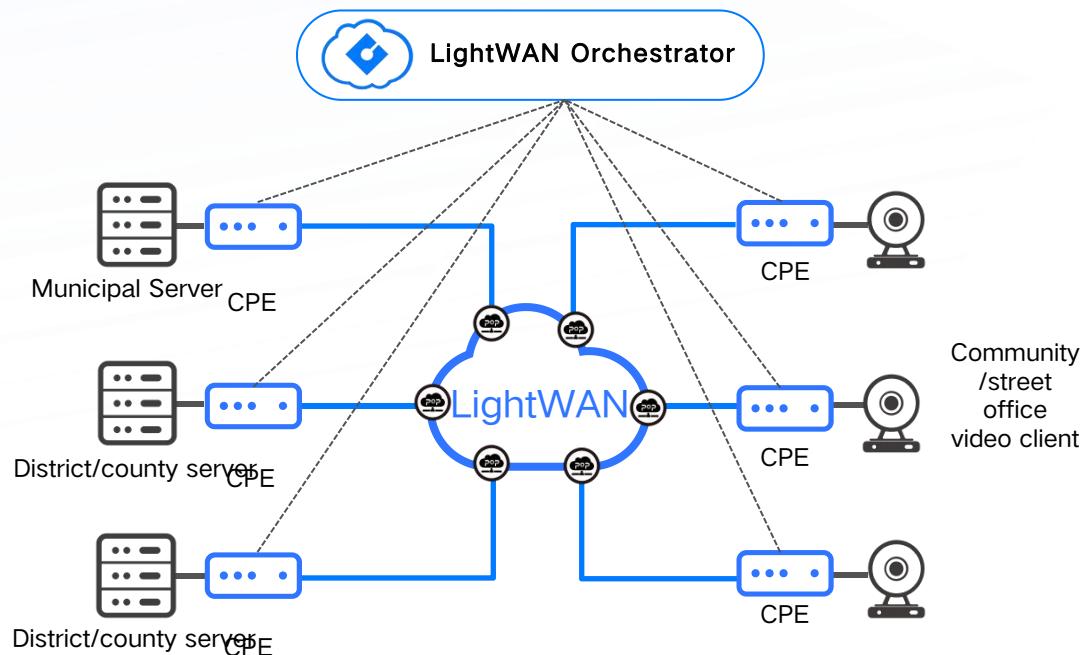| Test item		Internet	LightWAN
Indonesia – Beijing	Latency when accessing OA	231ms	92ms
	File download speed	155Kbps	1.2Mbps
South Africa – Beijing	Latency when accessing OA	350ms	216ms
	File download speed	35Kbps	1.1Mbps

Municipal Networking for a Government Project

Customer Requirements

- The partner's equipment is interconnected with more than 4,000 point platforms in each community and each point needs to be interconnected with the second layer server

- Video conferencing is smooth with High Definition

- Rapid and flexible deployment

- Unified management of the whole network visualization

Customer Benefits

- Clear and smooth video conferencing ensured by private communication protocol on layer 2 network

- guaranteed by optimal communication protocols

- Rapid network access to old communities

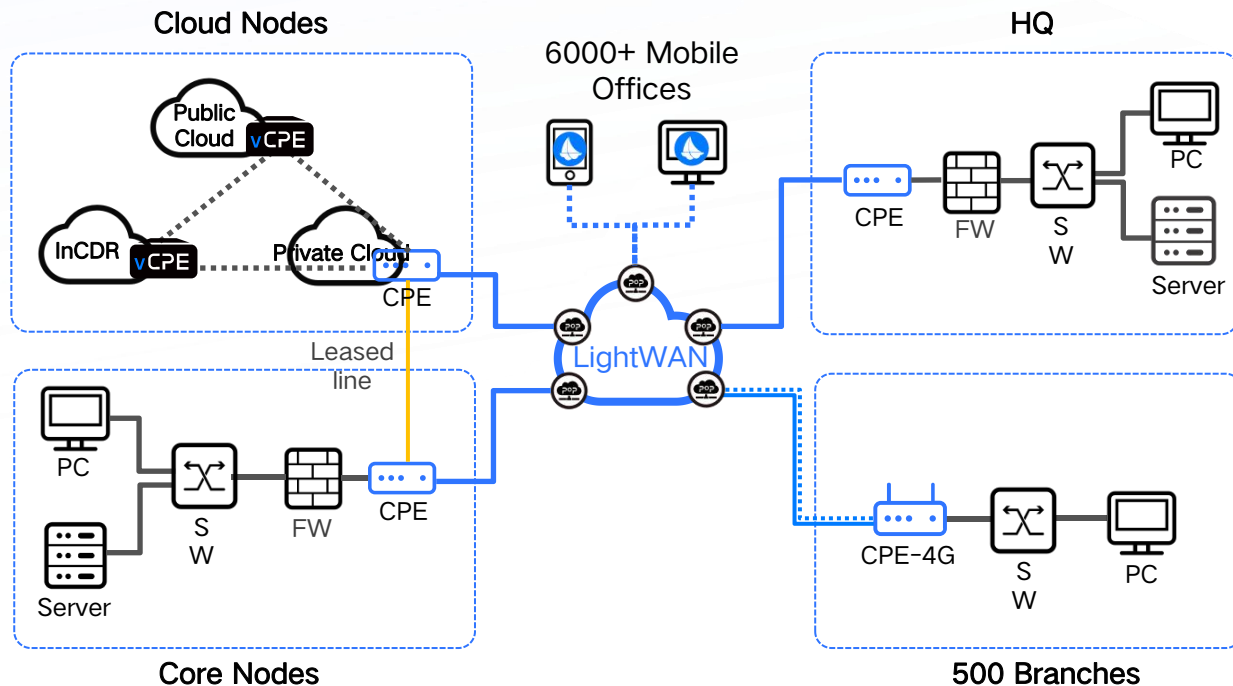- Unified control, improve operation and maintenance efficiency

