LINUXCON containercon CHINA 中国 CLOUDOPEN

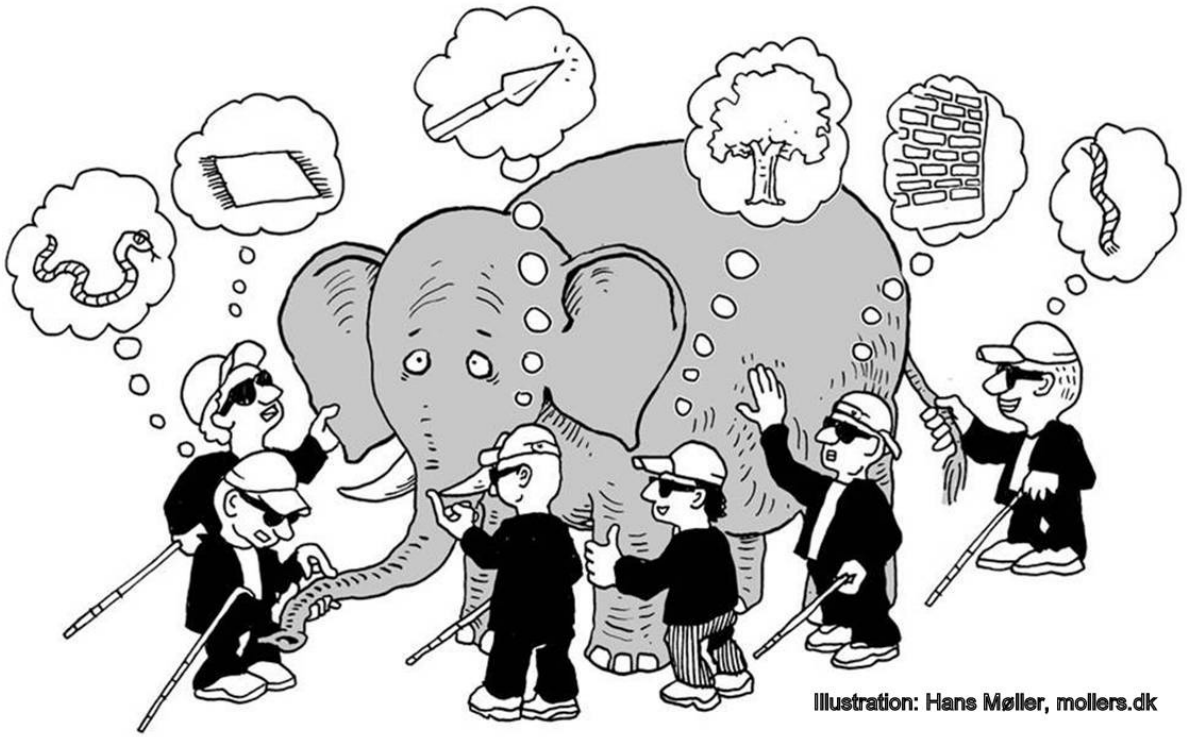
THINK OPEN
开放性思维

Challenges and Practice for SDWAN in China

Jerry Ziyi Lu
CTO, Tethrnet Technology


LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
What's
SDWAN
LF ASIA, LLC

SDWAN?

