# Huawei ISP Integrated Bearer Solution

HUAWEI

Video & Cloud Drive ISP Backbone Network Transformation

◆ Network Architecture Is Evoluting to DC-Centric

Just as the Internet is rapidly transforming traditional industries, video and cloud services are driving networks to evolve to a DC-centric ultra-broadband architecture. DC-centric networks are being constructed wherever data centers (DCs) need to be interconnected.
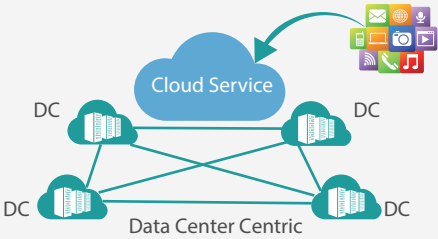

◆ The growing bandwidth demand of the industry is spurring large Internet service providers (ISPs) to construct their own backbone networks.

What Challenges Face ISP?

◆ High Bandwidth

Traffic between DCs grows at a compound annual growth rate (CAGR) of greater than 30%. By 2020, the data center interconnect (DCI) market will reach $4.8 billion (forecasted by Ovum).

Unit: $Billion

■ Backbone ■ Metro ■ Subsea
Source: Ovum
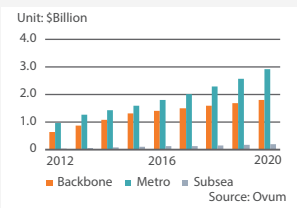
◆ Multi-service Access

The network needs to carry multiple services to meet the requirements of various ISPs.

Unit: $Billion

■ 10M ■ 100M ■ 1G ■ 10G ■ 100G
Source: Ovum
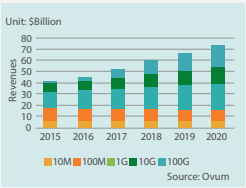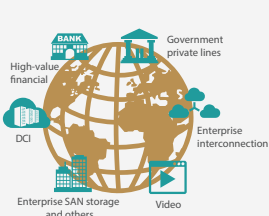
High-speed private lines are rapidly increasing while low-speed private lines are stagnating.

◆ High Reliability

Network availability and reliability are major concerns of ISPs. Reliability has become one of the most important factors for ISPs when evaluating network performance.

◆ Low Latency

Cloud-based services require low latency network.

Desktop cloud
< 30 ms

HD online video
< 20 ms

Intra-city disaster
recovery for DCs < 1 ms

Emerging cloud
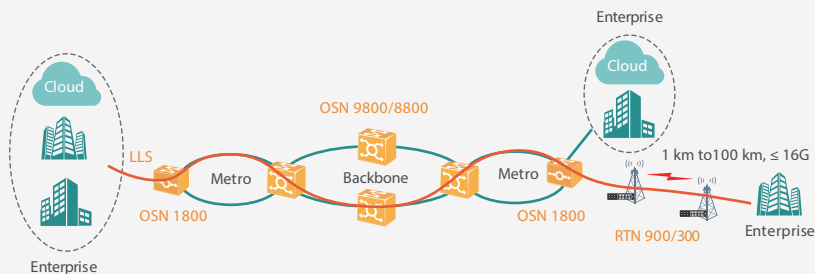(such as IoT and IoV) < 10 ms

Gaming
< 25 ms

High frequency trading (HFT)
in the financial industry < 1 ms

◆ Simplified O&M

Making O&M as simple and efficient as possible is a basic requirement for ISPs without large-scale maintenance teams or specialized communications O&M units.
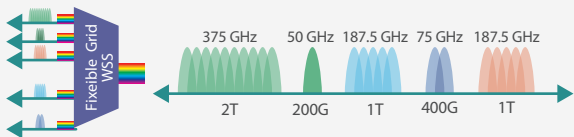
ISP Integrated Bearer Solution

- ◆ Exchanges large amounts of data between DCs in backbone and metro networks.
- ◆ Provides private line services for enterprises in backbone and metro networks. Without optical fibers, IP microwave is the best choice for ISP networks.
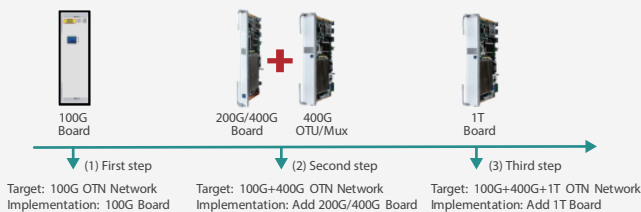
Large Capacity

- ◆ Ultra-high bandwidth & ultra-long haul

  Provides ultra-high bandwidth for DCI and massive data services in the cloud era. The industry's longest transmission distance meets the requirements for cross-region long-haul transmission.

