

Layer 1, 2 and 3 Integration

Vision and ongoing developments

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Introduction

Colt

- 13 countries, 34 EU MANs and 24 EU/USA/CEE POPs
- 19 datacentres and 16000 on-net building
- Served by a 25000km operated fiber network

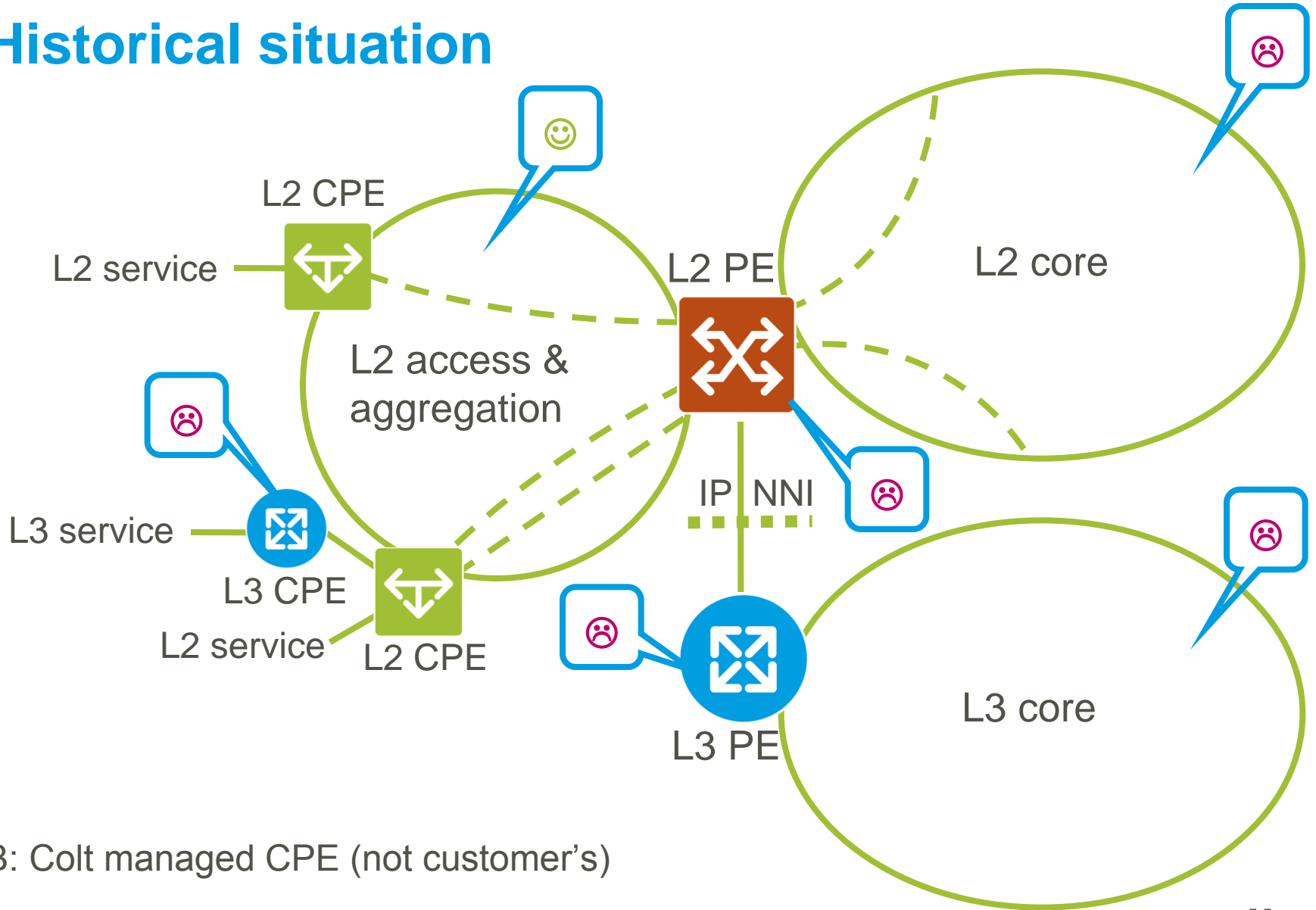
Next-Generation Networks and Services

- Optical Transport
- Carrier Ethernet
- IP/MPLS (Internet and IPVPN)
- IMS/VoIP
- Cloud/xAAS

L2 & L3 product requirements

Characteristics	L2	L3
Service type	E-Line, E-LAN, E-Tree	Internet, VPN, mVPN
Protection	Sub50ms	100s of ms (~10x)
QoS	3 classes (user)	5 classes (user)
Bandwidth model	Hard QoS & CAC for CIR in the access & core	Hard QoS & CAC for CIR in the access only
Latency	Static explicit routing (NMS or ERO) critical for all “Fastnet Ultra” services	IGP-driven acceptable

Historical situation



NB: Colt managed CPE (not customer's)

Background to the L2 & L3 separation

Characteristics	L2 requirements	Gaps (in 2007)
Protection	Sub50ms	BFD, FRR, ... not supported in the L3 core
QoS	Hard QoS & dual colour rates	None supported in the L3 core
Provisioning	End-to-end point & click	More complex due to the transport PW infrastructure
Bandwidth scaling	Hard QoS for CIR in the core (per service instance)	L3 core « too small » to serve the L2 traffic forecasts
Price point	The cheaper the better	L3 PE/P far more expensive

Technical and business benefits

Simplification

Operations, architecture, service nodes (PEs)

Cost

Reduced CAPEX (less devices per L3 service, “pay as you grow” core) and OPEX (simplified delivery & assurance)