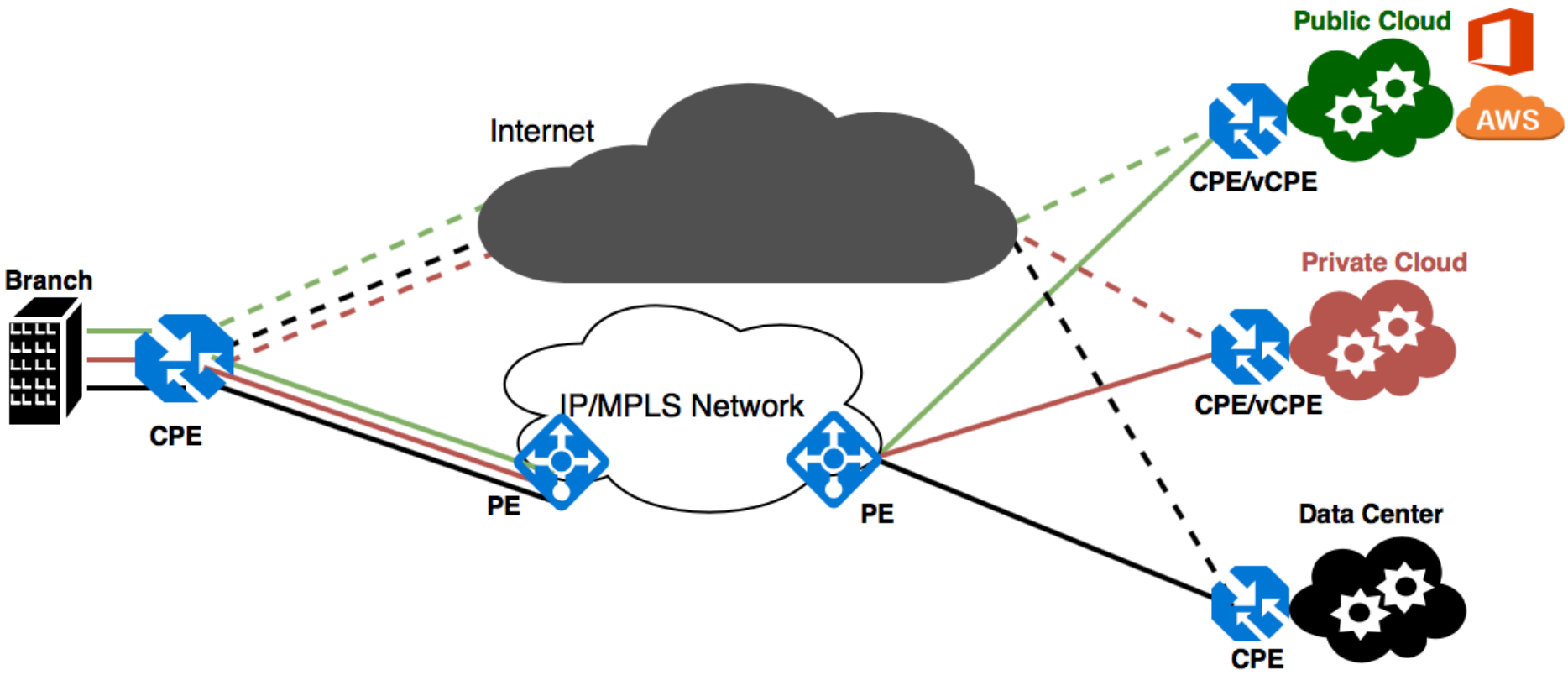


Software Defined
Wide Area Network

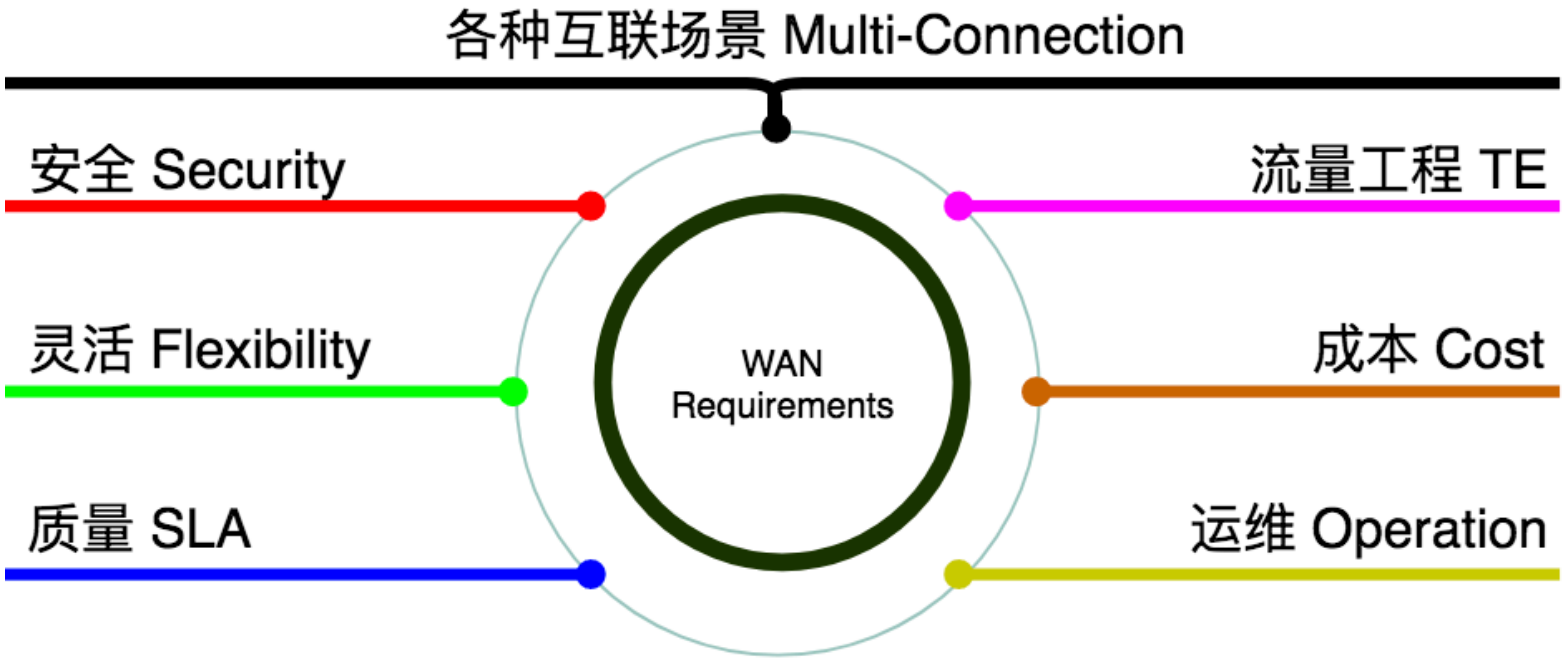
- DCI?
- VPN?
- Overlay on Internet?

- Auto configuration?
- Quick deployment?
- Low cost?
- Simple operation?

WAN Envolving



WAN Requirement



SDWAN!

