# Hybrid Networks Security

## L2/L3 integration and its security implications

**Nicolas Fischbach - Director, Network Architecture**

colt

smarter / faster / further

RIPE#61 // Nov'10



*The information delivery platform for European business*

# Agenda

1. Ethernet and IP Services Comparison
2. Why Hybrid Networking ?
3. Hybrid Networking Solution
4. Security
5. Questions

# Benefits of Carrier Ethernet and IP Services

## Ethernet Services

- ✓Reserved bandwidth
- ✓Static path
- ✓Dedicated protection path
- ✓Low latency & jitter
- ✓Transparency for any protocol / application
- ✓Security – no switching / address learning for E-Line

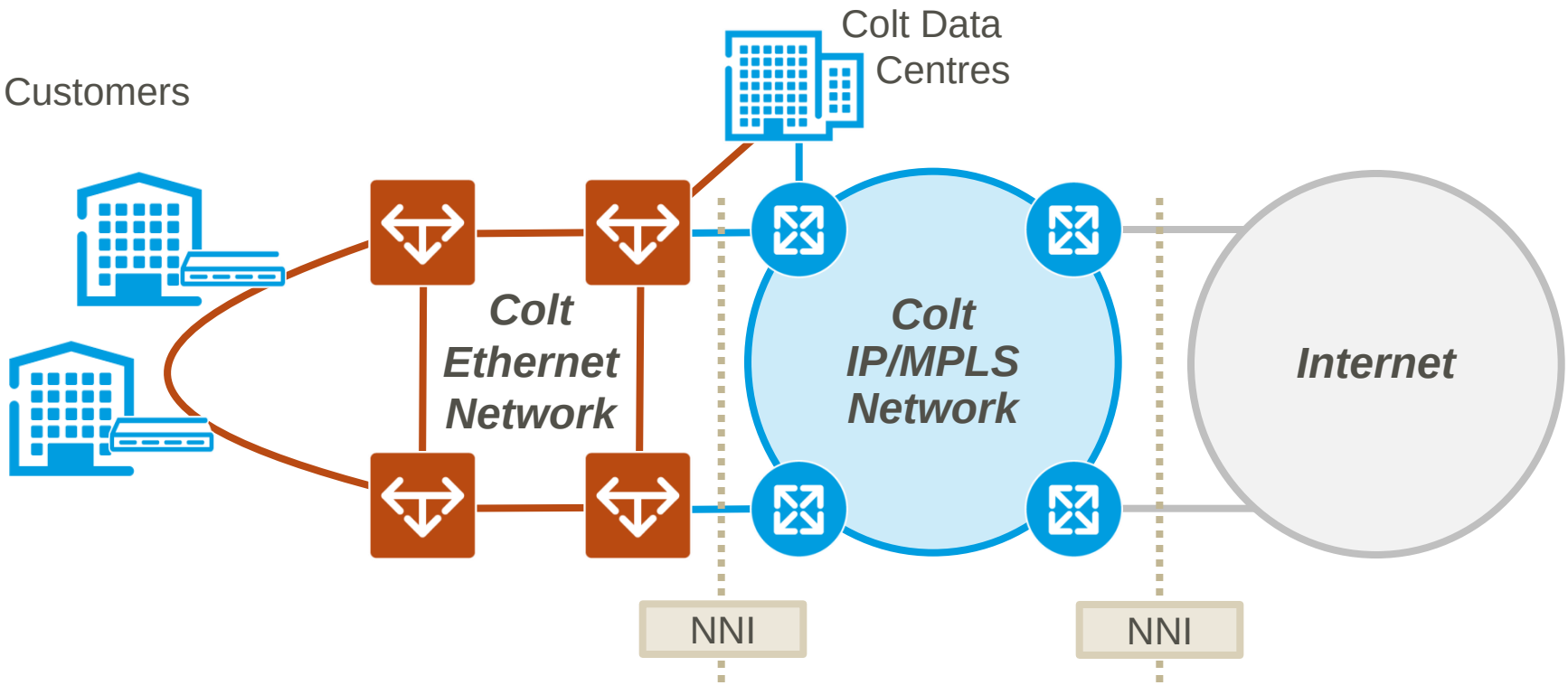
- No IP routing in core
- Connection orientated services
- Committed bandwidth end-to-end – no traffic shaping

## IP VPN Services

- ✓Highly scalable
- ✓Global reach
- ✓Managed IP routing
- ✓Meshed architecture – shortest path any-to-any
- ✓Distributed protection
- ✓Integration with remote access

- IP routed network (Internet)
- Latency varies
- CoS used to ensure best latency for priority traffic