LightWAN Orchestrator

Municipal Server   CPE

District/county server   CPE

District/county server   CPE

CPE

CPE

CPE

LightWAN

Community /street office video client

Multi-Cloud Interconnection and Networking for a Large-scale Enterprise

Customer Requirements

- Intranet interoperability between domestic headquarters and branches
- Multi-cloud interconnection
- Multi-link unified control
- Visual management of the whole network

Customer Benefits

- Nationwide 500 branch network interconnection within one month
- Intelligent SLA to ensure link stability
- Visual management and monitoring of the whole network to improve the efficiency of operation and maintenance
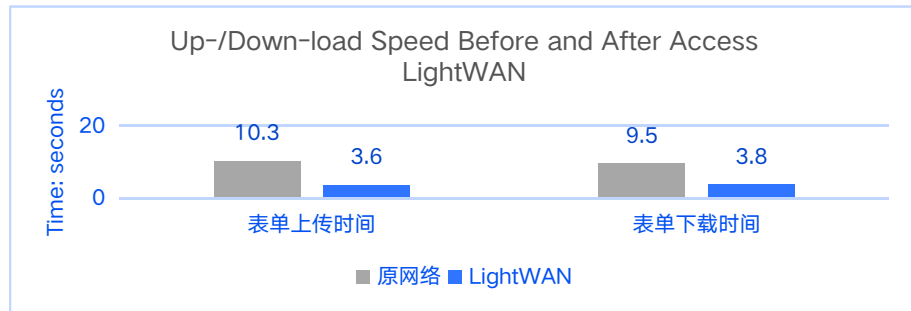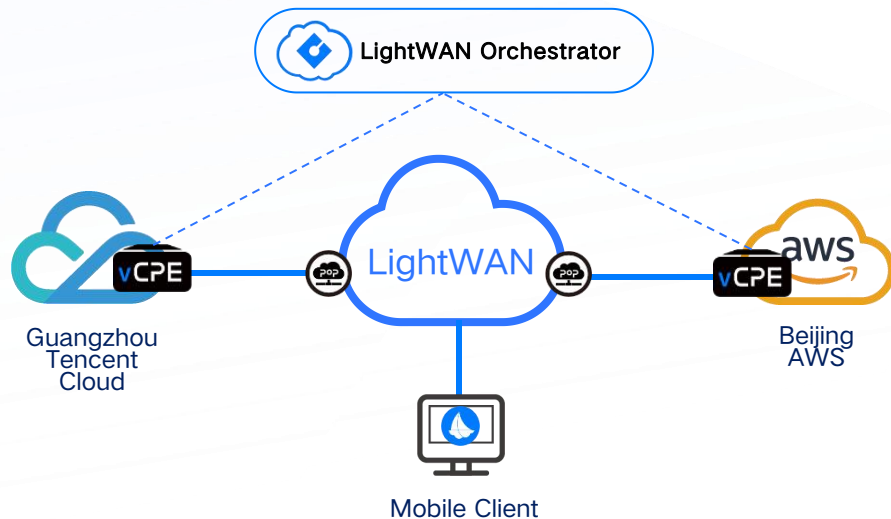

Cloud Nodes

Public Cloud vCPE

InCDR vCPE

Private Cloud CPE

Leased line

6000+ Mobile Offices

LightWAN

Core Nodes

PC

SW

Server

FW

CPE

HQ

CPE

FW

SW

PC

Server

500 Branches

CPE-4G

SW

PC

Heterogeneous Clouds Networking for Architectural Firm

Customer Requirements

- Multi-cloud connectivity
- Mobile user access Tencent Cloud and AWS Cloud for intranet business system
- Ensure data security
- Simple and effective management of the whole network

