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palais des congrès  
de paris



# Traffic Engineering Evolution

1987

Public IP / UUNET



- Global Corporations & Early ISPs

- World's first commercial Internet transit; evolved into today's PIP network

1995

vBNS / vBNS+



- Research Universities & Supercomputing Centers

- High-speed R&D data exchange; eventually integrated into the **Private IP infrastructure**

1998

Verizon "Backbone"



- Internal Verizon TE Backbone

- Unified IP/ATM **global core**; currently serves as the **Converged Core** for all Wireless & Wireline traffic

~2002

Private IP / PIP



- Government & Multinational Enterprise

- Secure Layer 3 MPLS VPNs and converged mission-critical data/voice

~2013

Wireless eNSE



- Mobile Consumers & IoT

- Virtualized 4G/5G core; transitioned to Segment Routing to optimize 5G traffic steering and network slicing

~2018

Unified Transport

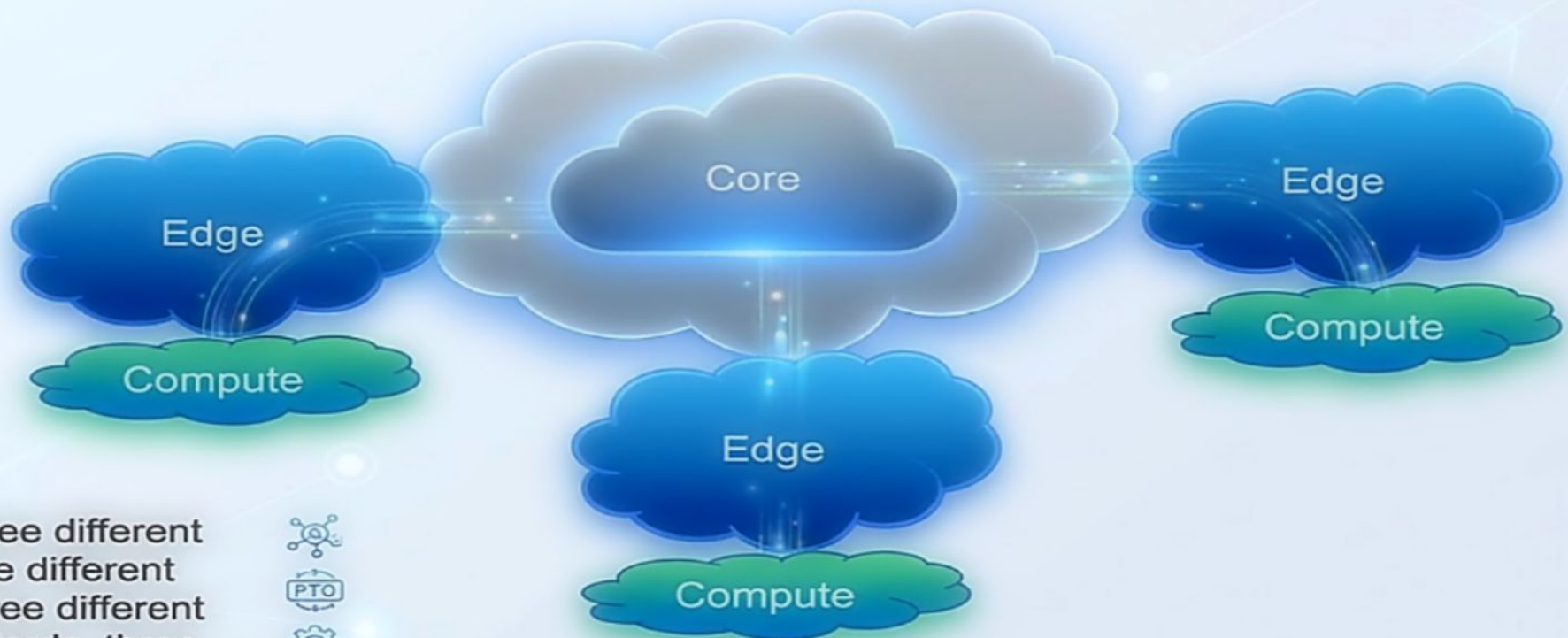


- All-Segment Convergence (Consumer, Business, Wireless)