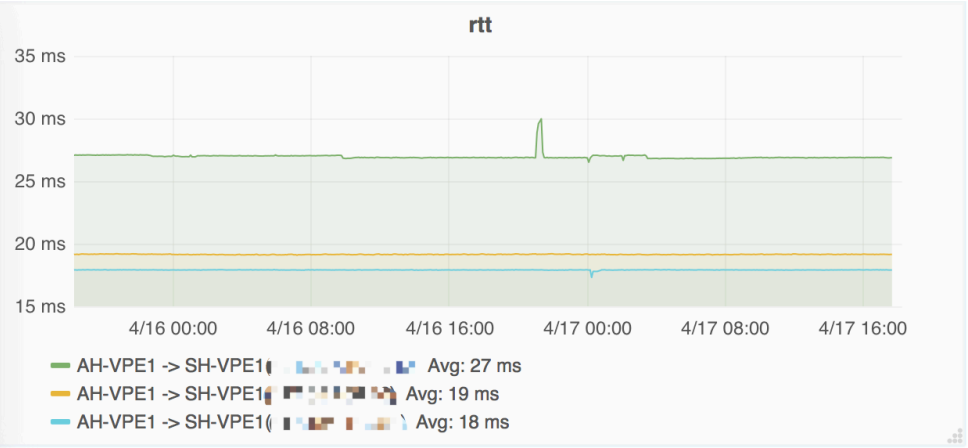
- Meet WAN requirement via SDN
  - Strict (openflow, control/data plane separation) to more generic
  - Generic SDN
    - Programmable (overlay, virtualization)
    - Data Analytics
    - Intelligent Control (more than routing protocol)