# Today: Two networks…




- Static paths
- Predefined protection

- Routed network
- Meshed

- Wild wild Internet



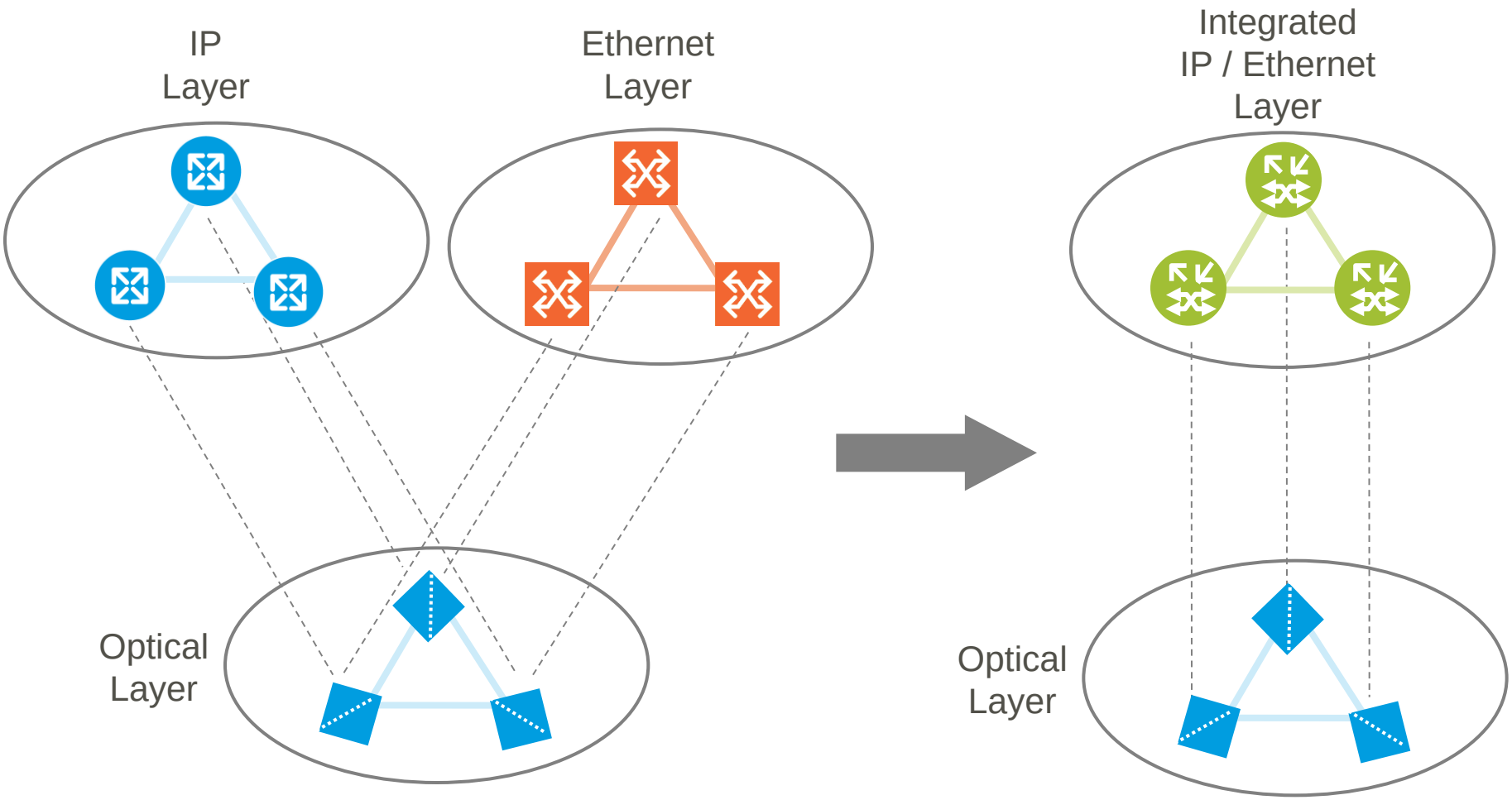
colt
smarter / faster / further

# Why such a separation ?

| Characteristics | L2 requirements | Gaps (in 2007) |
|---|---|---|
| Protection | Sub50ms | BFD, FRR, … not supported in the L3 core |
| QoS | Hard QoS & dual colour rates | None deployed in the L3 core |
| Provisioning | End-to-end point & click | Automated but more complex |
| Bandwidth scaling | Hard QoS for CIR in the core (per service instance) | L3 core « too small » to serve the L2 traffic forecasts |
| Security | « Private » network | Internet-originated risks |

- What are today's challenges for hybrid networking ?
  - Mostly psychological ?
  - Simplify here, augment complexity there ?
  - Weaken "strong" L2 services because of alignment to L3 (IP) capabilities and shared L2/L3 infrastructure ?
  - How to transport "Internet" traffic and manage/guarantee availability and security

