Enterprise Private Line Service Scenarios and Further Requirements

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Customer requirements for private line service

- The requirements of different customer groups differ significantly

Customer type	Requirement characteristics	Bandwidth(Mbps)	Time delay(ms)	Isolate	Reliability(%)	Number of failures(Per annum)	Packet Loss Rate
Finance	Physical isolation, high performance, low latency	10~1000M	<5ms	L0/L1	99.9--99.99%	<3	<10-4
Government	Physical isolation, high performance, large bandwidth	10~1000M+	<3ms	L0/L1	99.9--99.99%	<3	<10-3
Science and technology	Low latency, high performance, large bandwidth, high reliability	10~1000M+	<2ms	L0/L1/L2	99.9--99.99%	<3	<10-4
Medical treatment	Low latency, high performance, high reliability	10-100M	<10ms	L0/L1/L2	99.9--99.99%	<10	<10-4
Education	Low latency, high reliability, large bandwidth	10~1000M	<8ms	L0/L1/L2	99.9--99.99%	<6	<10-3
Traffic	High reliability	10-100M	<50ms	L0/L1/L2	99.9--99.99%	<5	<10-3
Manufacture	High reliability, large bandwidth	10~1000M	<50ms	L0/L1/L2	99.9--99.99%	<3	<10-3
Corporate premises	Fast access, low cost, differentiation	>100M	-	L0/L1/L2	99.9%	-	-
Hotel	Low cost	>50M/room	-	L2/L3	99.9%	-	-
Shop	Low cost, fast access	>200M	-	L2/L3	99.9%	-	-

L0 is a completely isolated network (physical isolation). L1 is a partially isolated network (logical isolation).
L2 is a non-private network. L3 is the public Internet.

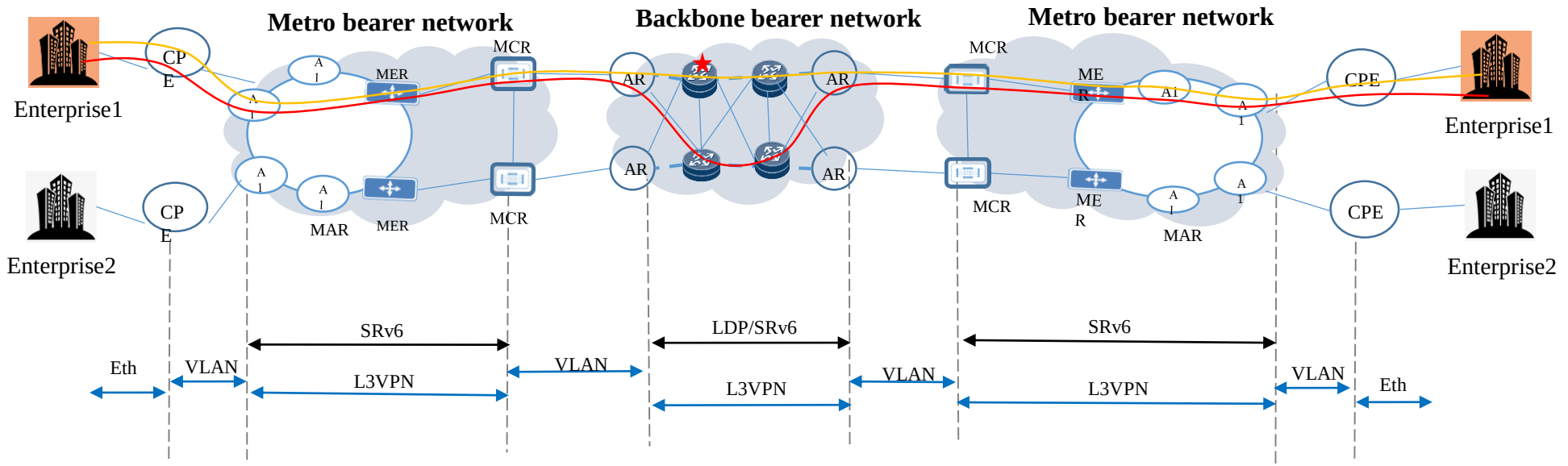
Typical offerings by providers

Offering	Typical scenario	Target customer
EVPN	Enterprise sites are connected by Layer 2 VPN private lines	Enterprises that require Layer 2 interconnection
MPLS VPN (SRv6/LDP)	Interconnection between the headquarters and branches, high-quality WAN networking	Enterprises that have flexible networking and WAN networking requirements
Cloud Bond (SRv6/LDP)	Access between cloud pools, or enterprise nodes accessing to cloud services	Internet companies, cloud service providers, enterprises demanding cloud services
Internet private line	A fixed public IP address is used to access the Internet	General external network access services for various enterprises such as industrial parks
SDH line /MSTP private line	High safety, high reliability, circuit indicators can be committed to the dedicated line service	Party, government, military, financial and other customers with very high security requirements

Typical offering: L3VPN across WAN

Application scenarios:

- Interconnection for enterprise headquarters and branches;
- Private line for enterprise nodes accessing to cloud services etc.