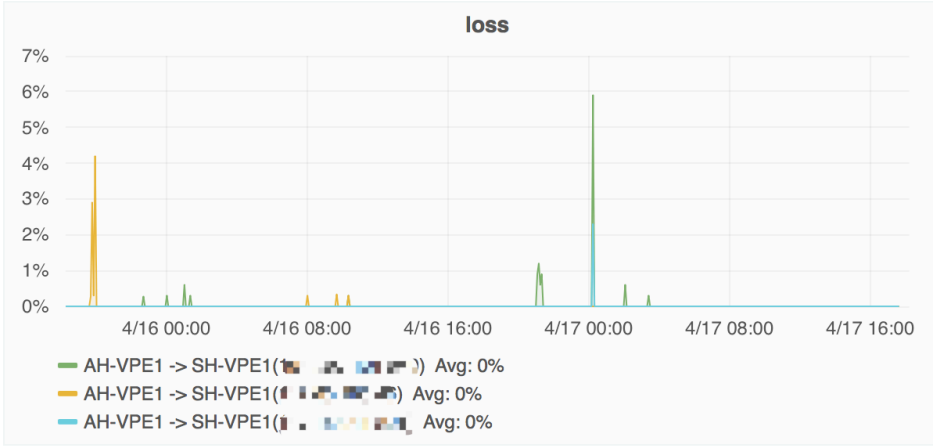

LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
SDWAN
Challenges
LF ASIA, LLC