- A unified Packet/Optical Network access layer

# Abstract

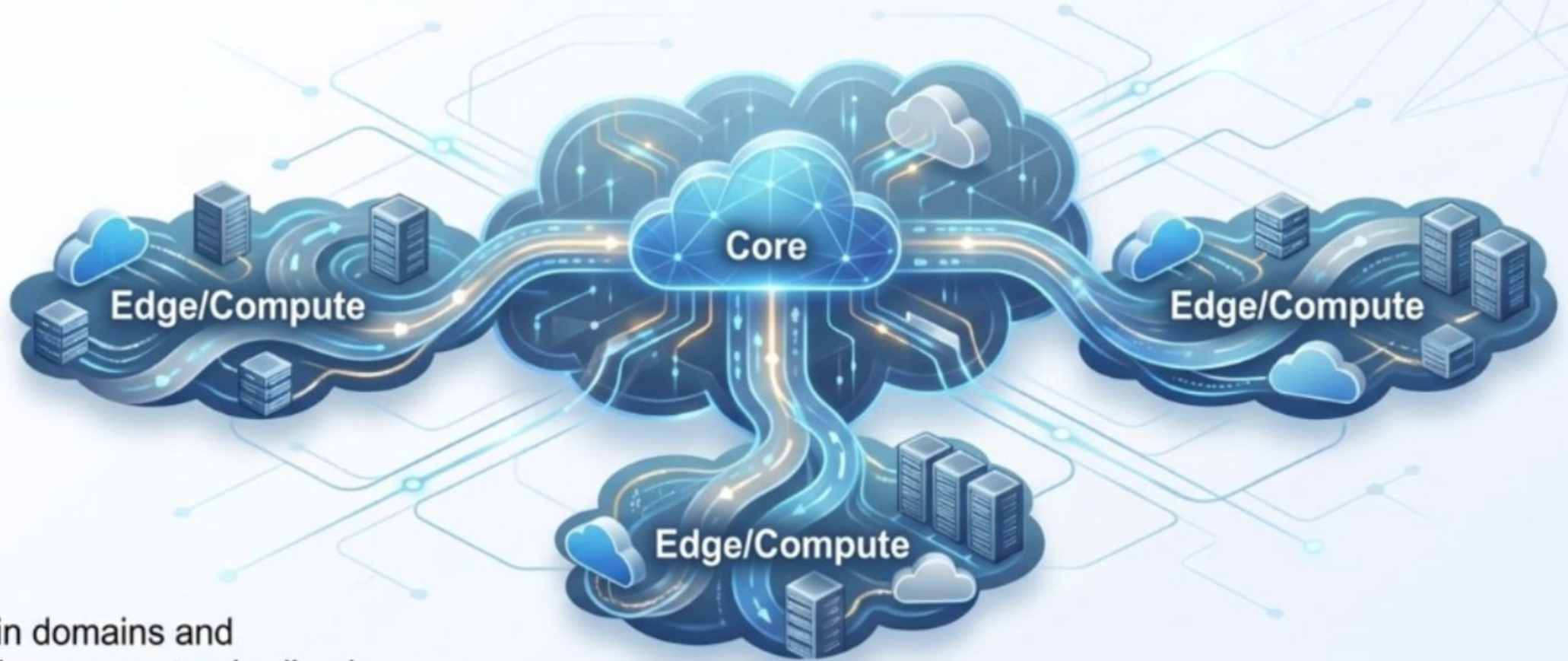
- Compute infrastructure is often protocol-isolated from IP networks
- This drives high scale and feature complexity in network hardware
- Moving encapsulation to the host reduces IP hardware requirements
- Hosts can then integrate directly into the IP fabric and gain network visibility



For end-to-end, three different domain types, three different encapsulations, three different configuration standards, three different traffic engineering(TE) problems