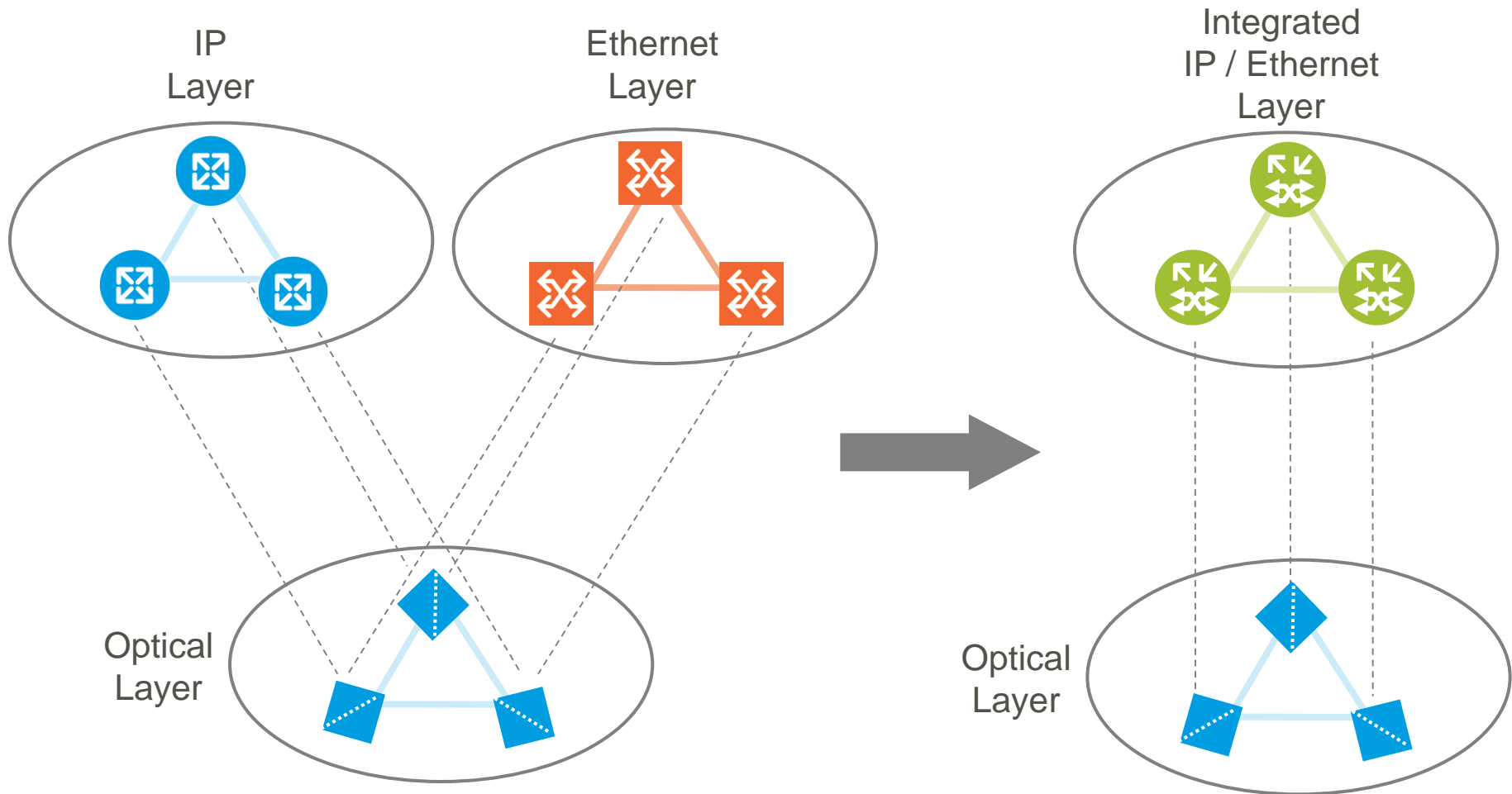
Technical

Statistical multiplexing gain in the core also for L2 with EIR

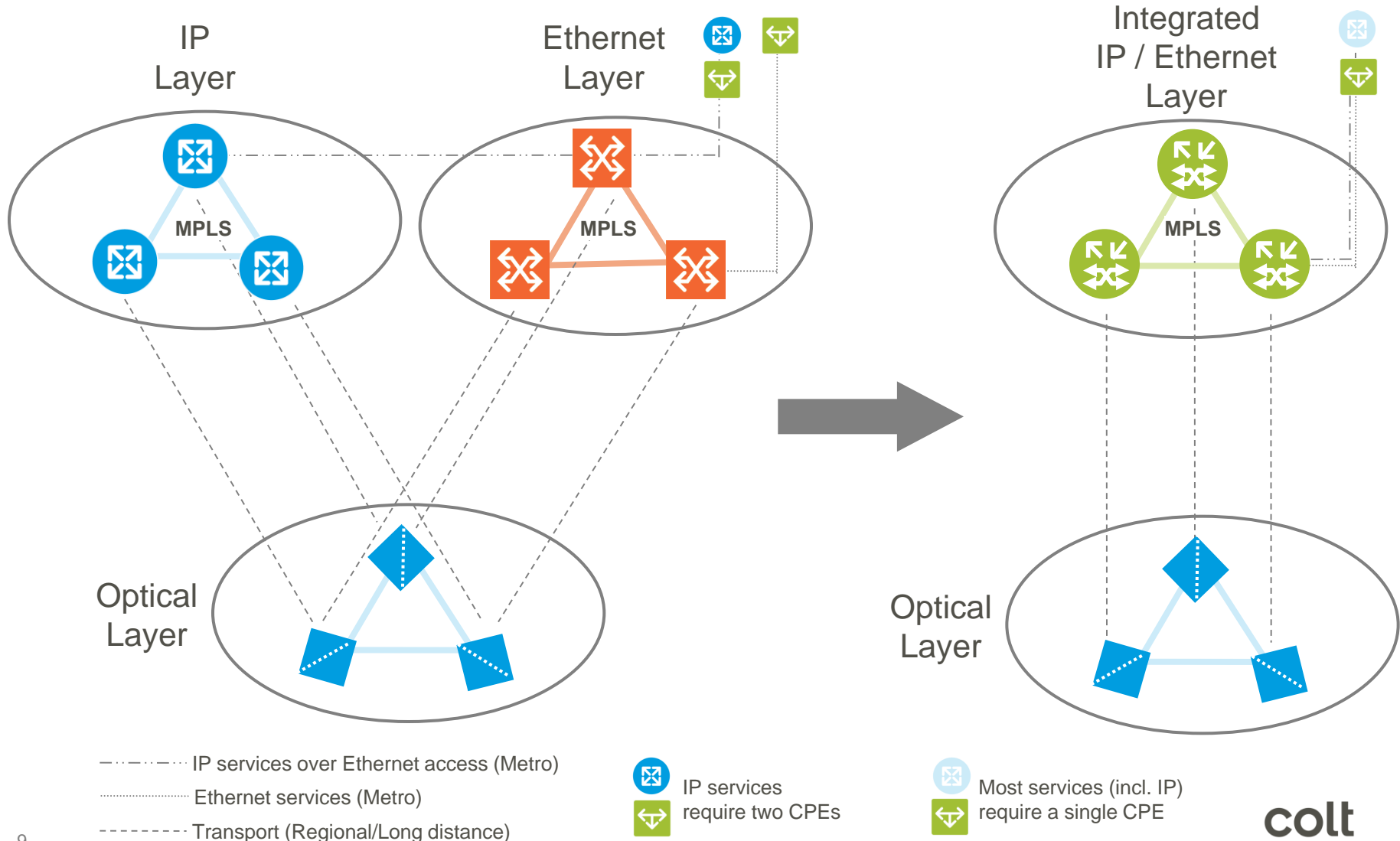
Product

L2 & L3 service blending (with Integrated Routing & Bridging on PE) and improved