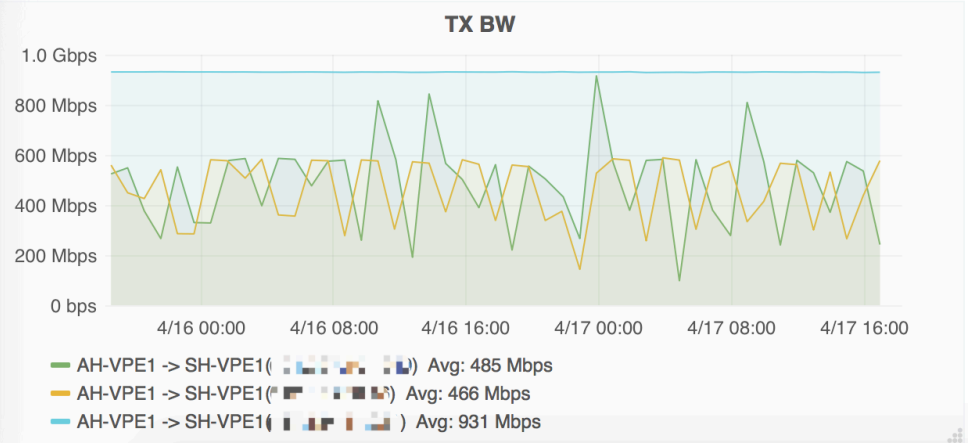
C1: internet end to end VPN

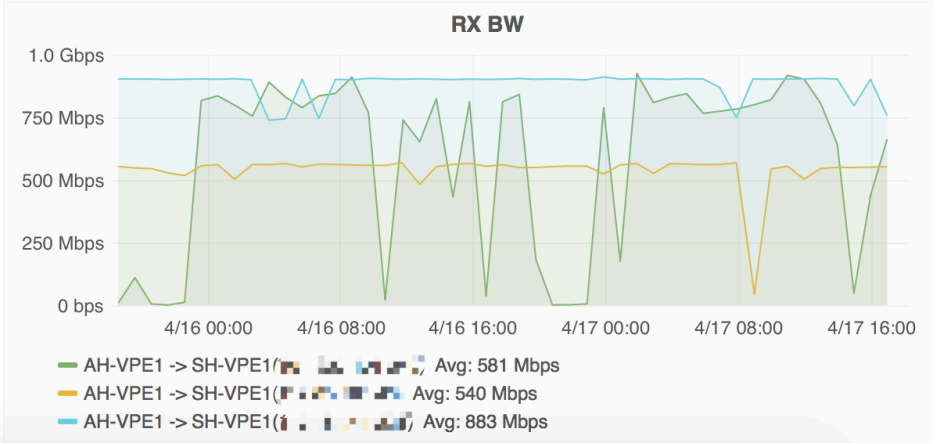
- Internet Overlay end to end VPN, NOT good for China
  - inter-SP
  - Lack of public IP

Inter-SP


rtt
35 ms
30 ms
25 ms
20 ms
15 ms
4/16 00:00
4/16 08:00
4/16 16:00
4/17 00:00
4/17 08:00
4/17 16:00
AH-VPE1 -> SH-VPE1(Avg: 27 ms
AH-VPE1 -> SH-VPE1(Avg: 19 ms
AH-VPE1 -> SH-VPE1(Avg: 18 ms


loss
7%
6%
5%
4%
3%
2%
1%
0%
4/16 00:00
4/16 08:00
4/16 16:00
4/17 00:00
4/17 08:00
4/17 16:00
AH-VPE1 -> SH-VPE1( ) Avg: 0%
AH-VPE1 -> SH-VPE1( ) Avg: 0%
AH-VPE1 -> SH-VPE1(Avg: 0%


TX BW
1.0 Gbps
800 Mbps
600 Mbps
400 Mbps
200 Mbps
0 bps
4/16 00:00
4/16 08:00
4/16 16:00
4/17 00:00
4/17 08:00
4/17 16:00
AH-VPE1 -> SH-VPE1( ) Avg: 485 Mbps
AH-VPE1 -> SH-VPE1( ) Avg: 466 Mbps
AH-VPE1 -> SH-VPE1( ) Avg: 931 Mbps


RX BW
1.0 Gbps
750 Mbps
500 Mbps
250 Mbps
0 bps
4/16 00:00
4/16 08:00
4/16 16:00
4/17 00:00
4/17 08:00
4/17 16:00
AH-VPE1 -> SH-VPE1(Avg: 581 Mbps
AH-VPE1 -> SH-VPE1(Avg: 540 Mbps
AH-VPE1 -> SH-VPE1(Avg: 883 Mbps

C2: SaaS access

- SaaS or public cloud access, not covered by traditional WAN solution

C3: Backbone Network

- Do we need backbone network?
- Backbone network can be pure built upon Internet?
- Can leverage the existing backbone network, such as MPLS VPN network?
  - Can current MPLS VPN user seamlessly adopt to SDWAN?
  - Hybrid network: SDWAN + MPLS VPN backbone

C4: Traffic Engineering

- Access
  - Internet/MPLS performance monitoring, auto switching
- Backbone
  - Dynamic load balancing, route optimization

C5: Centralized vs Distributed

- Centralized Controller
  - Good for Global view/control
  - Not good for fast failover
- Distributed Controller
  - Routing Protocol?