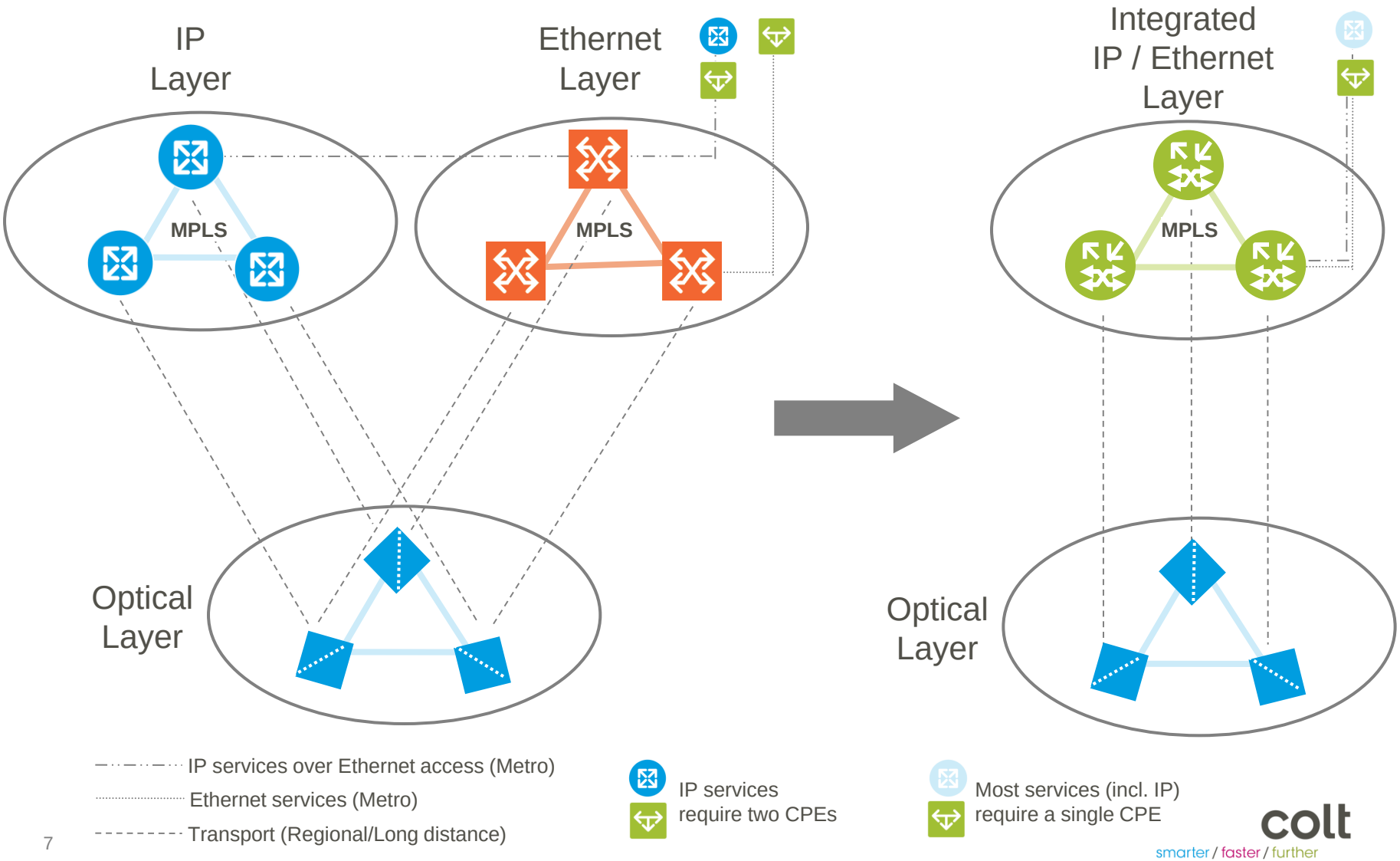
# IP and Ethernet Network Integration






colt
smarter / faster / further

