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Enterprise Requirements about High Reliability and Low Latency in WAN Network

Ruibo Han, China Mobile

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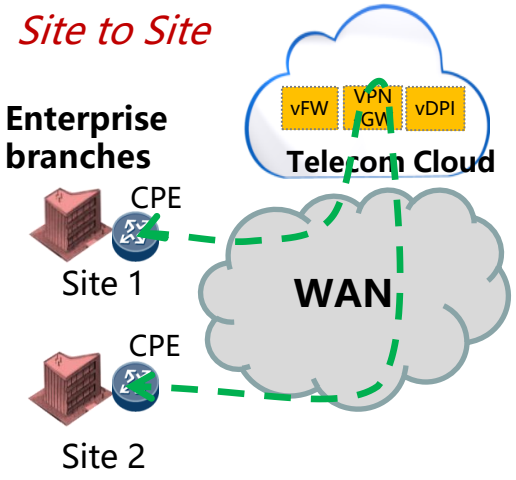
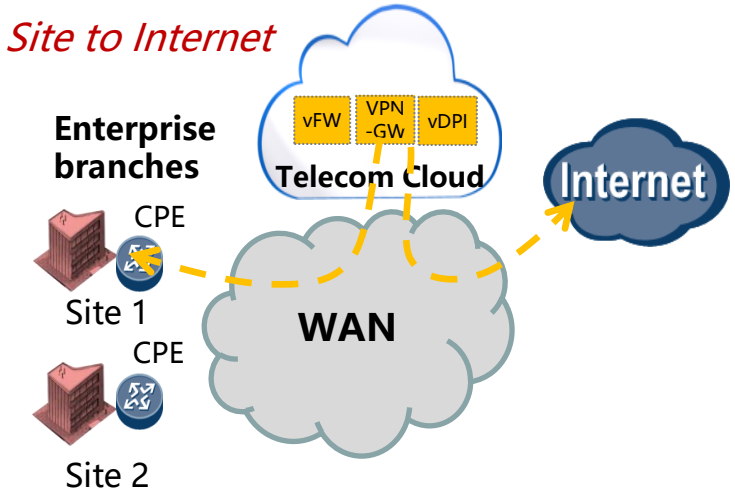
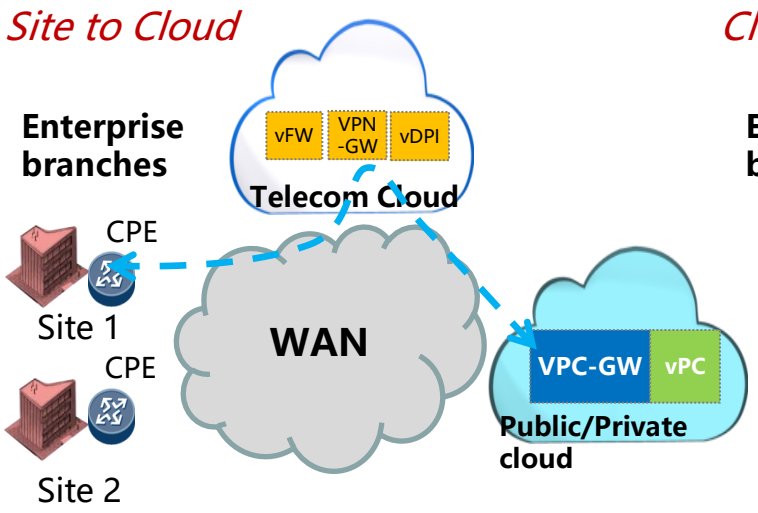
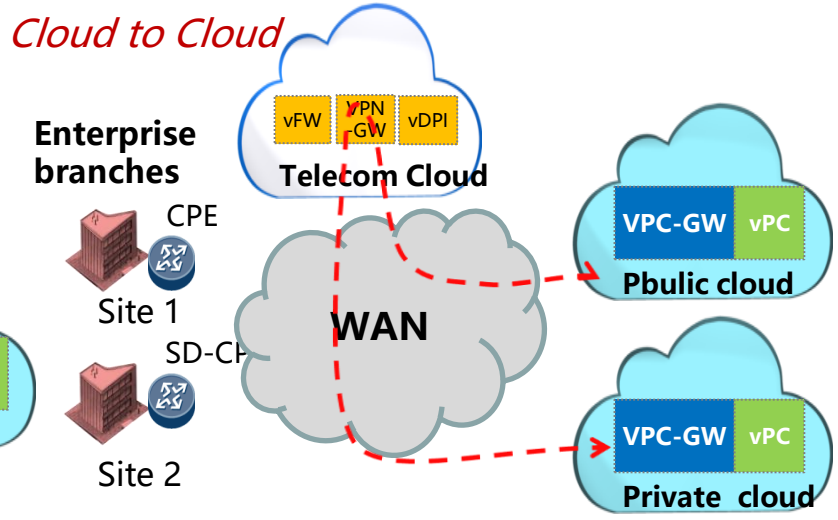
SD-WAN(Software-Defined WAN) Scenarios