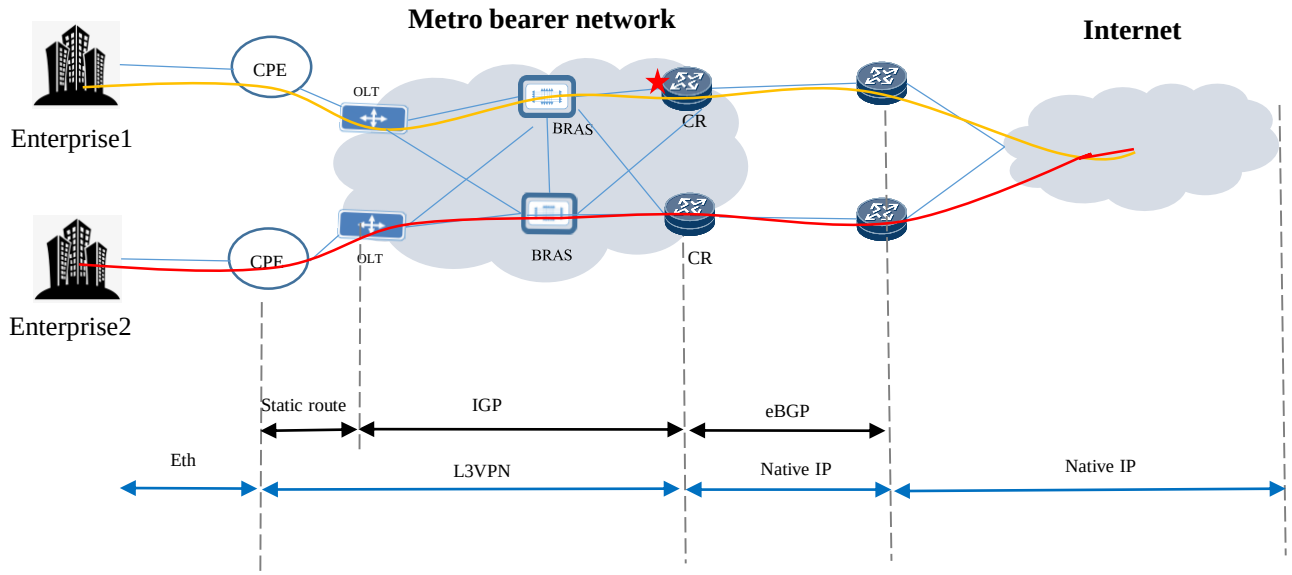
Challenges:

- To accurately sense the type of user service, and apply differentiated QoS assurance
- To sense the congestion in time, and optimize the traffic accordingly
- Protocol conversion between segments lead to high operational complexity/cost

Typical offering: Internet Access

Application scenarios:

- Private lines for enterprise customers to access the Internet,
- Allocating fixed public IP addresses for enterprises



Challenges:

- Internet access private lines are much more congestion-prone than enterprise VPNs
- Providers need to avoid congestion nodes as much as possible for premium users

Further requirements

User’s perspective

- **Differentiated capabilities**
  - Different service require different capabilities
- **Fast and flexible**
  - Quick to use and adjust at any time
- **Value-added services**
  - Pay to improve quality

Operator's perspective

- **Integrated bearer**
  - Using one bearer network to carry various services
- **Protocol unification**
  - Reduce unnecessary protocol interconnection and conversion (e.g. different encapsulations for VPNs)
- **Easier management**
  - Improve the level of intelligent management and control
- **Value-added services**
  - More service offering

Potential innovation/standardization work

- **Differential slicing capacity:**
  - Large particle slice, small particle slice
- **Unified network protocols:**
  - Unified encapsulation protocols for VPN service
- **Network-Application collaborating:**
  - The network to provide differentiated services based on application traffic awareness

Thanks!