service unit costs (CAPEX/OPEX reduction, statistical multiplexing)

IP and Ethernet Network Integration



IP and Ethernet Network Integration (Service View)



L2 & L3 integration phases

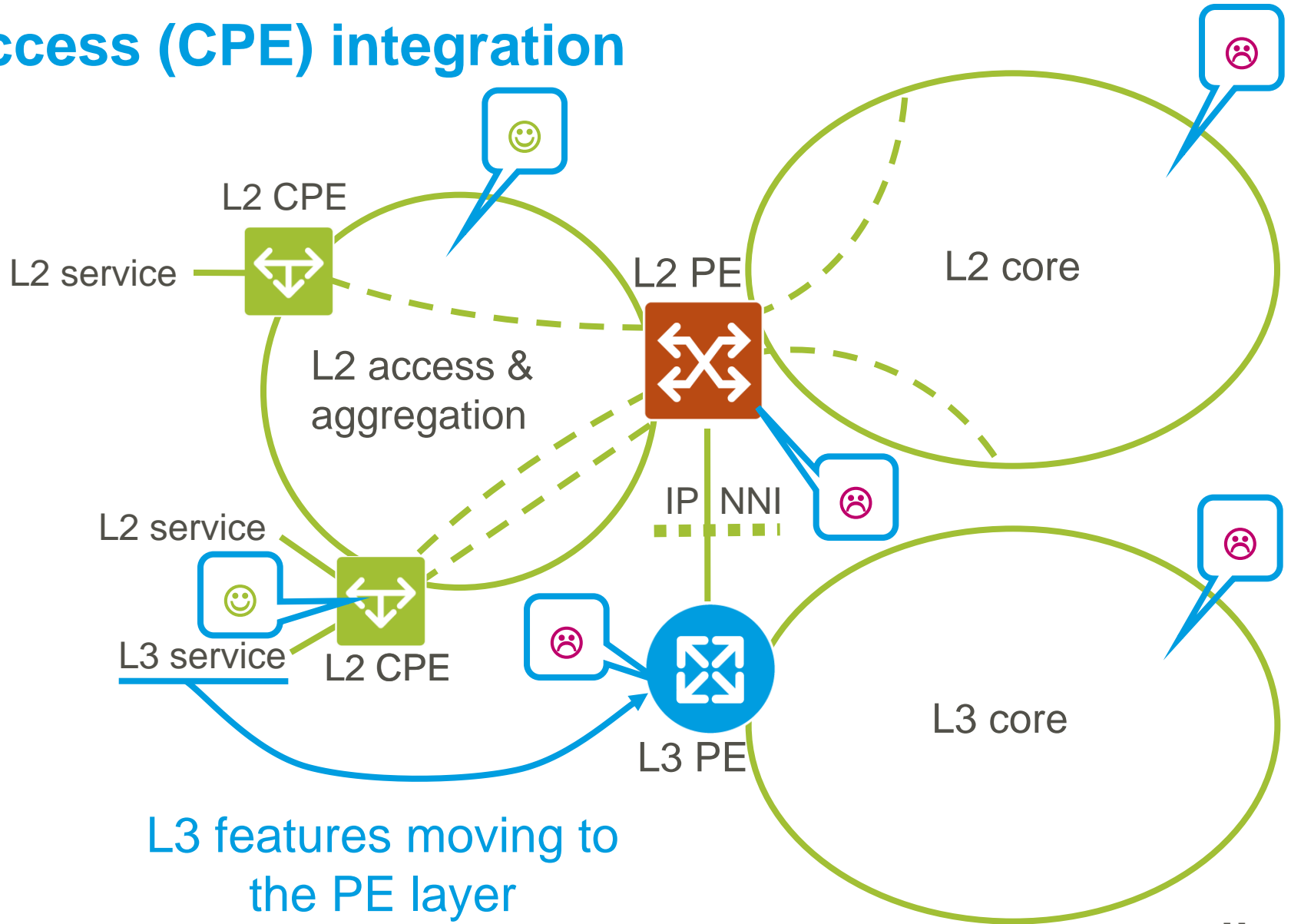
Phase 1: Access (CPE)