Four basic scenarios









Four basic scenarios in Software-Defined WAN,

- Site to site
- Site to internet
- Site to cloud
- Cloud to could

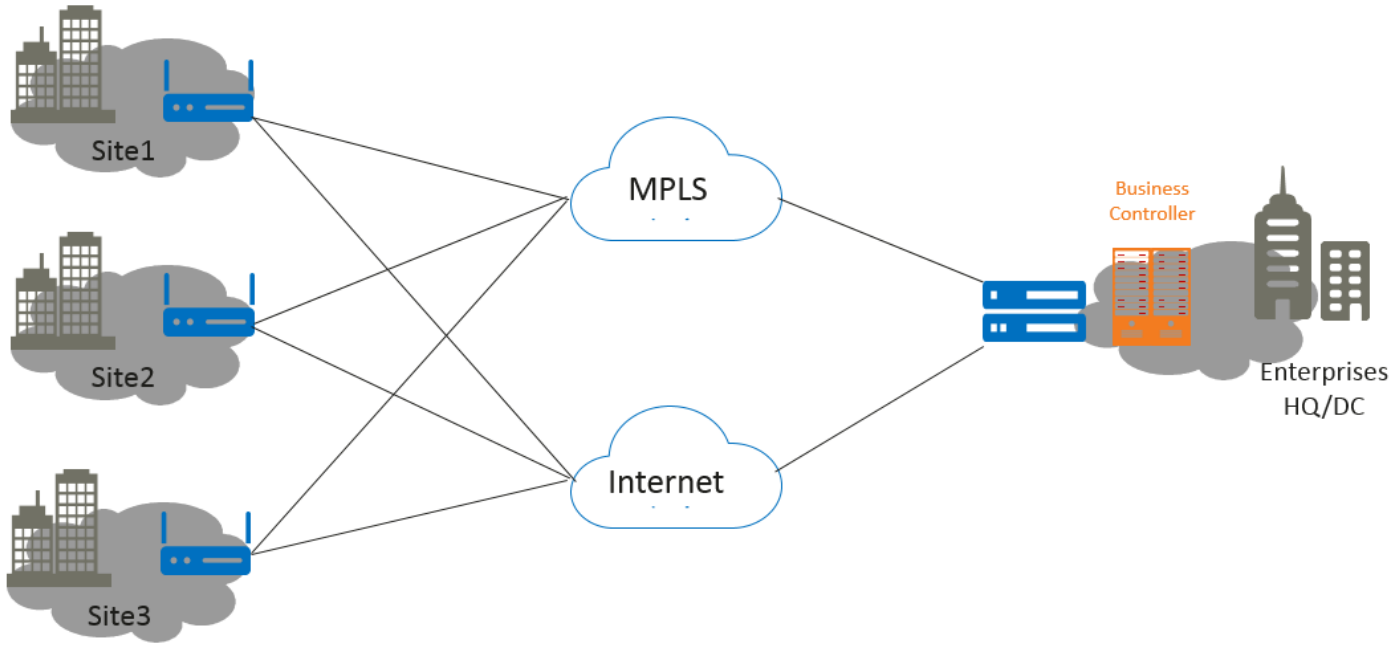
Highly reliable enterprise connections are appealing for service provider networks;

- High resolution video conference;
- 8K video surveillance;
- …

1.High Reliability Requirements Between Branch Site to HQ

- Typically it creates path tunnels over WAN networks between two SD-WAN devices, different internet connections with various quality (PON, 3G/4G, Metro Ethernet, etc.);
- Establish encrypted WAN paths through WAN overlay tunnels;
- User traffic may need to traverse one or more NAT devices (such as BNG/BRAS, etc.);

Reliable Enterprise Connections in SD-WAN Network



It is a tendency to use multiple internet connections for high reliable P2P connections between different remote sites or between branch site and cloud servers, rather than lease line, for better cost-efficiency;

Rough calculation for reliability on multiple IP connections is, with n replication path;

$$R = 1-(1-r_1)*(1-r_2)*(1-r_3) \ .. *(1-r_n);$$ r_1 is reliability on link 1 and so on;

Is there a better way, by using frame replicate and eliminate for reliability?