Customer Benefits

- On-demand bandwidth modification with fast service delivery
- Ensure intranet data security and transmission
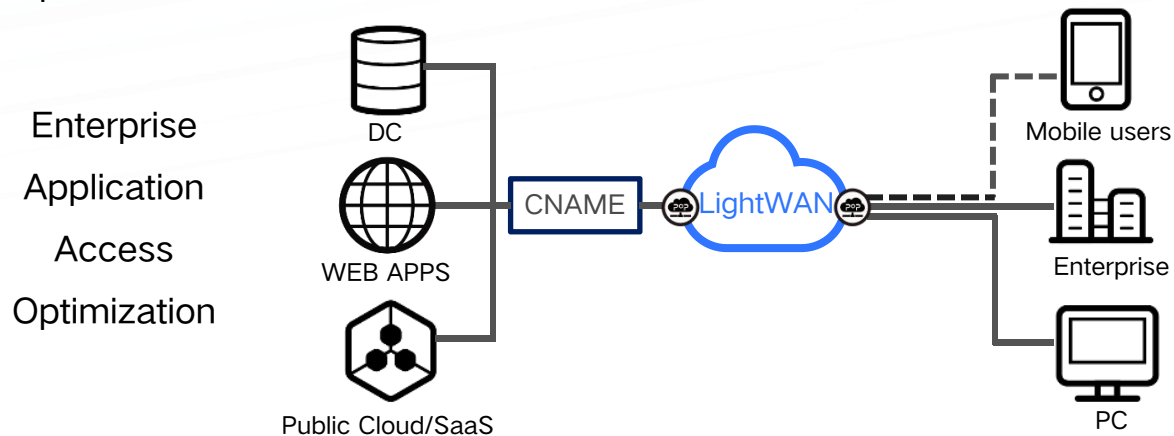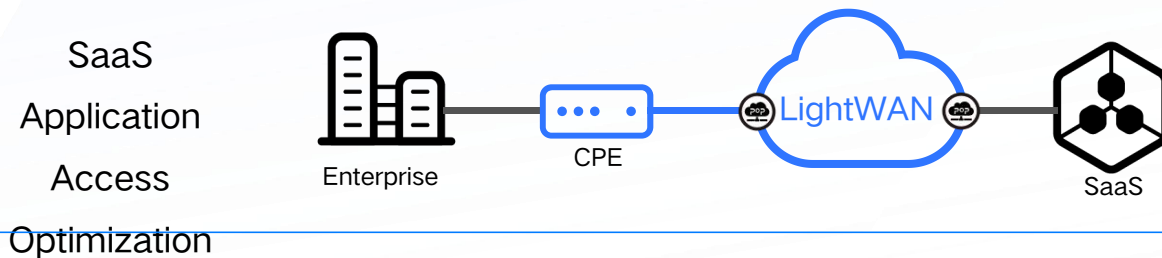- Visual management and monitoring of the whole network

LightWAN Orchestrator

Guangzhou Tencent Cloud — LightWAN — Beijing AWS

Mobile Client

Up-/Down-load Speed Before and After Access LightWAN

Time: seconds

	表单上传时间	表单下载时间
原网络	10.3	9.5
LightWAN	3.6	3.8

■ 原网络 ■ LightWAN

Customers of Enterprise Networking Solutions

SaaS Access Optimization

SaaS Application Access Optimization

Enterprise — CPE — LightWAN — SaaS

Enterprise Application Access Optimization

DC / WEB APPS / Public Cloud/SaaS — CNAME — LightWAN — Mobile users / Enterprise / PC

www.lightwan.com.cn

SaaS Access Optimization for a Large Enterprise

Customer Requirements

- Improve the efficiency of branches abroad to access the application system in Beijing headquarters
- Fast deployment, short delivery cycle, and simplified operation and maintenance