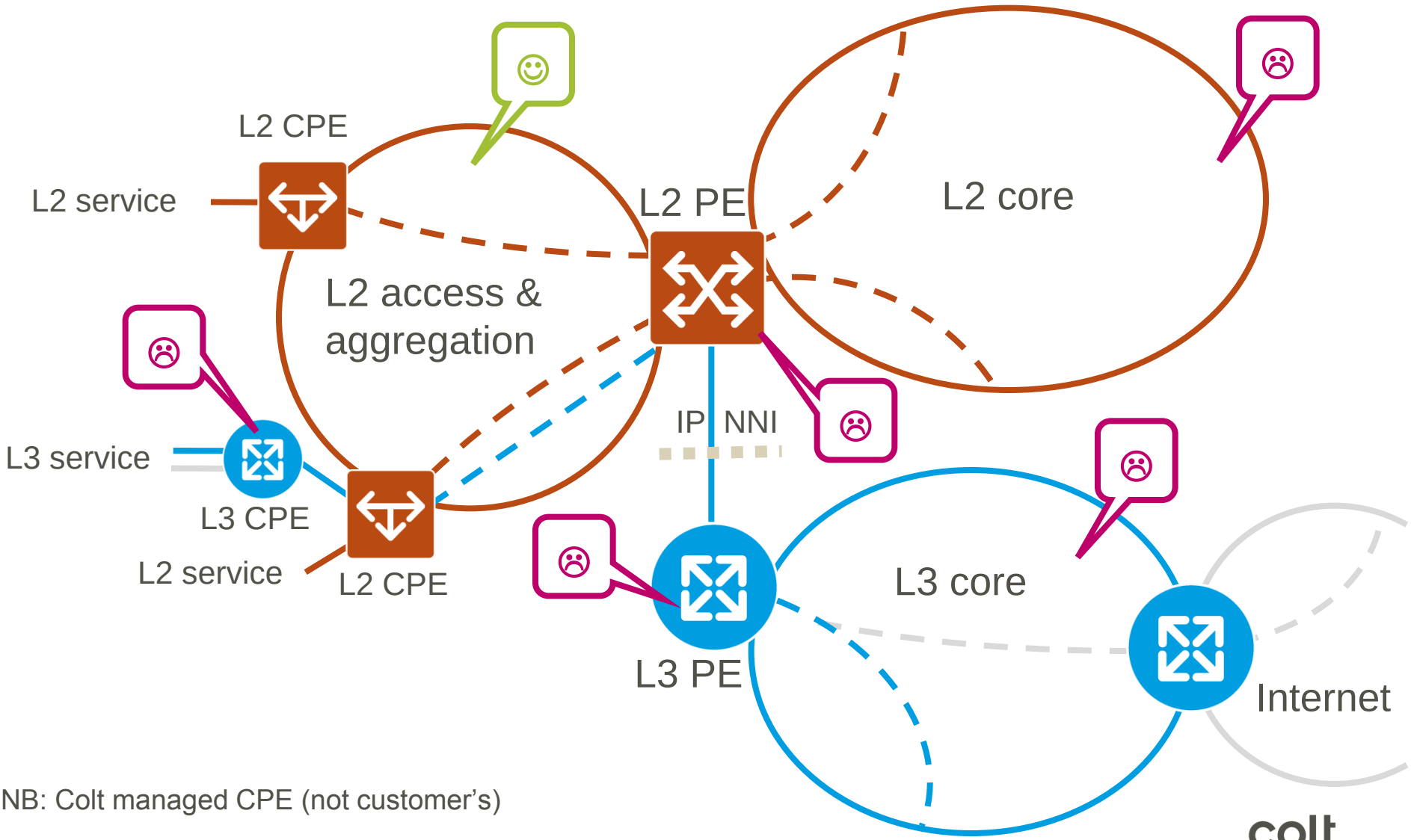
# IP and Ethernet Network Integration (Service View)