Possibility of Using 802.1CB FRER over SP network

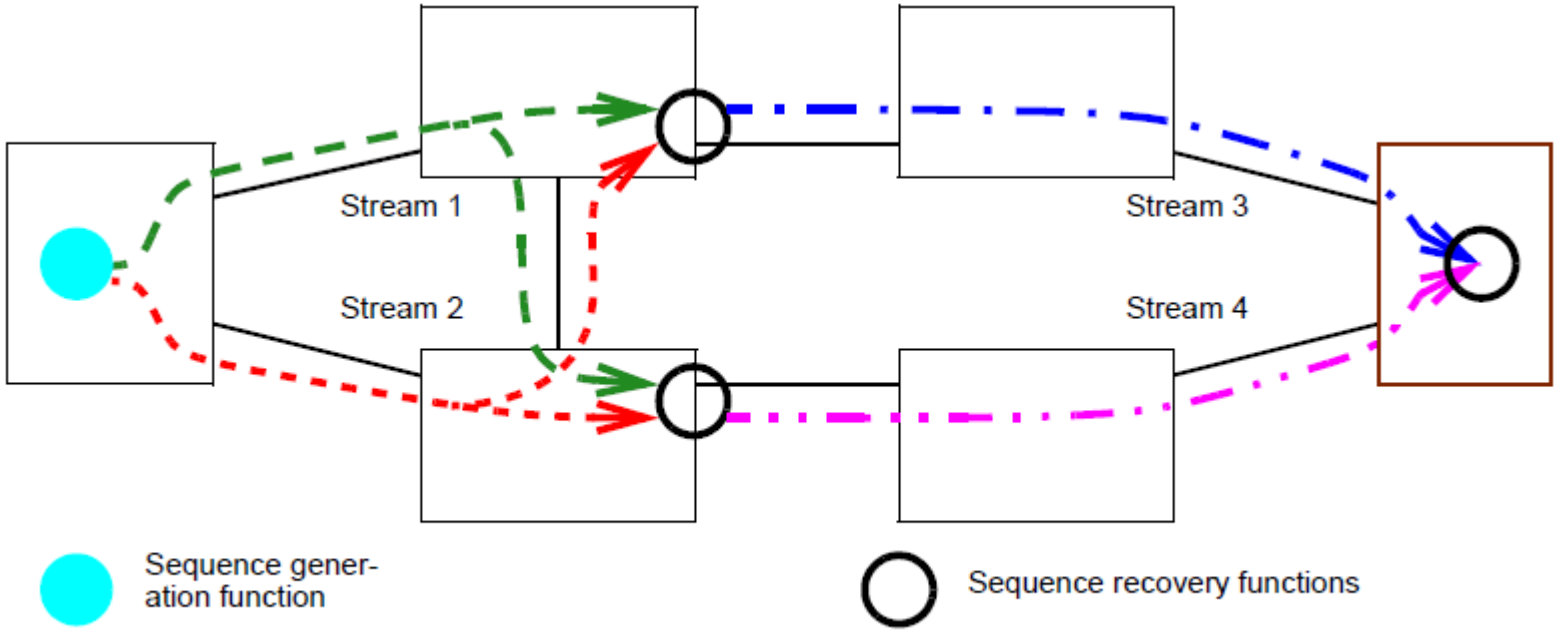


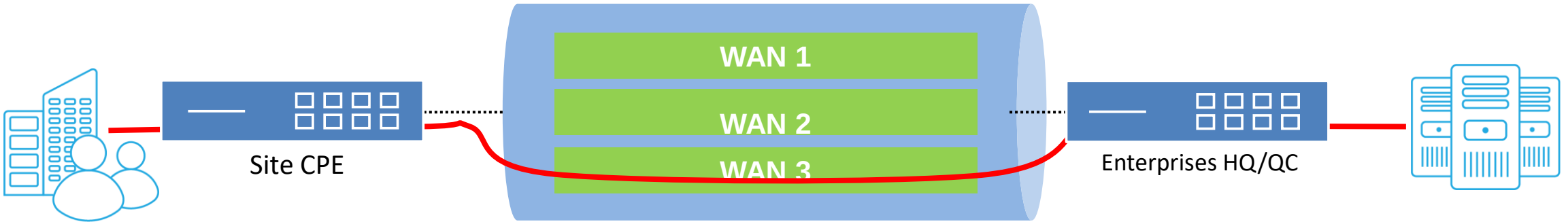
Figure 7-1—Compound Stream built from four Member Streams

Is this a possible solution in L2/L3 protocols?

Is current 802.1CB tags sufficient for enterprises users over encrypted tunnel ?

How to deal with NAT devices in SP network?

2.Low latency Connection Between Branch Site to HQ



- User traffic which needs low latency, can transmit packets on special connections(the red one, may be MPLS, SDH,OTN,etc.)

Scenarios	Latency requirements
CDN	insensitive
ARVR	<15ms
Industrial Automation	<10ms
LTE-V	<20ms
Indoor human localization	<100ms
3D holographic	<20ms (bandwidth 20-100Mbps)

3.Multi Connections with various quality Between Branch Site to HQ

- Different connections with various quality
- User traffic which needs High Reliability，can use FRER on two or more connections(the green two lines，PON, 3G/4G, Metro Ethernet, etc.)
- User traffic which needs Low Latency，can transmit packets on special connections(the red one line, may be MPLS, SDH,OTN,etc.)

Summary

Prefer to have one unified SP network providing multiple solutions with differentiated SLA (latency, reliability);

- Single internet connection
- Multiple internet connections, with FRER capability
- TSN/DetNet/SDH/OTN Connections

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Thank you.

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