Customer Benefits

- Deploy and implement without modifying branch network structure
- Branch access time to the headquarters application server is greatly reduced, and the access experience is significantly improved
- 24/7 proactive operation and maintenance service 24/7 proactive operation hours and operation service maintenance with effortless operation and maintenance
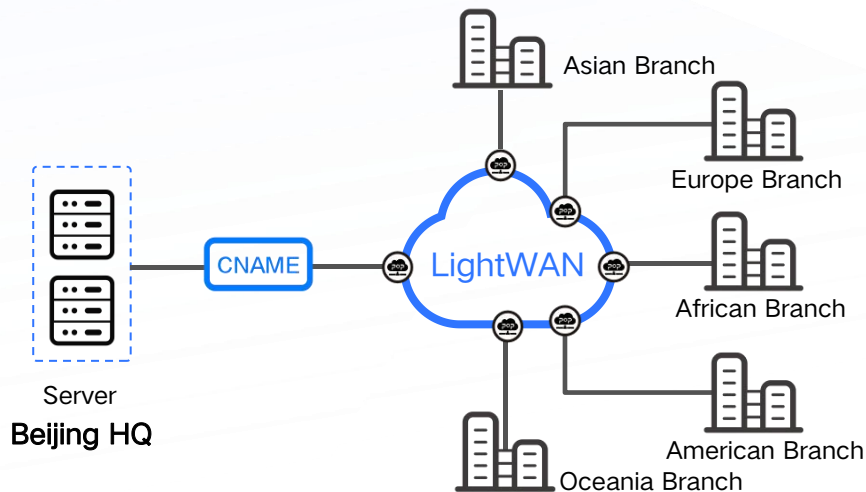
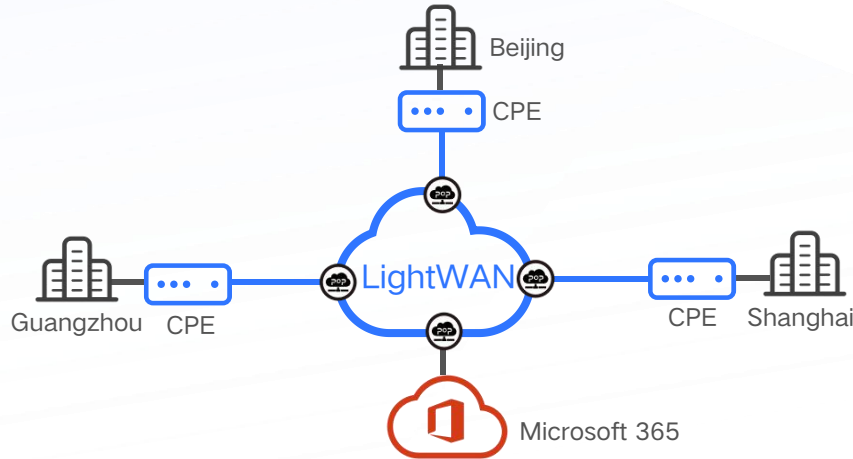| Latency	Internet	LightWAN
Dubai–Beijing	267ms	176ms
Japan–Beijing	183ms	67ms
Cambodia–Beijing	332ms	104ms
Australia–Beijing	314ms	168ms

Microsoft 365 Optimization for a Telecom Equipment Manufacturer

Customer Requirements

- Improving Chinese staff's experiences of Microsoft 365

Customer Benefits

- Improved Microsoft 365 access experience and work efficiency

  HD and smooth video conferencing on Teams

- Visualized management for improved operation and maintenance efficiency

Test Item	Internet	LightWAN
Skype/Teams	Lagging & unclear picture	Smooth & HD
Exchange Online (time to download 30MB file)	58–180s	9s
OneDrive for Business (time to download 30MB file)	80–201s	6s
Teams (latency)	289ms	53ms
Outlook (packet loss rate)	5%	0.6%
SharePoint (packet loss rate)	6%	0.5%

SaaS Access Optimization for a Famous Electrical Company

Customer Requirements

- Speed up international business access for employees in all branches

- Improve the access efficiency of Microsoft 365

- Optimize Teams video conferencing experience for smooth operation
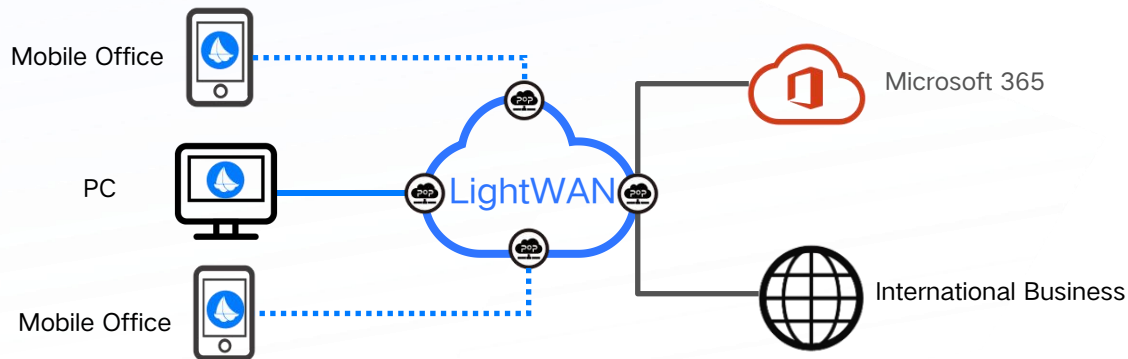
Customer Benefits

- Significant improvement in user experience of Microsoft 365 access and work efficiency

- Clear and smooth video conferencing with Teams

- Improved the efficiency and stability of own business access

- Support visual management of the whole network, reducing operation and maintenance costs

SaaS Application	Internet		LightWAN	
	Latency	Packet Loss Rate	Latency	Packet Loss Rate
Teams	58.4ms	3%	56.1ms	0
Exchange	72.3ms	2%	51.7ms	0
Salesforce	227.8ms	1%	95ms	0
International Business 1	289.9ms	12%	199.6ms	0
International Business 2	266.6ms	25%	220.9ms	0