colt
smarter / faster / further

# Three areas to simplify (and secure)

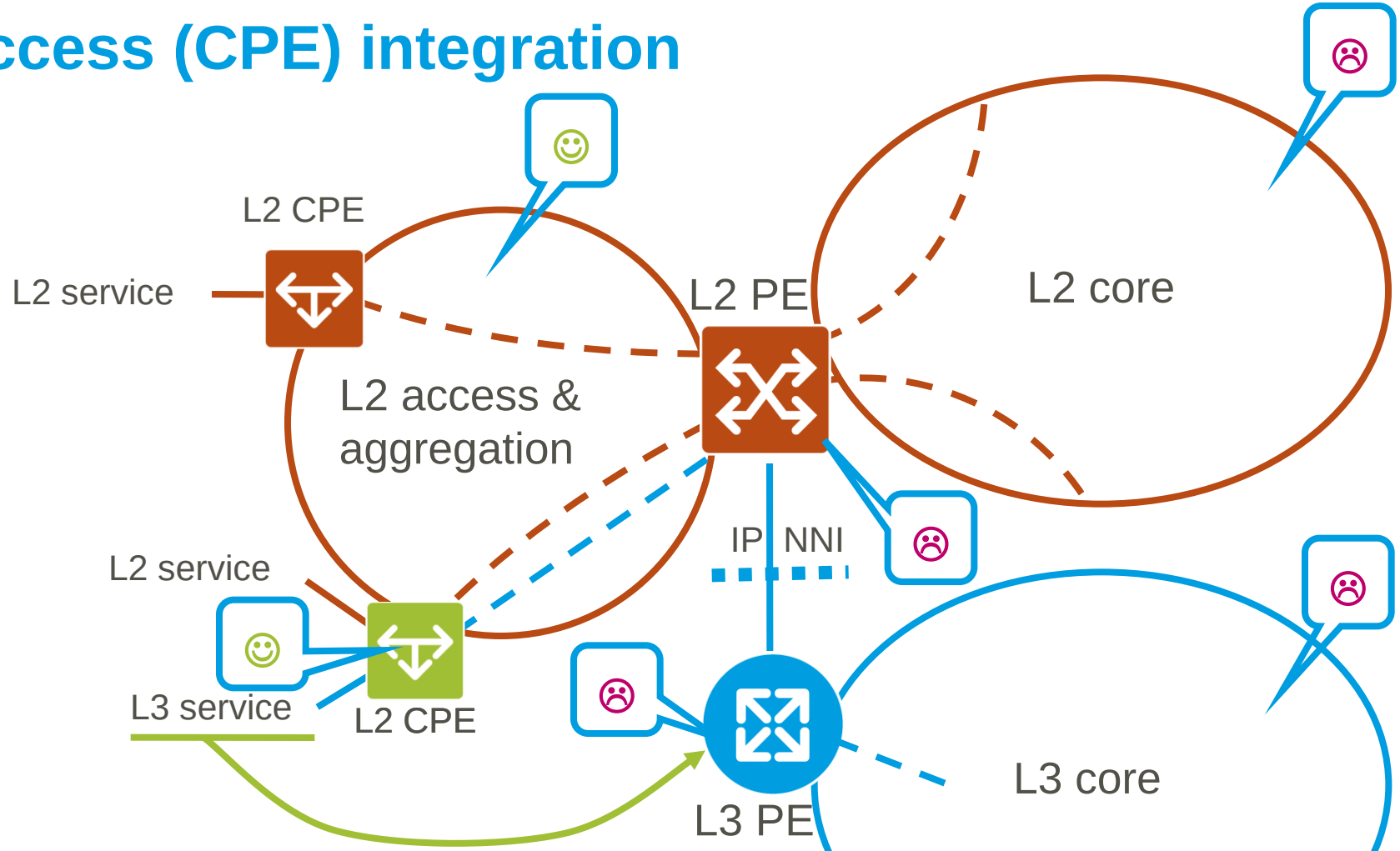



NB: Colt managed CPE (not customer's)