Phase 2: Edge

Phase 3: Core

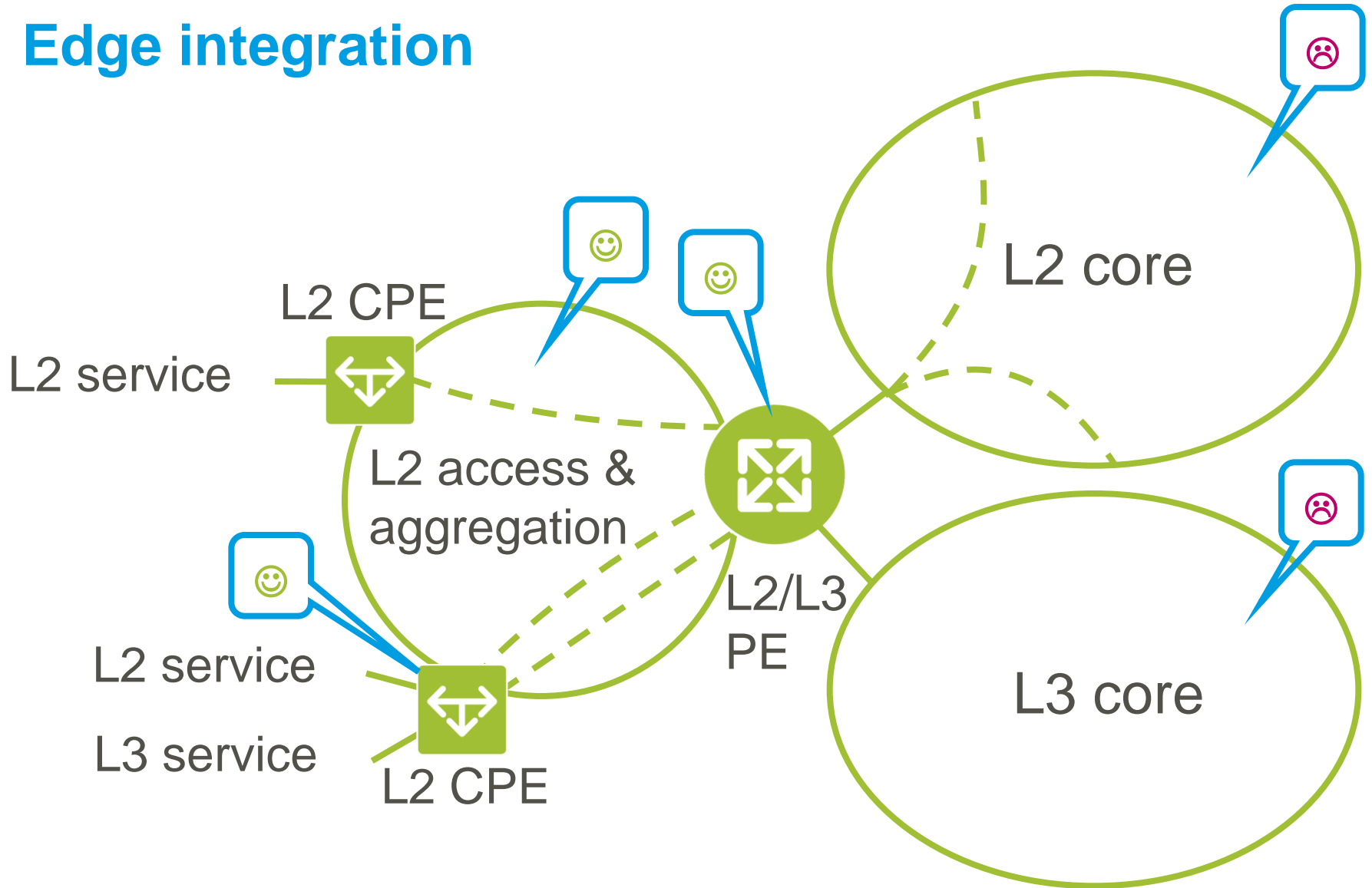
Alternative phasing?