Video Conferencing Optimization for High School

LightWAN

Customer Requirements

- Cross-border Zoom video conferencing optimization

Customer Benefits

- Save costs for cross-border Internet access

- Optimal cross-border Internet quality and smooth video conferencing

Xiamen School   CPE   POP (Fuzhou)   LightWAN   POP (Hong Kong)   SaaS Video Conferencing Apps

SaaS Access Optimization for a Computer Manufacturer

LightWAN

Customer Requirements

- Improve the access efficiency of Microsoft 365

- Optimize Zoom video conferencing experience for smooth operation
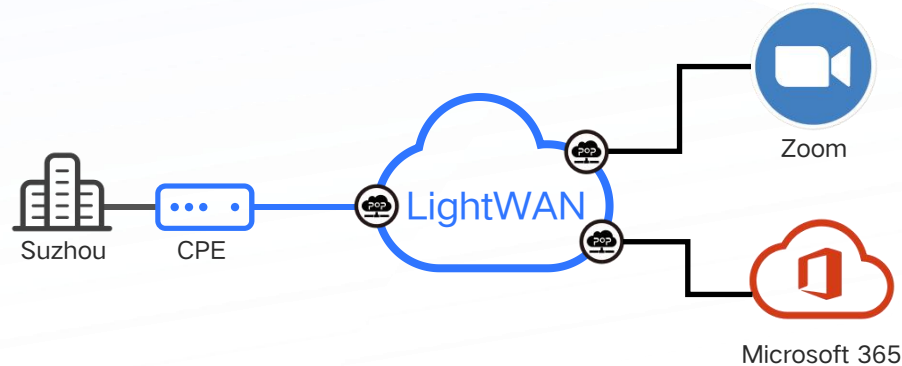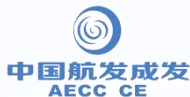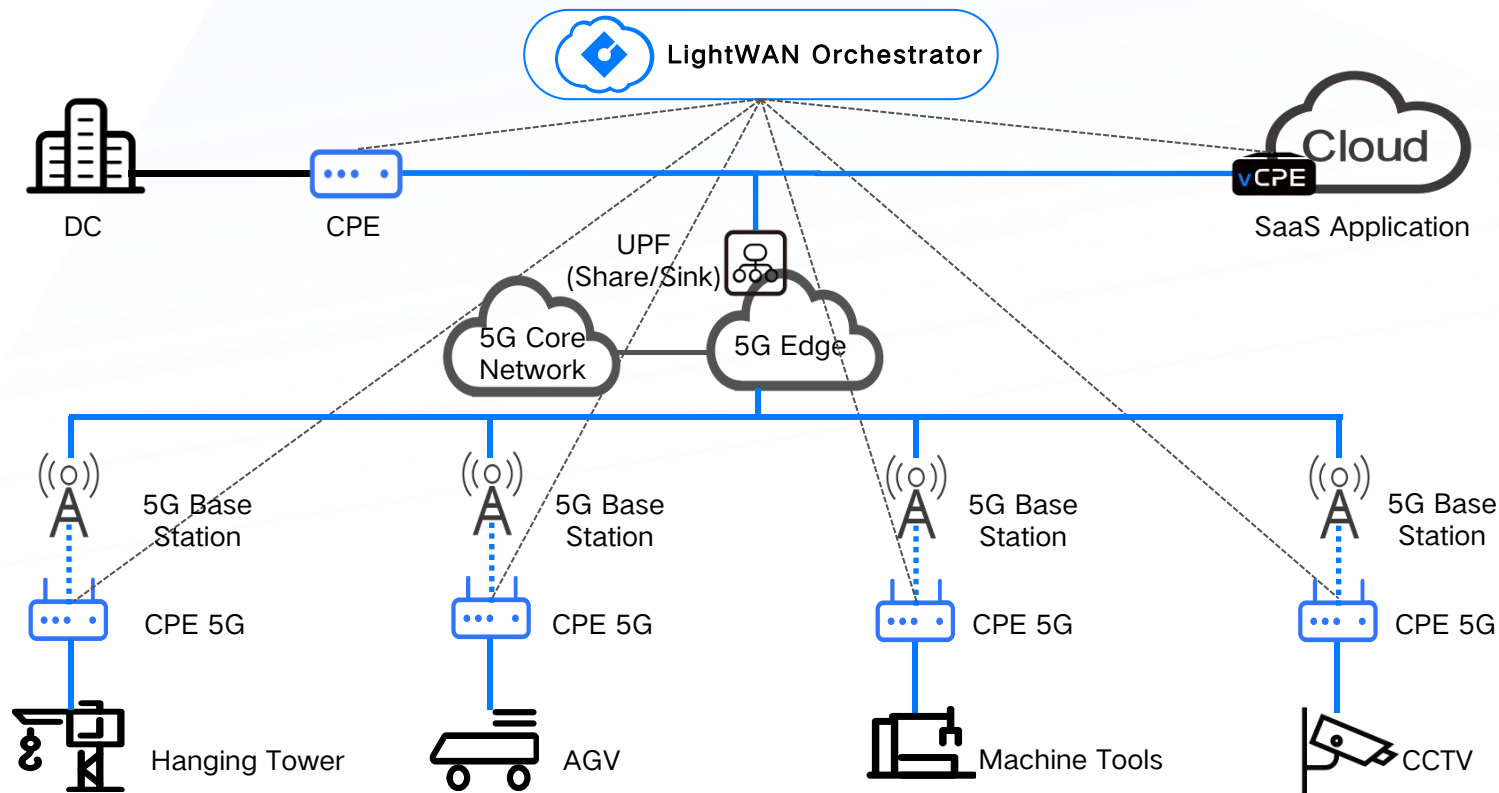