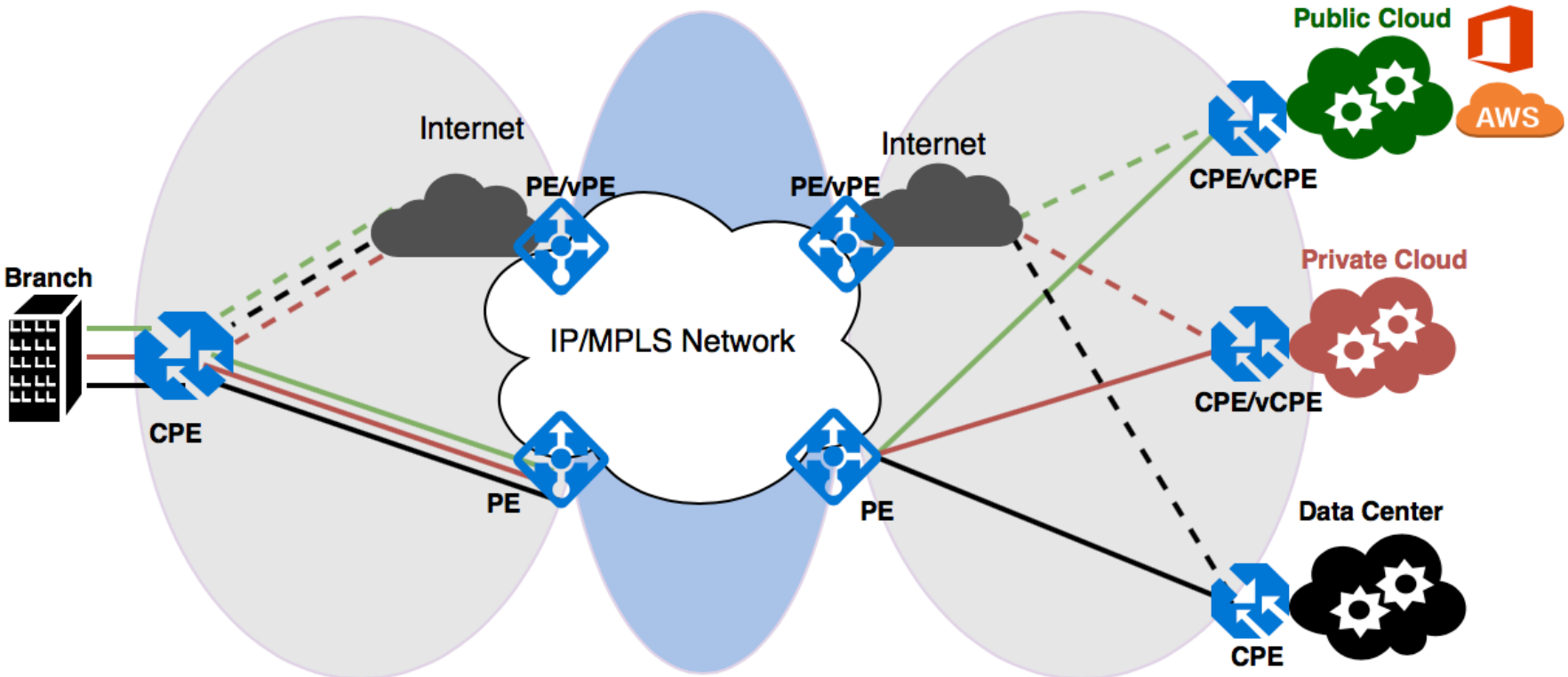

LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
SDWAN
Practice
LF ASIA, LLC


LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
Access
Network
LF ASIA, LLC

Traditional Solution

- MPLS/MSTP
  - Good: Security, SLA
  - Bad: Flexibility, Cost
- Internet VPN
  - Good: Flexibility, Cost
  - Bad: SLA, Operation
  - CloudVPN
- Internet + MPLS !