Single-wavelength 100G/200G
Ultra-long-haul transmission of 6000 km without electrical regeneration
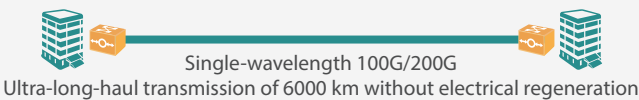
- ◆ Supports Flexible Grid to maximize the system capacity, achieving a maximum single-fiber capacity of 25.6 Tbit/s.

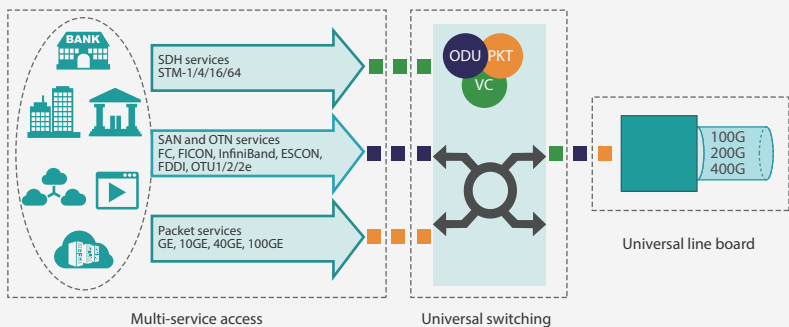- ◆ Supports the smooth evolution from 100G to beyond 100G.

100G Board	200G/400G Board + 400G OTU/Mux	1T Board
(1) First step	(2) Second step	(3) Third step
Target: 100G OTN Network Implementation: 100G Board	Target: 100G+400G OTN Network Implementation: Add 200G/400G Board	Target: 100G+400G+1T OTN Network Implementation: Add 1T Board

Multi-service Access

- ◆ All services are received and transmitted in one box.

SDH services STM-1/4/16/64

SAN and OTN services FC, FICON, InfiniBand, ESCON, FDDI, OTU1/2/2e

Packet services GE, 10GE, 40GE, 100GE

ODU PKT VC

100G 200G 400G

Universal line board

Multi-service access

Universal switching

High Reliability

◆ ASON: provides a reliability of 99.9999% and supports services of different classes to meet different needs.

◆ Protection: provides network-level and equipment-level protection schemes and various security policies.
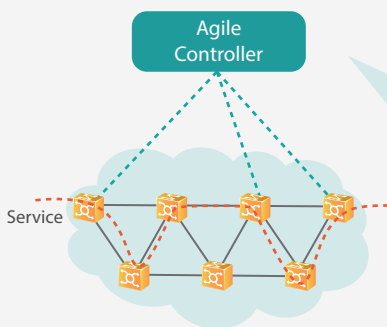
SLA Stores

Diamond
1+1+R < 50 ms
Latency: 50 µs

Silver
Rerouting < 10s
Latency: 1 ms

Copper
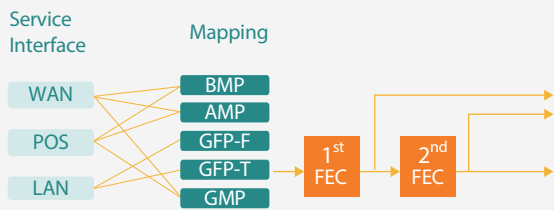No protection
Latency > 5 ms

Agile Controller

Service

- Provides tenants with various SLAs that provide different levels of protection and latency guarantees.
- Sorts out suitable SLAs based on different service requirements.
- Supports ASON with licenses on the OSN platform.

Low Latency

◆ OTN minimizes network latency.

Electrical: minimal latency

OTN   OTN

Optical: zero latency for pass-through
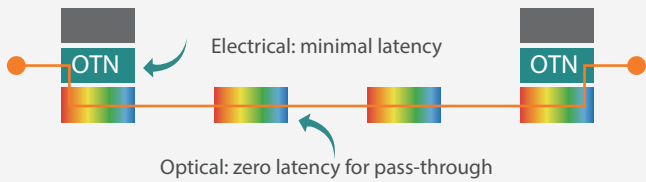
◆ Flexible FEC configuration and optimized encapsulation and mapping shorten single-NE latency from 50 µs to below 10 µs.

Service Interface   Mapping

WAN   BMP
             AMP
POS   GFP-F
             GFP-T   1st FEC   2nd FEC
LAN   GMP

◆ Compared with traditional 10G networks, pure 100G coherent networks do not require dispersion compensation. The latency is reduced by 10%.

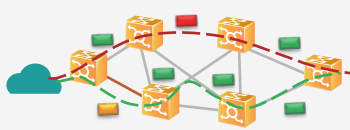◆ Minimum-latency trails are provided to meet requirements of VIP accounts.