Customer Benefits

- Significant improvement in user experience of SaaS application access and work efficiency

- Video conferencing is smooth with High Definition

- Visualized management for improved operation and maintenance efficiency

Item	Internet	LightWAN
Zoom	Lagging, mosaic	High Definition and smooth
Outlook (time to receive an email)	10-20min	10s
Teams (latency)	289ms	53ms
Outlook (packet loss rate)	5%	0.6%

Customers of SaaS Access Optimization Solutions

IoT/IIoT

LightWAN

LightWAN Orchestrator

DC — CPE

Cloud

vCPE

SaaS Application

UPF (Share/Sink)

5G Core Network — 5G Edge

5G Base Station — CPE 5G — Hanging Tower

5G Base Station — CPE 5G — AGV

5G Base Station — CPE 5G — Machine Tools
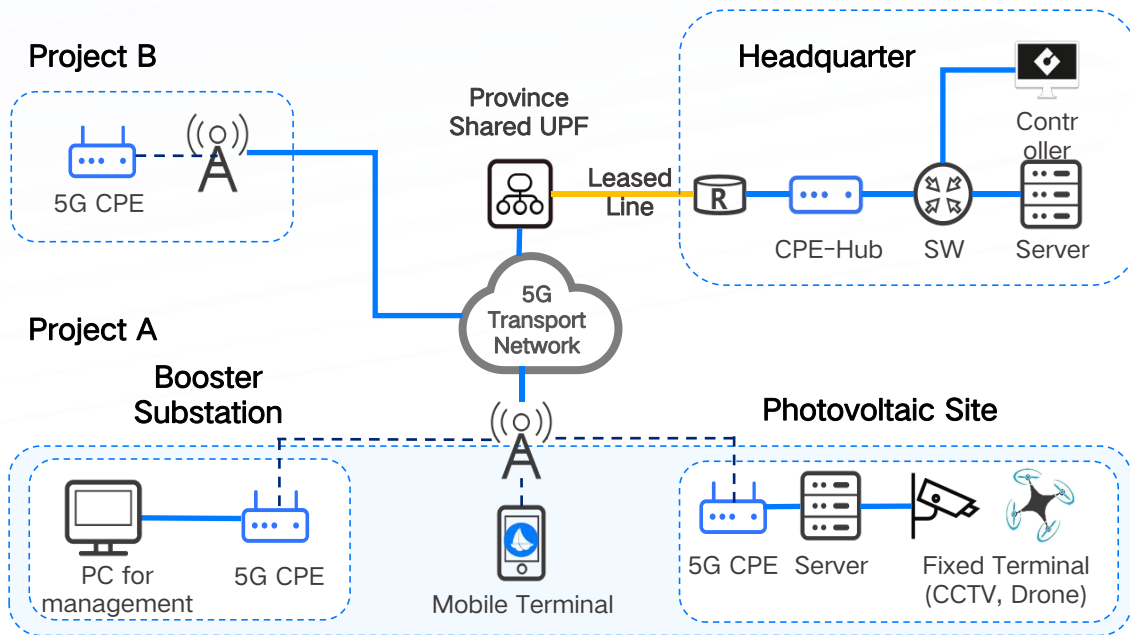
5G Base Station — CPE 5G — CCTV

5G IoT + Intelligent Inspection

Customer Requirements

- Centralized networking
- Avoid costly and difficult wired networking with long cycle
- Improve operations and maintenance efficiency
- Visualized and unified management platform