Access (CPE) integration

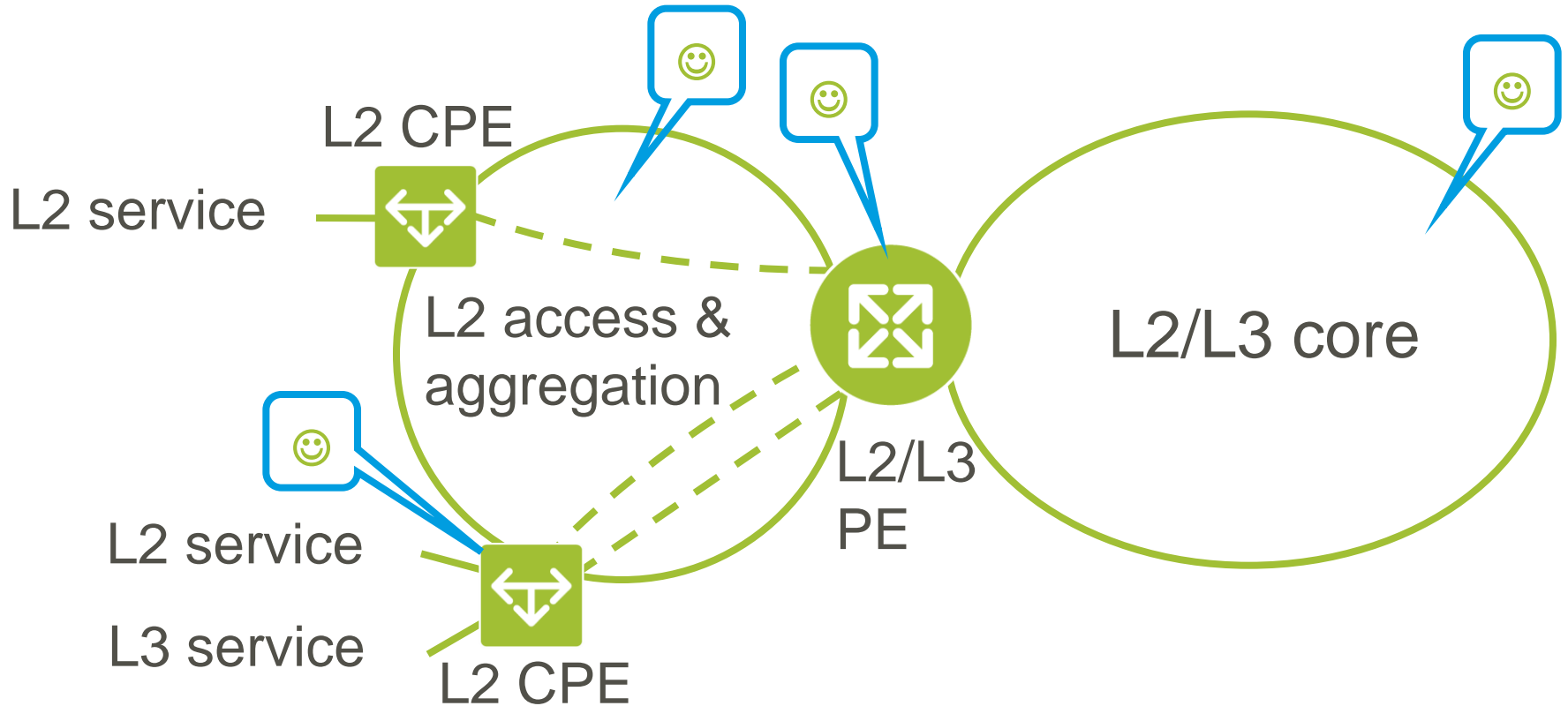


L3 features moving to the PE layer

Edge integration



Core integration



L2 & L3 integration phases and challenges

Access

- Quick win phase to save the L3 CPE at the customer premises
- Challenge to identify the eligible L3 product feature set
 - The backup, resilience and remote access options would require a L3 CPE

Edge

- Optimisation of the service node architecture
 - PE shared for L2 & L3 services
- Challenge to meet the L2 product requirements

Core

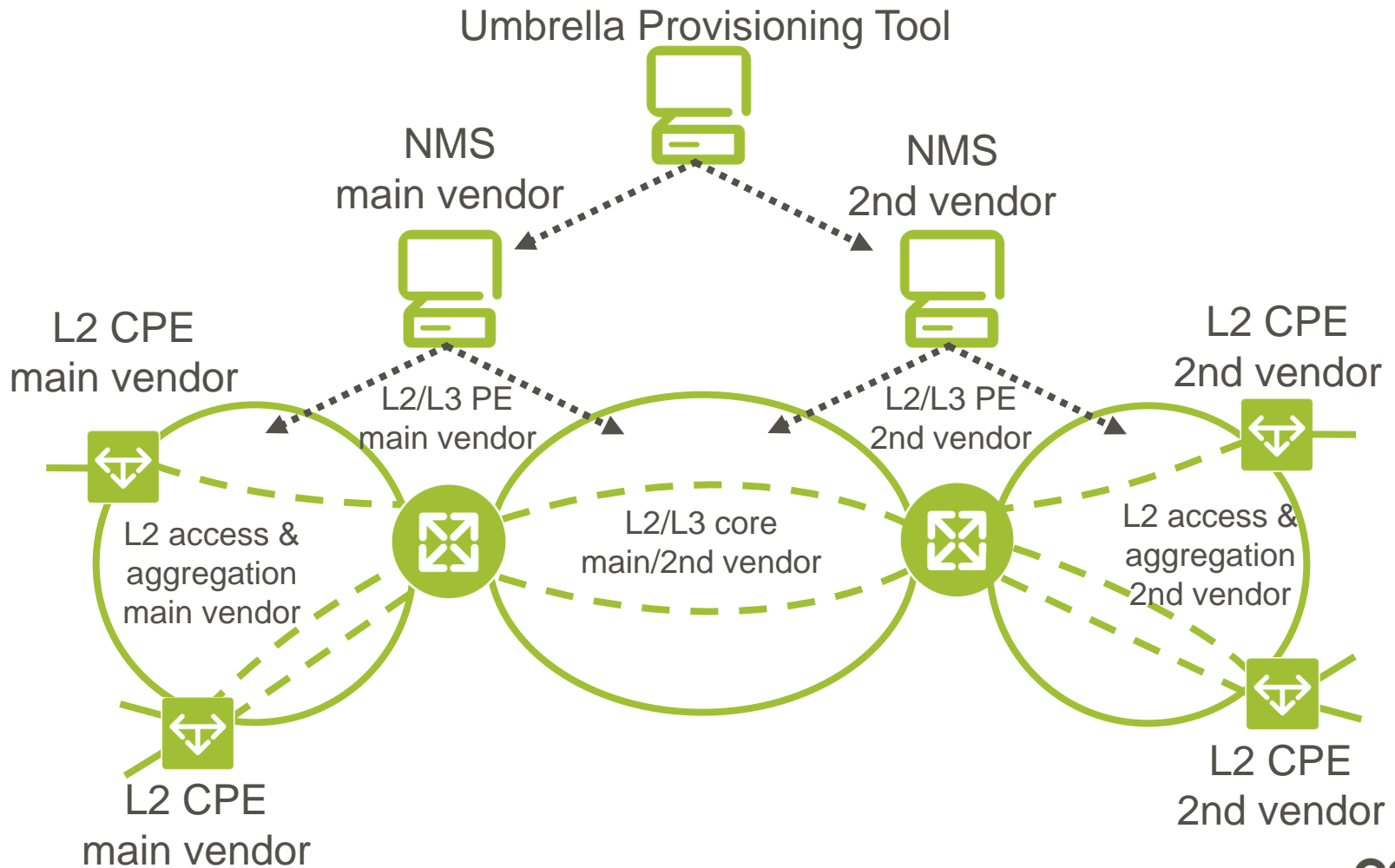
- Ultimate and most complex phase to happen after the edge integration
- Higher challenge to meet the L2 product requirements

Dual-vendor requirement

- General strategy at Colt for the main platforms like L2 and L3
 - Step 1: Launch with the main vendor
 - Step 2: Close the critical gaps of the second vendor
 - Step 3: Launch the second vendor
- Multiple direct benefits...
 - Stronger influence on the vendors' roadmap
 - Stronger influence in the business reviews (e.g. price lists)
 - Risk mitigation for vendors going bankrupt / end-of-X
- But other great challenges generated
 - More complex operations for service delivery, service activation and service assurance
 - Overlay deployment and patches due to limited inter-working (cf. proprietary and different standard implementations)
 - Infrastructure costs (power and cooling) and service distribution