colt
smarter / faster / further

# Access (CPE) integration

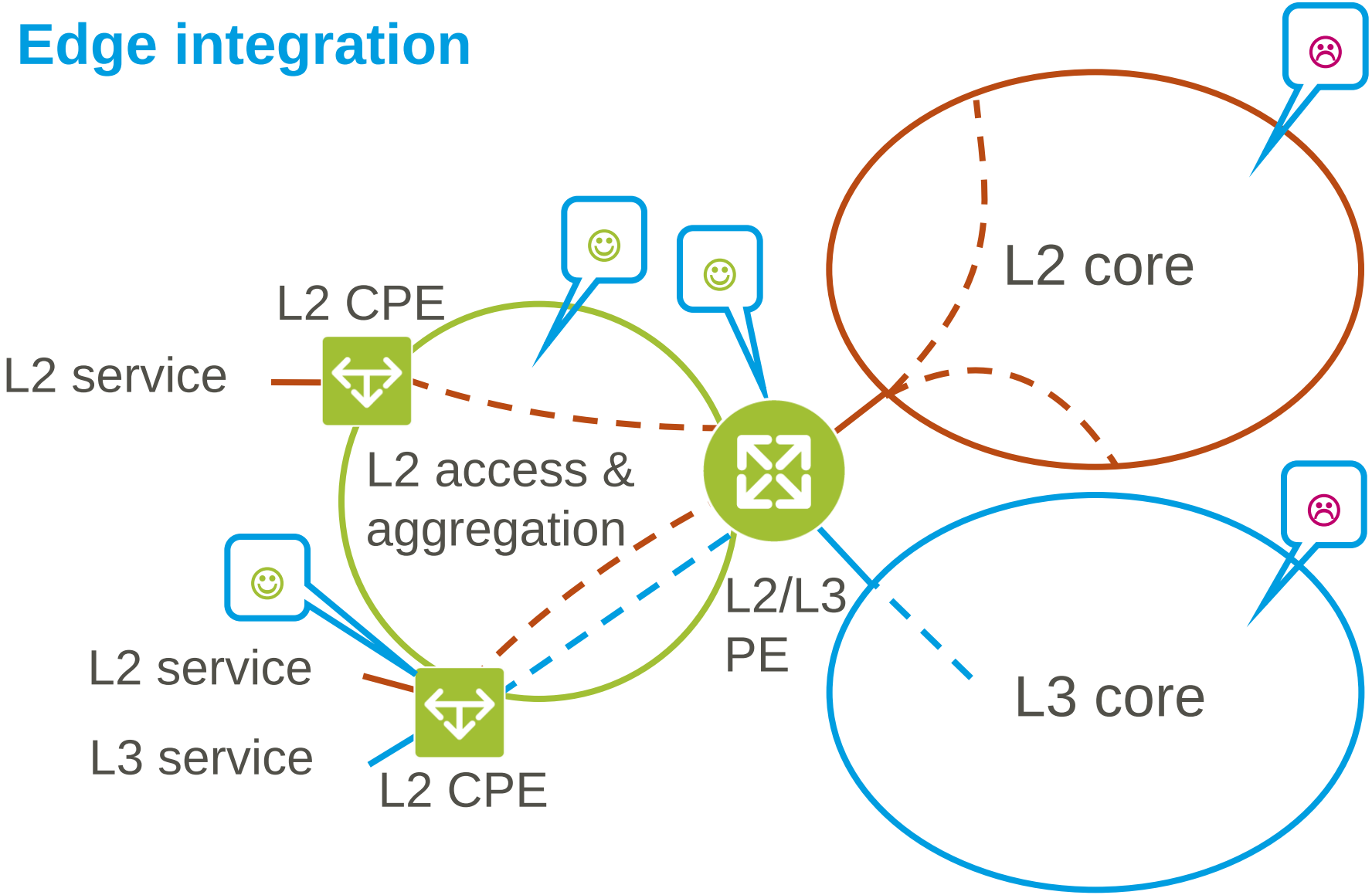



L3 features moving to the PE layer



colt
smarter / faster / further

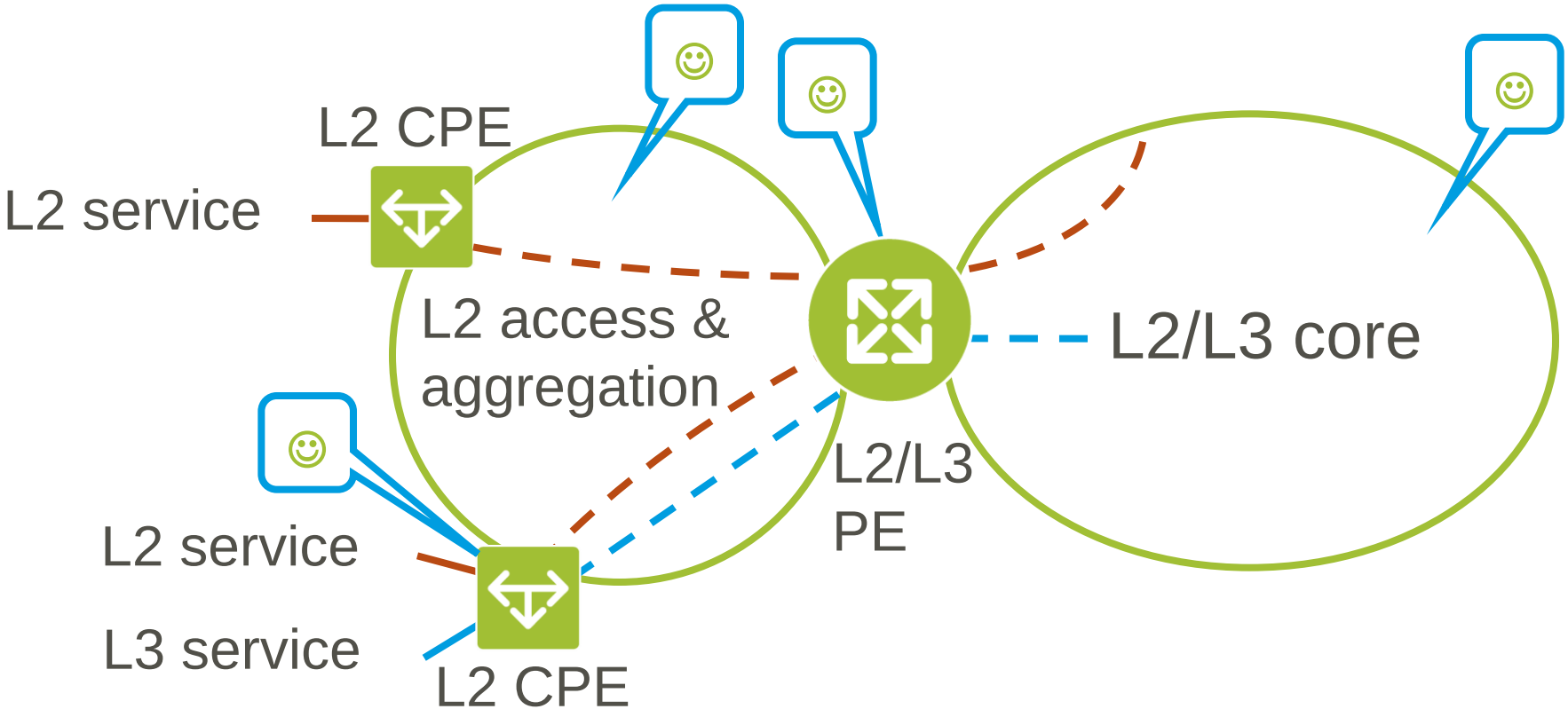
# Edge integration



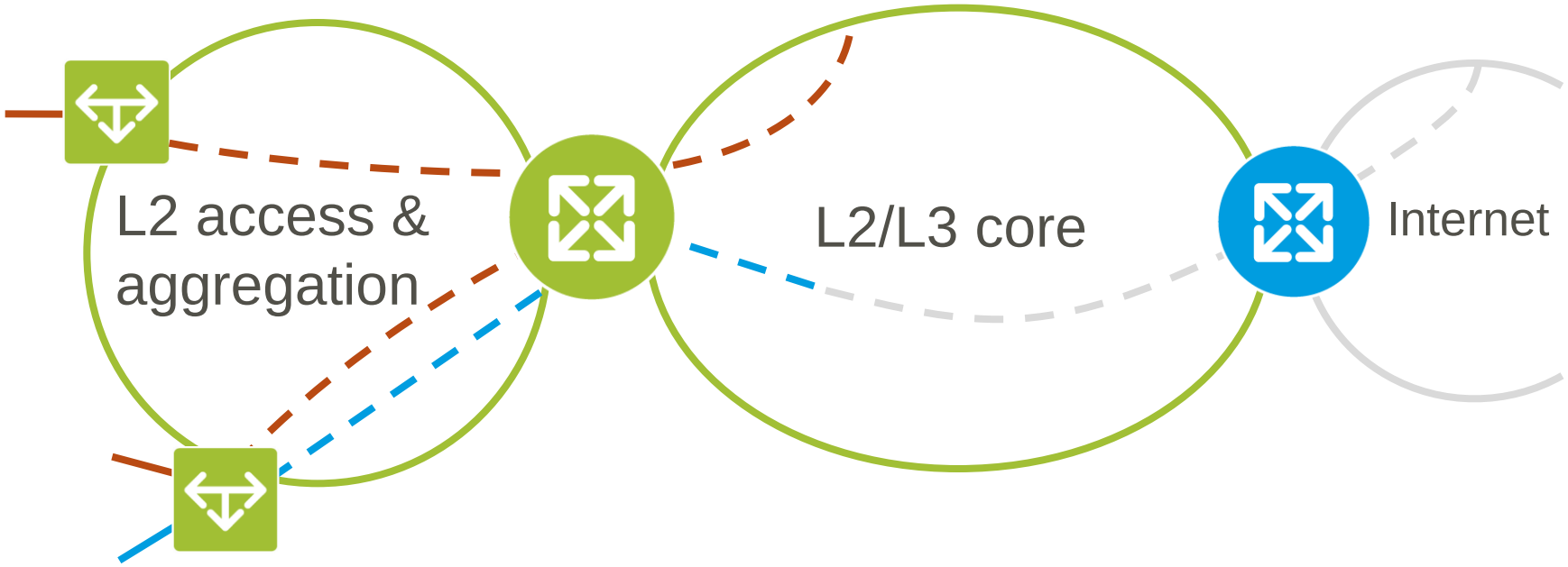



colt
smarter / faster / further

# Core integration

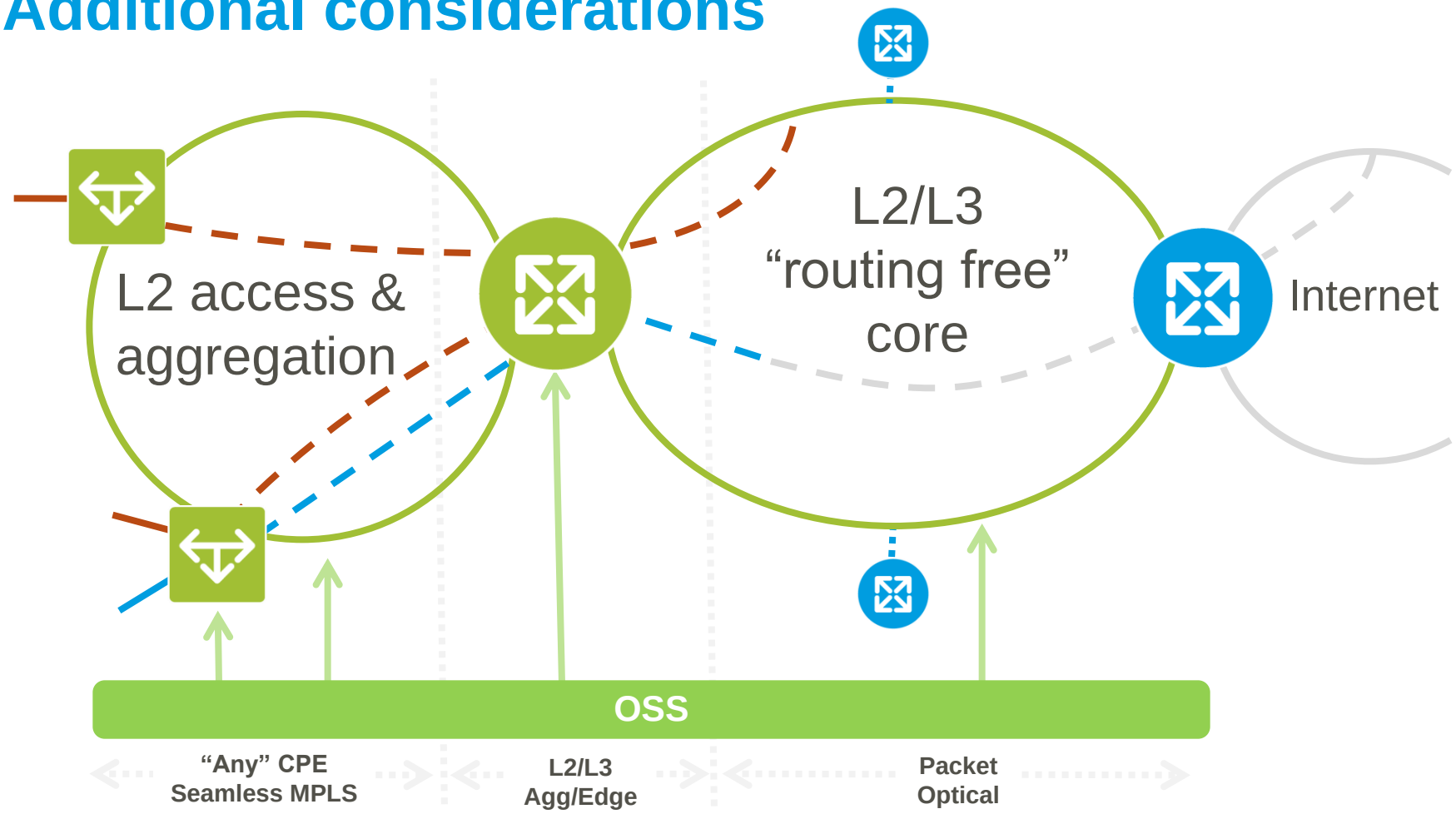


# Simplified e2e view




- Services: **Carrier Ethernet**, **IP VPN** and **IP Access**
- Access/Aggregation: 2 to 4 layers depending on Tier model (incl. PE)
- Core (P): 2 routers per city
- MPLS NNIs and IP Peering/Transit: 1 per IX, multiple IXes

# Additional considerations




- IPv4/v6 and VPNv4/v6 Route Reflectors and Multicast
- OSS and Dual Vendor Approach

# Security requirements / issues

- MPLS only core (“No routing”)
  - Run the Internet in a VRF
- “Out-of-band” management (which requires routing)
- Properly defined planes and plane separation
- Layer 2 broadcast domain and security features
- Per-VRF/RI features
  - General and per (sub)interface
- Fine grained AAA (CLI, XML-type APIs, etc)
- Netflow v9/IPFIX
- All/Most security enforcement features in hardware (incl. IPv6 !)
- Bandwidth / QoS management

# Conclusion / Next Steps

- Carrier Ethernet continuity is an absolute requirement for Colt L2 products
- Ability to blend IP (Access/VPN) and Carrier Ethernet services
- Security (especially availability, segmentation and visibility) is key
- Network automation is a must
- Next steps
  - Dual-vendor solution (incl. umbrella OSS for Service Delivery, Service Activation and Service Assurance)
  - Progress research on L1/L2/L3 integration (incl. MPLS-TP)

# Thank You ! Questions?

**Nicolas Fischbach - Director, Network Architecture**

**nico@colt.net**

colt

smarter / faster / further



*The information delivery platform for European business*