Customer Benefits

- Building a 5G private network significantly saves the cost of network construction
- WAN Optimization improves the transmission efficiency and stability of 5G wireless network
- Zero-touch deployment
- Visual unified management and control platform, greatly lighten the operation and maintenance workload of IT personnel
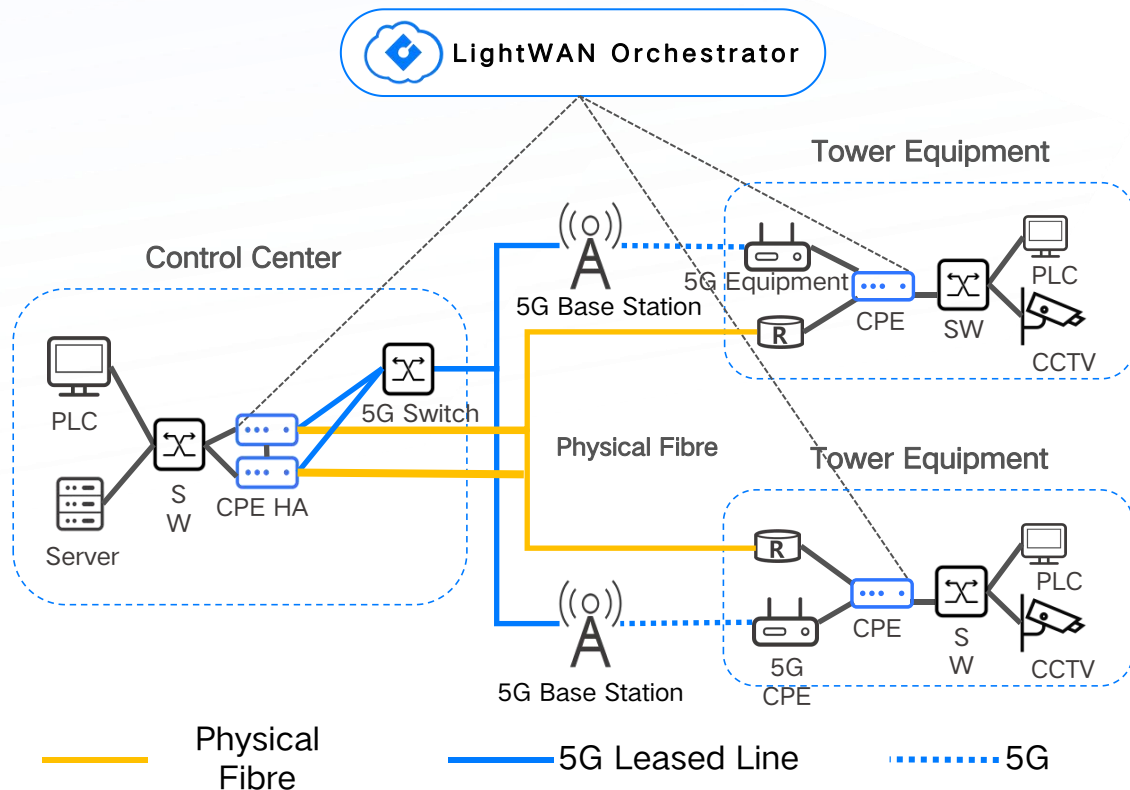
Project B

5G CPE

Project A

Booster Substation

PC for management
5G CPE

Mobile Terminal

Province Shared UPF

Leased Line

5G Transport Network

Headquarter

CPE-Hub
SW
Server
Controller

Photovoltaic Site

5G CPE
Server
Fixed Terminal (CCTV, Drone)

5G+ IoT Networking for a Smart Harbor in Xiamen

Customer Requirements

- Intelligent wireless remote control of equipment and reduce operational burden on operators

- Layer 2 protocol transmission based on Ethernet interfaces

- Optimal transmission of PLC instructions and continues equipment operation; stable transmission of smooth CCTV videos

Customer Benefits

- 5G+LightWAN networking covers all equipment so as to reduce work accident

- Comparing to physical fibre, our unique Layer 2 Networking technology (like virtual fibre) is more qualified and cost-effective

- Optimal 5G transmission ensures the delivery of PLC instructions and smooth video playback, supported by features such as multi-sending, selective receiving, smart traffic steering, and WAN optimization technologies. These technologies enhance business operations and improve work efficiency.

Private 5G Backup Link for a Government Project

Customer Requirements

- Secure and private 5G network for 30+ governmental offices

- Unstable network connection (need backup links)

- Switch route to private 5G network when network interruption occurs

- Highly stable and secure data transmission

Customer Benefits

- 5G+LightWAN networking facilitates the establishment of private 5G network for a backup solution

- Unified management and seamless switch of 5G leased line and physical fibre line to provide convenience for governmental services