Internet as Last Mile




LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
Backbone
Network
LF ASIA, LLC

Traditional Solution

- MPLS-VPN
  - Good: Stable, Fast Failover
  - Bad: Traffic Engineering, Complex Configuration and Operation(LDP, RSVP)

Backbone Re-Arch

- Web
  - Google: B4
  - Facebook: EBB
- SP
  - ATT: domain 2.0

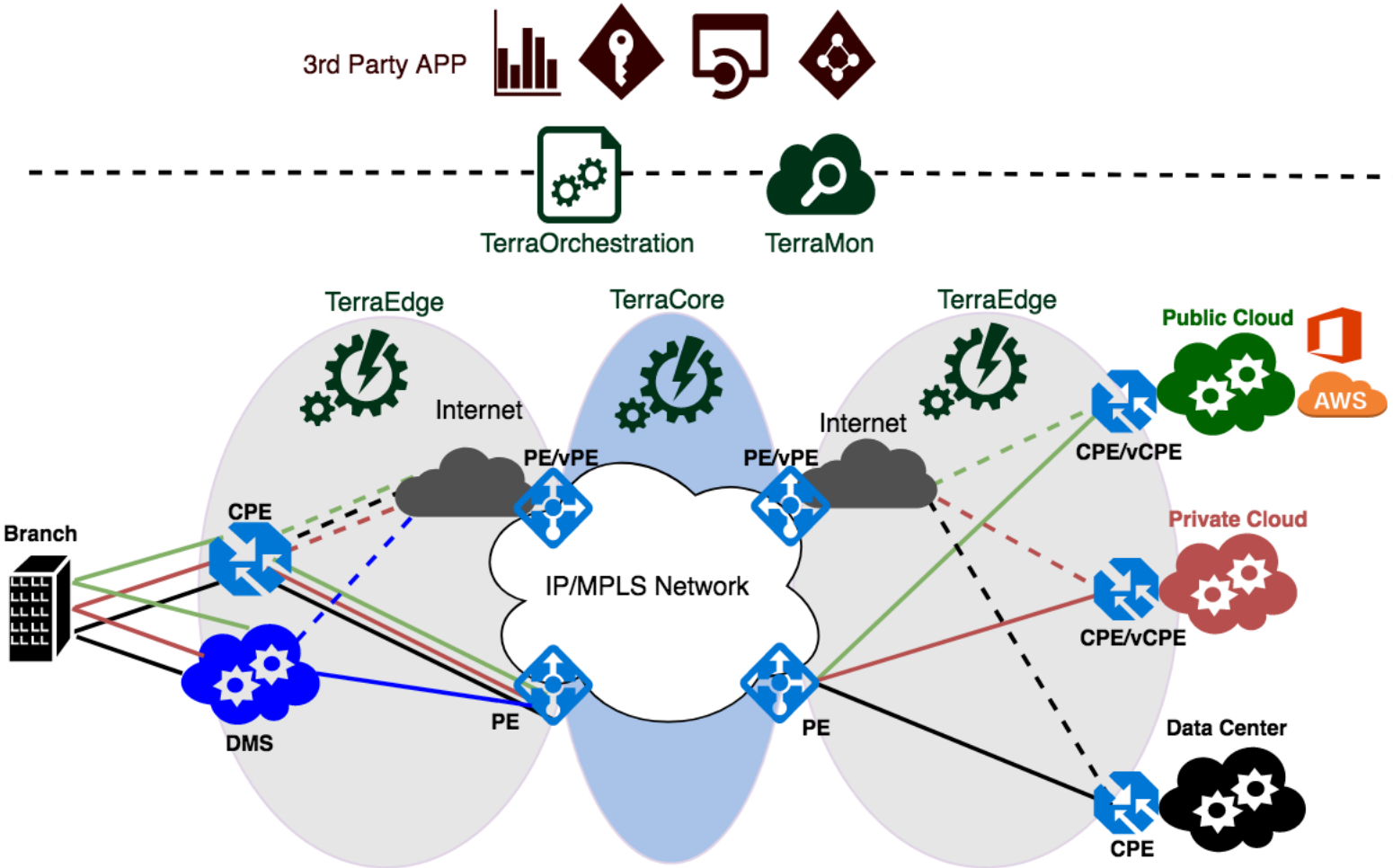
- Key Points:
  - Stability (control plane and data plane)
  - Failure detection and fast failover (<50ms)
  - Traffic engineering, dynamic route optimization

- Segment Routing !