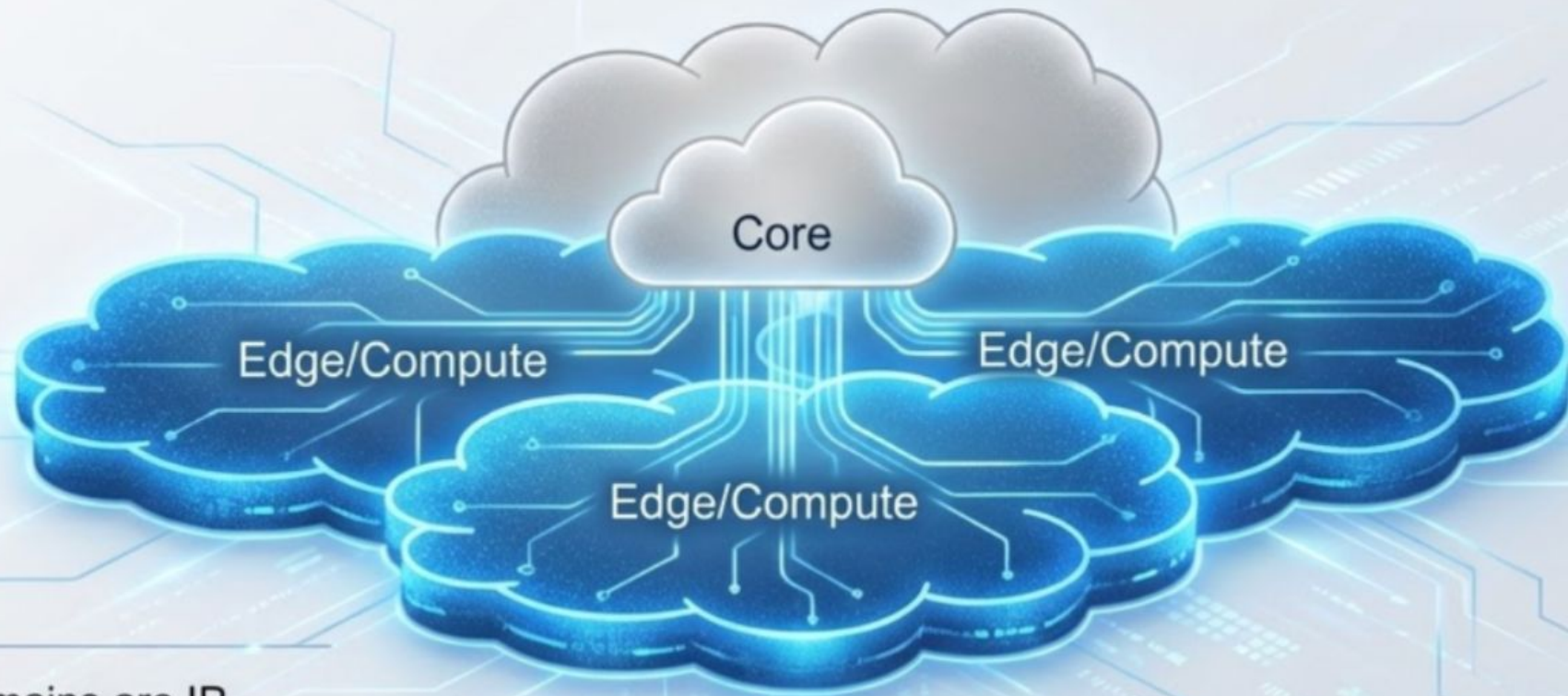


# Network Evolution .. 1



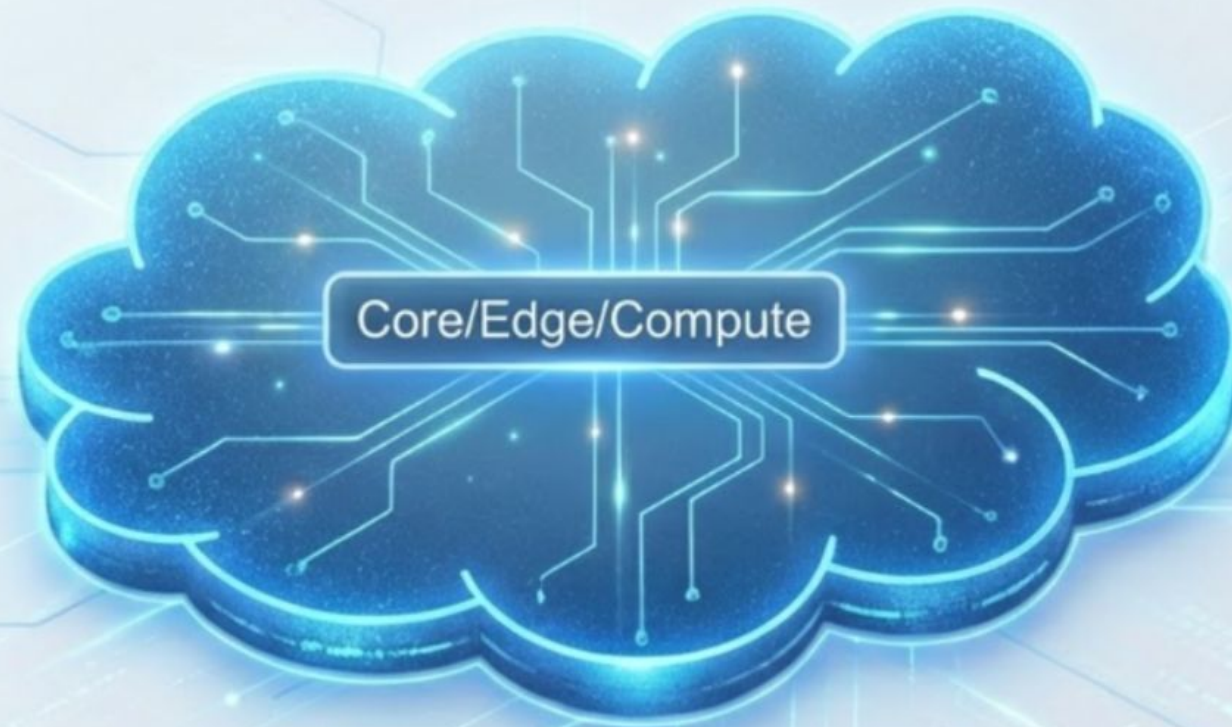
Reduction in domains and encapsulation, more standardized configurations and TE is simplified in domain

# Network Evolution .. 2



Edge/Compute domains are IP connected to appear flat, 1 encapsulation, traffic engineering Edge/Compute across domains.

# SRv6 in Compute, Edge & Core



SRv6 in all domains

single encap

single configuration standards,

single TE policy