- Orchestrator controls data transmission through private 5G network with end-to-end data encryption, to guarantee data security
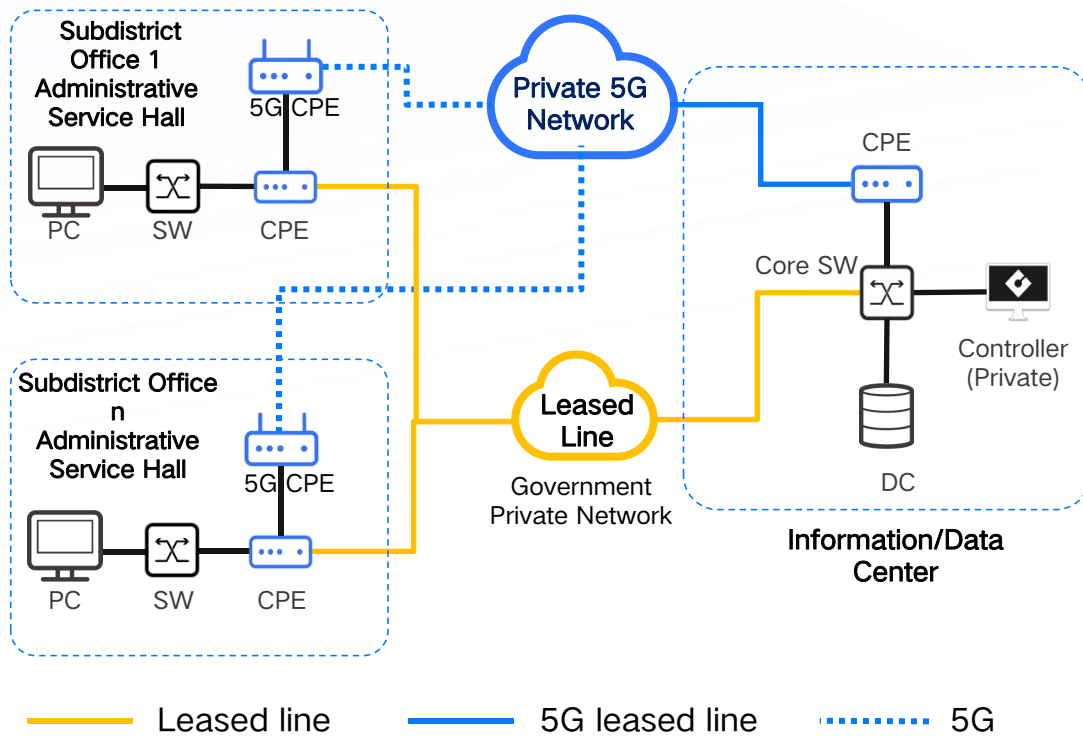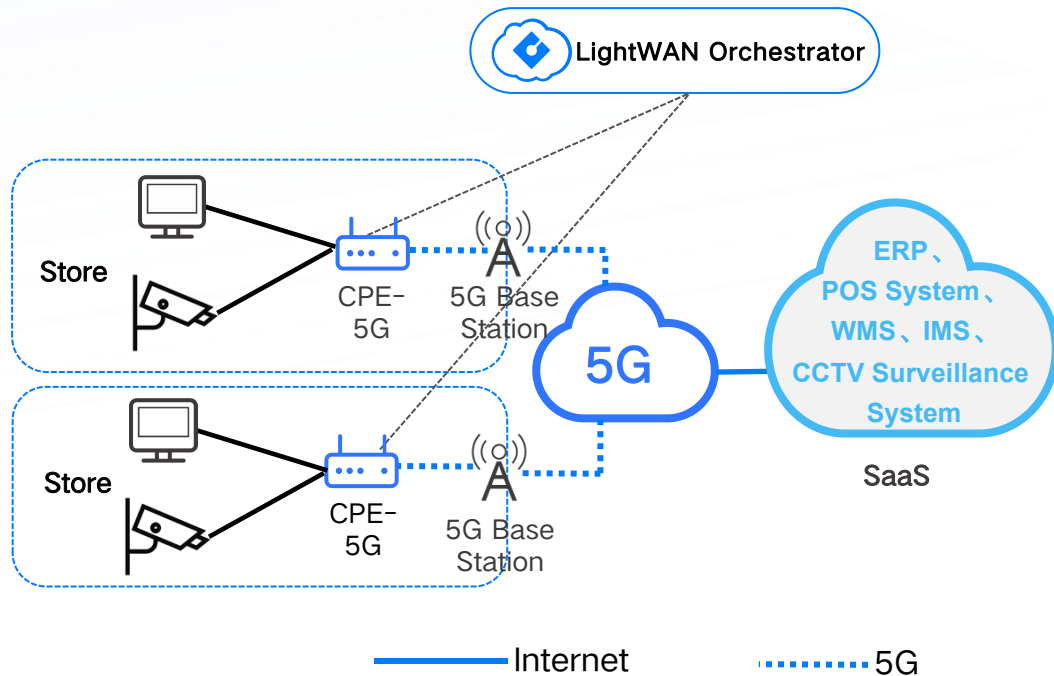
5G IoT for an Chain Business

LightWAN

Customer Requirements

- Solve business disruptions resulting from insufficient ADSL upstream bandwidth
- Reduce costs on leased line
- Fast networking across expanding store locations
- Boost efficiency in IT operations and maintenance

Customer Benefits

- Rapid data upload speed increasing work performance
- Save over 50% costs by replacing leased line with 5G
- Zero-touch provisioning, plug-and-play service, and fast activate our service in 10 days across hundreds of stores
- Visualized and unified control platform, significantly reducing IT staff's operation and maintenance work

LightWAN Orchestrator

Store
CPE-5G
5G Base Station

Store
CPE-5G
5G Base Station

5G

ERP、POS System、WMS、IMS、CCTV Surveillance System

SaaS

Internet 5G

Customers of IoT/IIoT

LightWAN