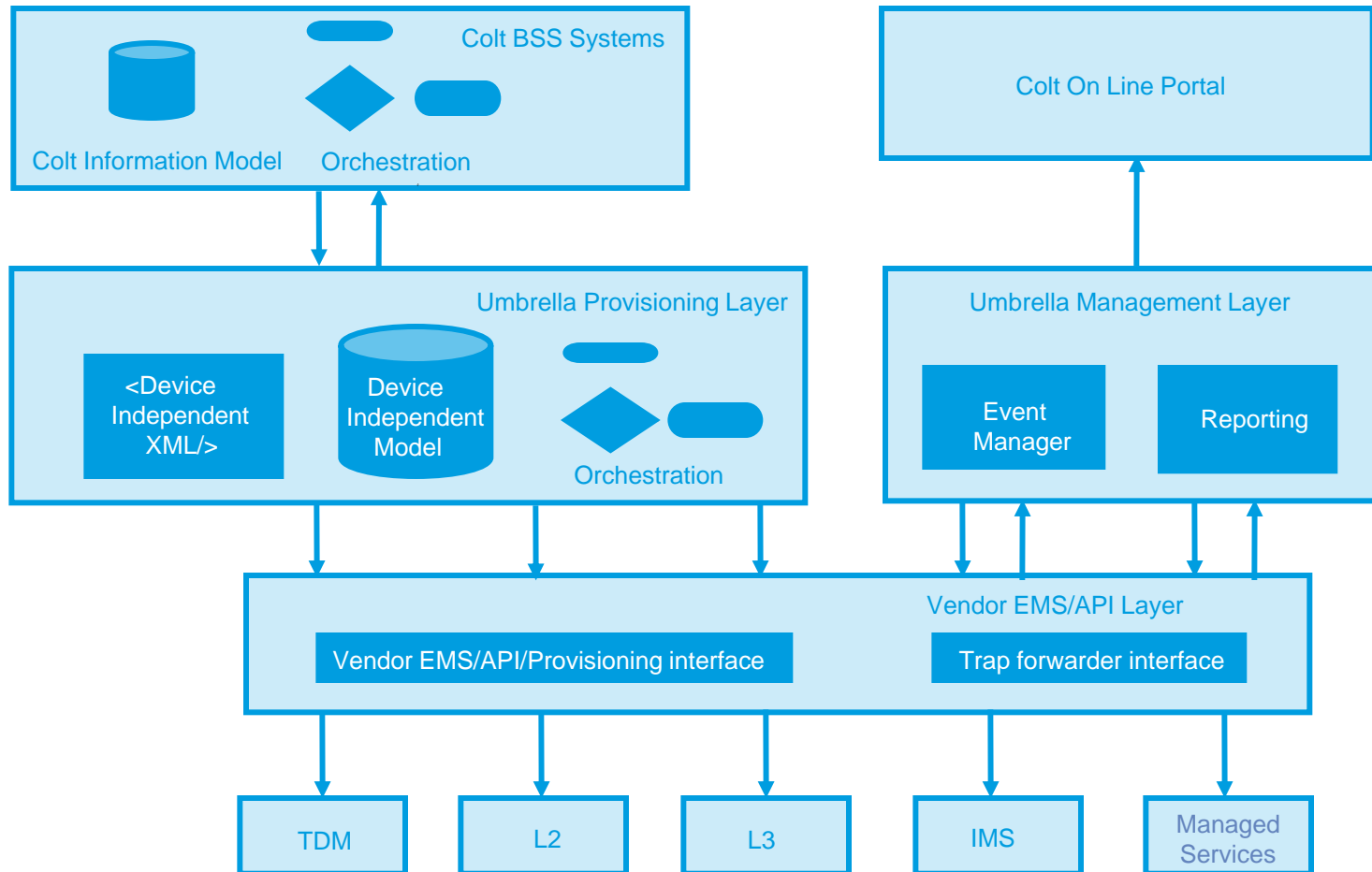
Dual-vendor requirement

What it means for the L2/L3 integrated solution



The OSS & BSS environments: service delivery, service activation and service assurance