12 ms
10 ms
5 ms   5 ms
5 ms   5 ms
         5 ms
5 ms
5 ms
10 ms   Route with the minimum latency
10 ms
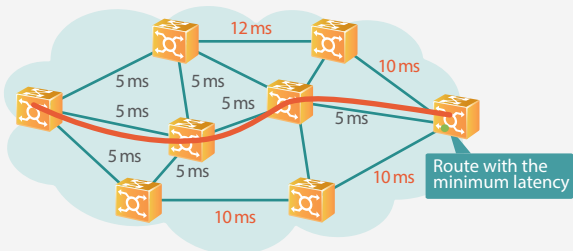
Efficient O&M

Fiber Doctor

✓ Fiber length test
✓ Attenuation test
✓ Fault location
(such as break, bend, and splice)

Black-box

White-box

Invisible and unmanageable

Visible and manageable

Online Monitoring	Wide Range	Fast Troubleshooting	Multi Scenarios
No interference for online services	Measurement range up to 160 km	High measuring accuracy	Legacy and new networks
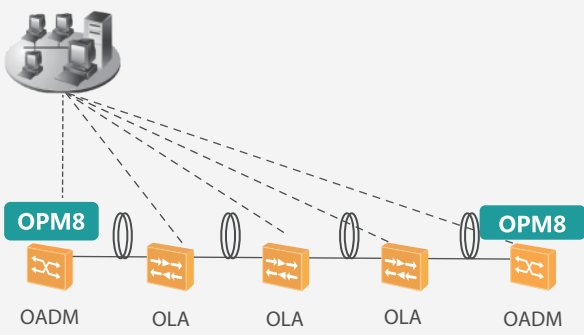
Optical Doctor

OPM8   OPM8

OADM   OLA   OLA   OLA   OADM

Online Monitoring

- Scan and monitor performance online automatically.
- No need for special equipment or manual work.
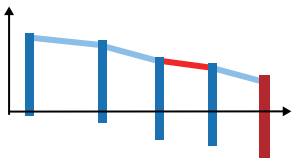
OSNR Detection

Spectrum Waveform
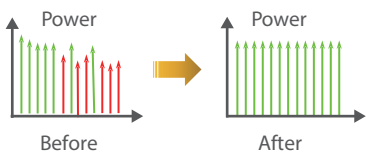dBm
-16
-40
-52
-64
1530/195.943

- The industry's first 100G E2E OSNR detection (including OLA sites).
- ±1 dB precision.

Fault Diagnosis

- Pre-warning for poor sections and OChs.
- User-friendly GUI to display fault sections.

Auto Optimization

Power   Power

Before   After

- Optimize poor OChs automatically after user confirmation.

Product Family

OSN 1800

	1800 I Compact	1800 II Compact	1800 V
Dimensions (H x W x D) (mm)	44 × 442 × 220	88 × 442 × 220	221 × 442 × 224
Electrical Switching Capability	Supports inter-board cross-connections of Any services at a rate lower than 1.25 Gbit/s and 10GE LAN services. Supports intra-board cross-connections of Any services at a rate lower than 2.5 Gbit/s, and intra-board cross-connections of VC-4 or VC-12 and ODUk(k=0, 1, 2, flex) services.		OTN: 700G ODUk (k=0, 1, 2, 2e, 3, 4, flex) Packet: 700G TDM: 280G VC-4 40G VC-3/VC-12
Service Slots	DC-powered chassis: 3 AC-powered chassis: 1	DC-powered chassis: 7 AC-powered chassis: 5	DC-powered chassis: 15 AC-powered chassis: 12
Maximum Line Rate	100G		

OSN 8800/OSN 9800

		8800 T16	8800 T32	8800 T64	9800 U16	9800 U32	9800 U64
Dimensions (H x W x D) (mm)		450 × 498 × 295	900 × 498 × 295	900 × 498 × 580	847 × 442 × 295	1900 × 498 × 295	2200 × 600 × 600
Electrical Switching Capability	OTN	1.6T ODUk	3.2T ODUk	6.4T ODUk	5.6T ODUk	12.8T ODUk	25.6T ODUk
		ODUk(k=0, 1, 2, 2e, 3, 4, flex)			ODUk(k=0, 1, 2, 2e, 3, 4, flex)		
	Packet	800G	1.6T	-	2.8T	6.4T	12.8T
	TDM	640G VC-4 20G VC-3/VC-12	1.28T VC-4 80G VC-3/VC-12	1.28T VC-4 80G VC-3/VC-12	1.12T VC-4 80G VC-3/VC-12	2.56T VC-4 80G VC-3/VC-12	5.12T VC-4 80G VC-3/VC-12
Service Slots		16	32	64	14	32	64
Maximum Line Rate		200G			400G		

RTN 900/RTN 300

	RTN 950	RTN 980L	RTN 380H
Dimensions (H x W x D) (mm)	88 × 442 × 220	225 × 442 × 220	320 × 265 × 95
Frequency Band	6 to 42 GHz	5/6/7/8/11 GHz	71 to 76, 81 to 86 GHz
RF Channels	8	16 (per antenna)	1
Maximum Air-interface Capacity	1018 to 1283 Mbit/s (per carrier)	440 to 558 Mbit/s (per carrier)	10 Gbit/s

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By Enterprise Transport MO & Information Dept.