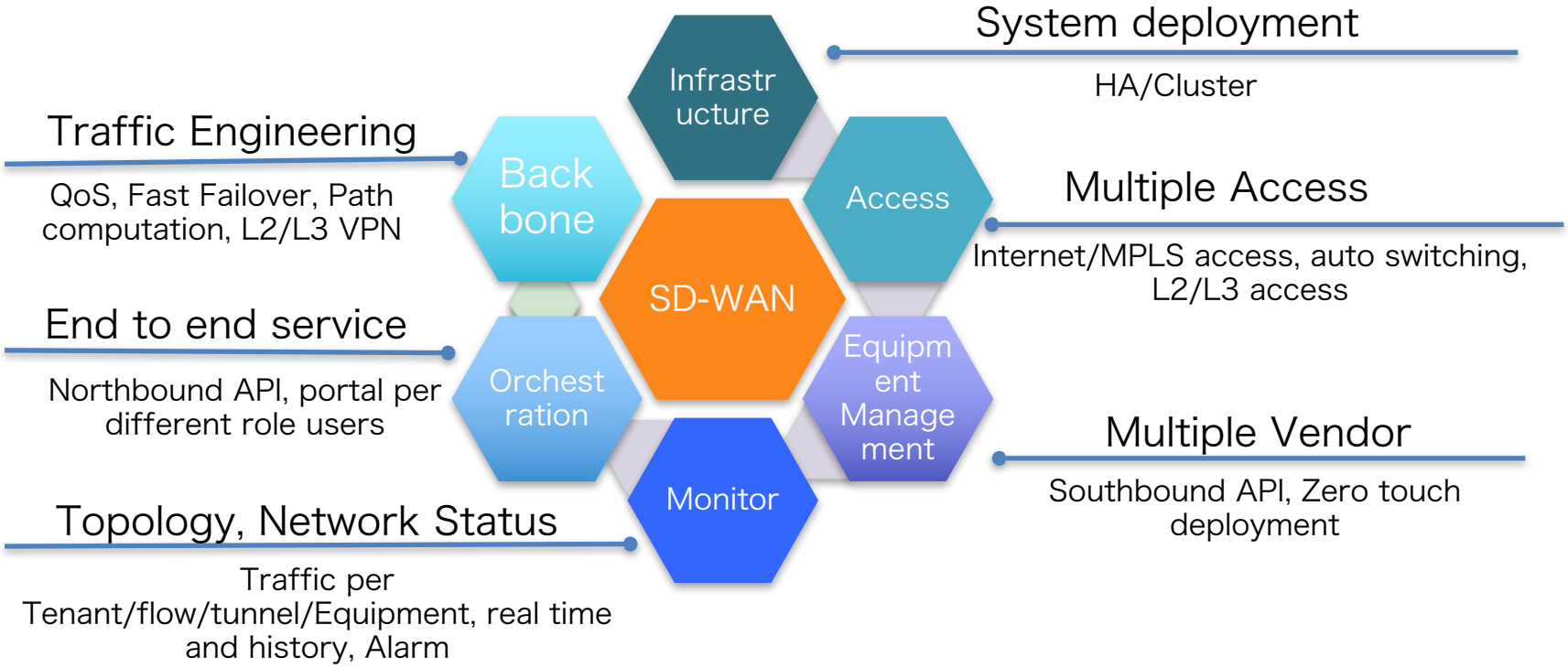
SR-TE

- SR-TE + SDN Controller
  - SR-TE:
    - Data Plane: MPLS
    - Control Plane: SR or Controller (No LDP/RSVP)
  - SDN Controller:
    - Global Resource Management
    - Dynamic Path Computation

SDWAN Solution



SDWAN Modules




LINUXCON
containercon
CLOUDOPEN
CHINA 中国
THINK OPEN
开放性思维
LF ASIA, LLC