Umbrella Provisioning Tool (UPT) framework



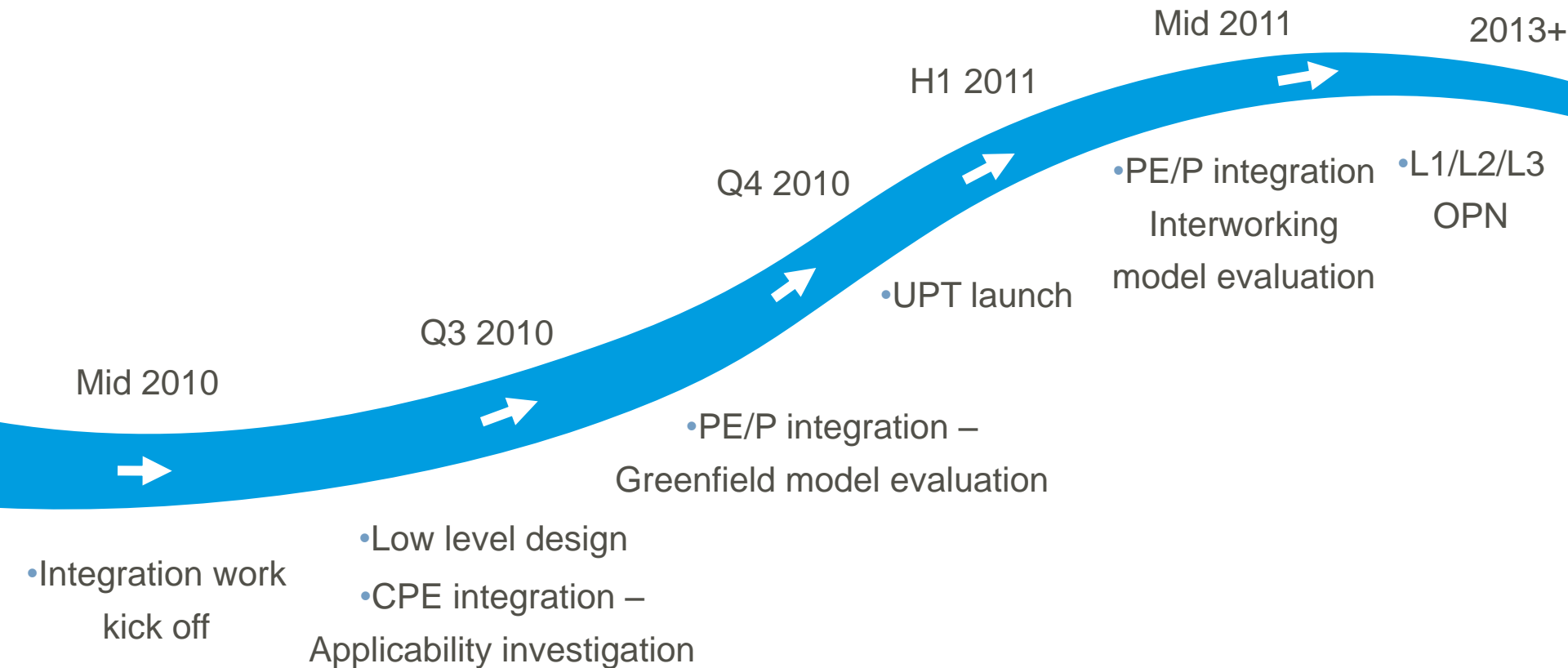
Progress review of the Colt project

Where we are now

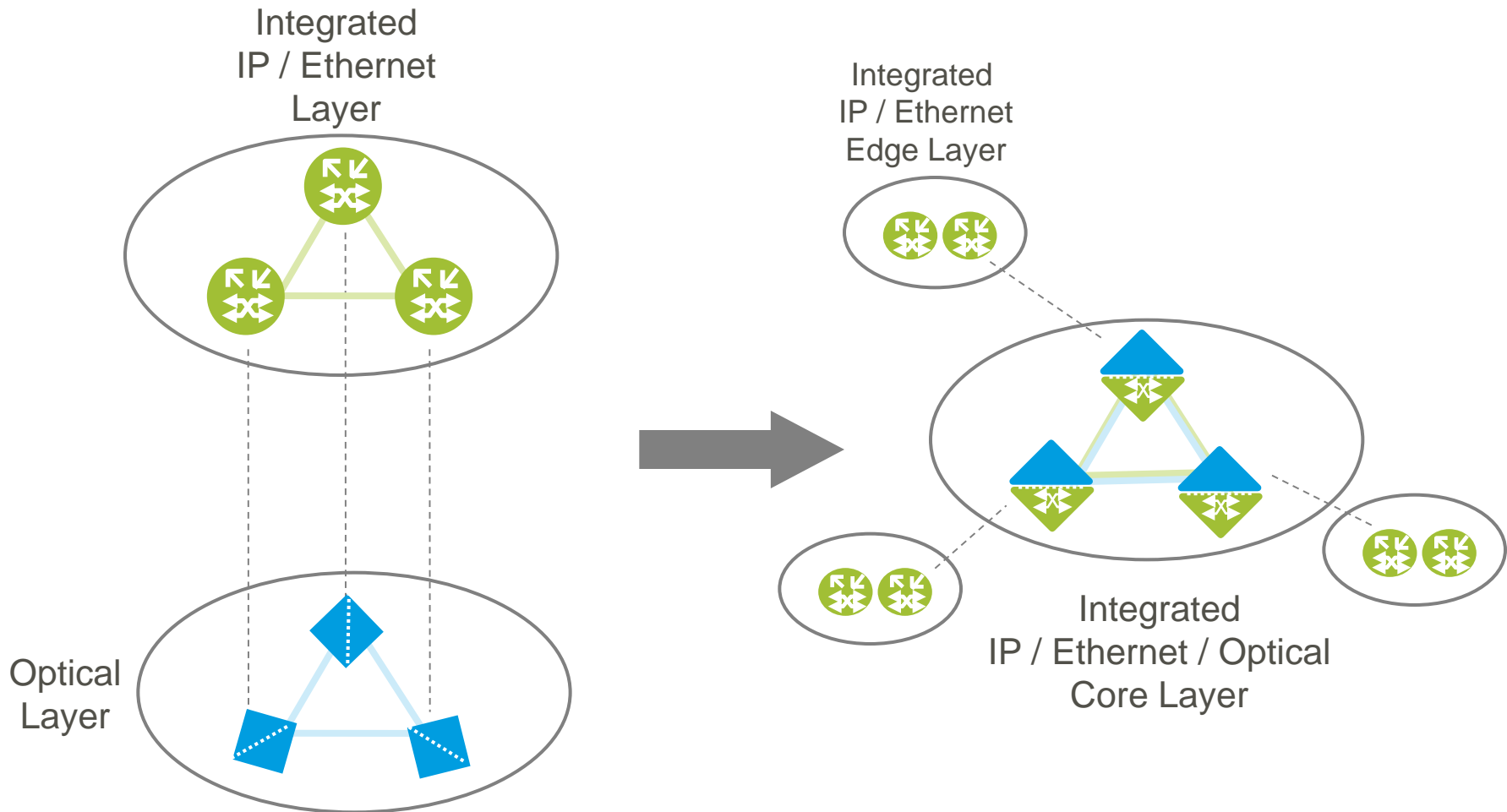
- On the company roadmap with divisional resources already engaged
 - Colt-wide integration work kicked off
- High level design done without major development required from the main vendors
 - Various development pieces to come from the general roadmap
- Areas under investigation
 - Strategy for the historical L2 & L3 edge and core: cap and grow, natural decline over time (ceases), migrate
 - PE architecture: shared PE for L2 & L3 (possibly multisegment-PW with reduced PE footprint)
 - UPT launch: tactical, mass production

Progress review of the Colt project

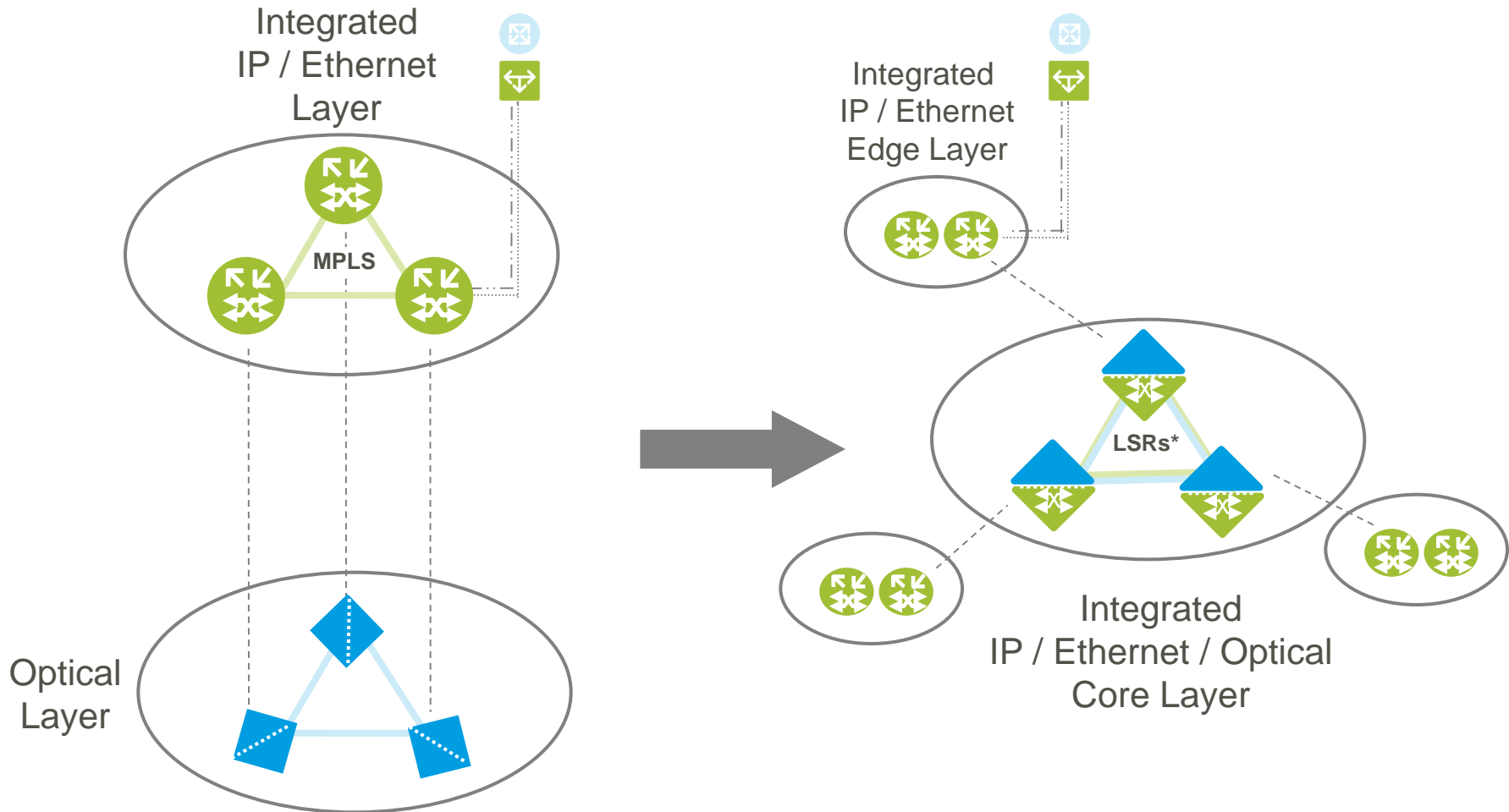
Where we are going



IP, Ethernet and Optical Core Network Integration



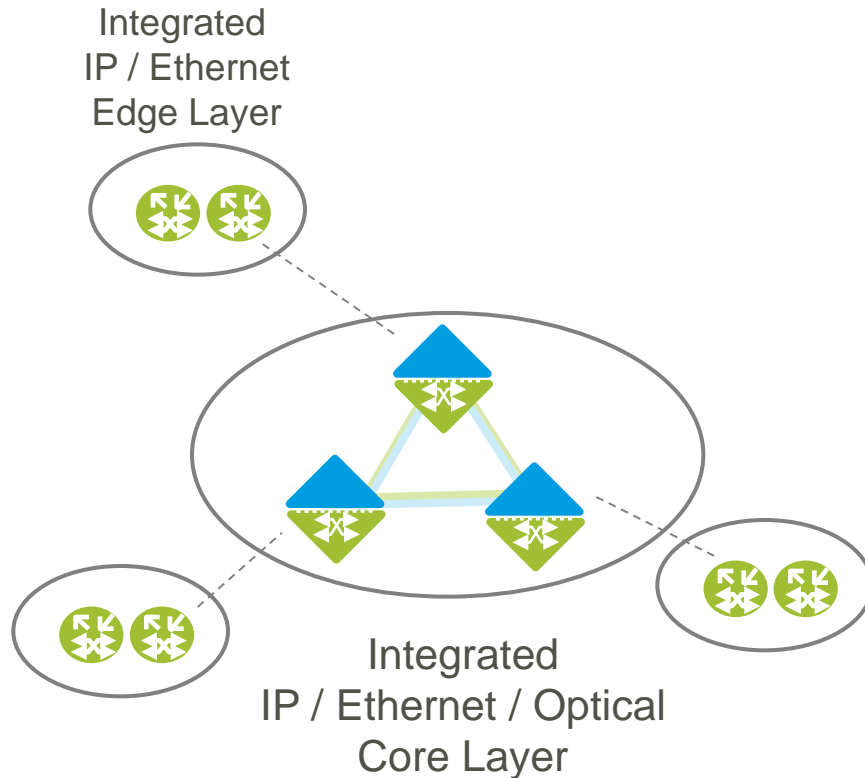
IP, Ethernet and Optical Core Network Integration Service View



- - - - - Ethernet access for IP services (Metro)
- Ethernet services (Metro)
- . - . - Transport (Regional/Long distance)

*LSRs – Pure MPLS Label Switch Routers

IP, Ethernet and Optical Core Network Integration



Router by-pass
Core optimisation
Benefits & Risks

Summary

- Carrier Ethernet continuity as an absolute requirement for Colt L2 products
- Fully approved integrated solution in 1 year time
- Infrastructure ready for product evolution

e.g. blending of L2 & L3 services with collapsed PE

A smarter integrated L2 & L3 platform,
easier to operate,
and to benefit the customers.

- Next steps: progress research on L1/L2/L3 integration

Thank you. Questions?

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