



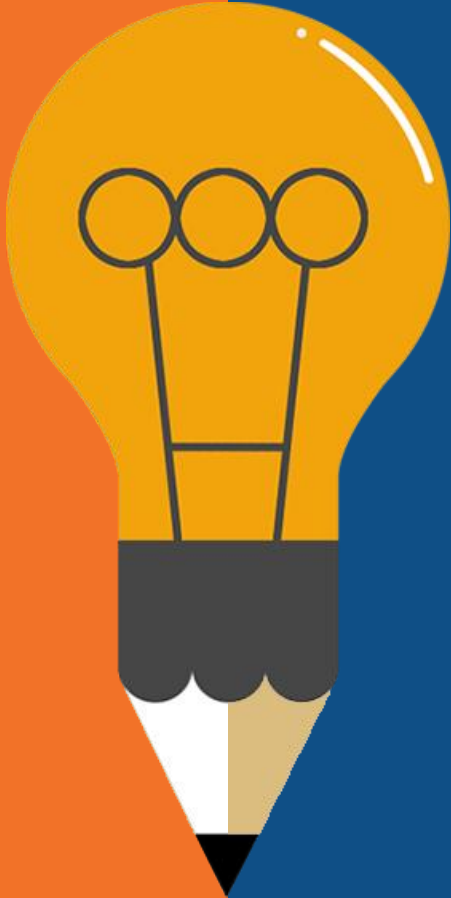
Telecom



IPv6 ONLY at FPT

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IPv6 EVOLUTION AT FPT TELECOM

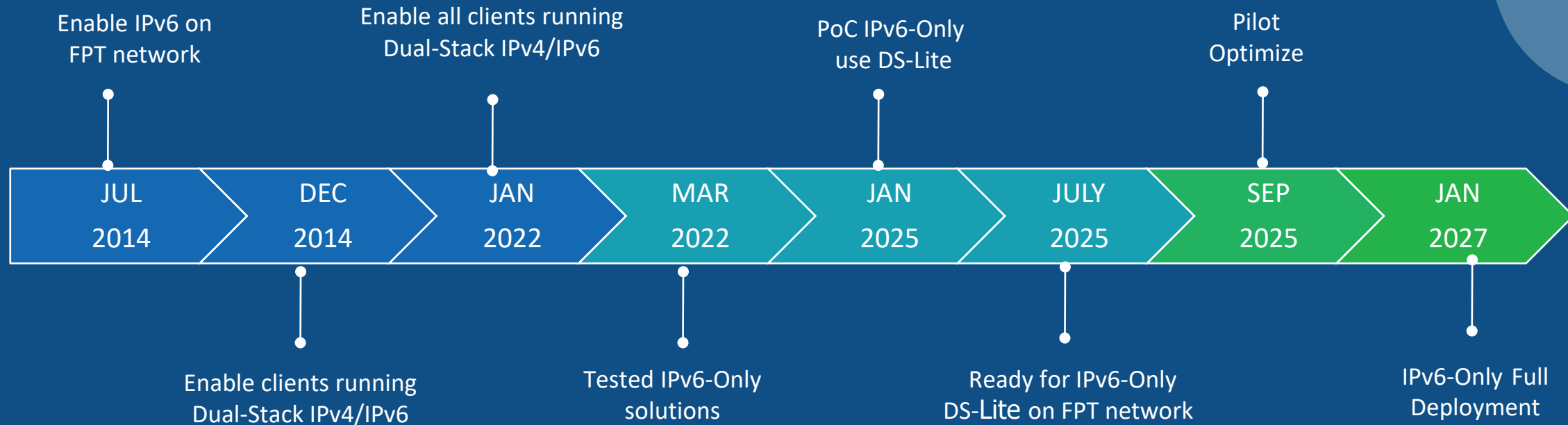
02

IPV6-ONLY WITH DS-LITE

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IPv6-ONLY DEPLOYMENT AT FPT TELECOM

IPv6 EVOLUTION AT FPT TELECOM



IPV6 EVOLUTION AT FPT TELECOM

93.21%

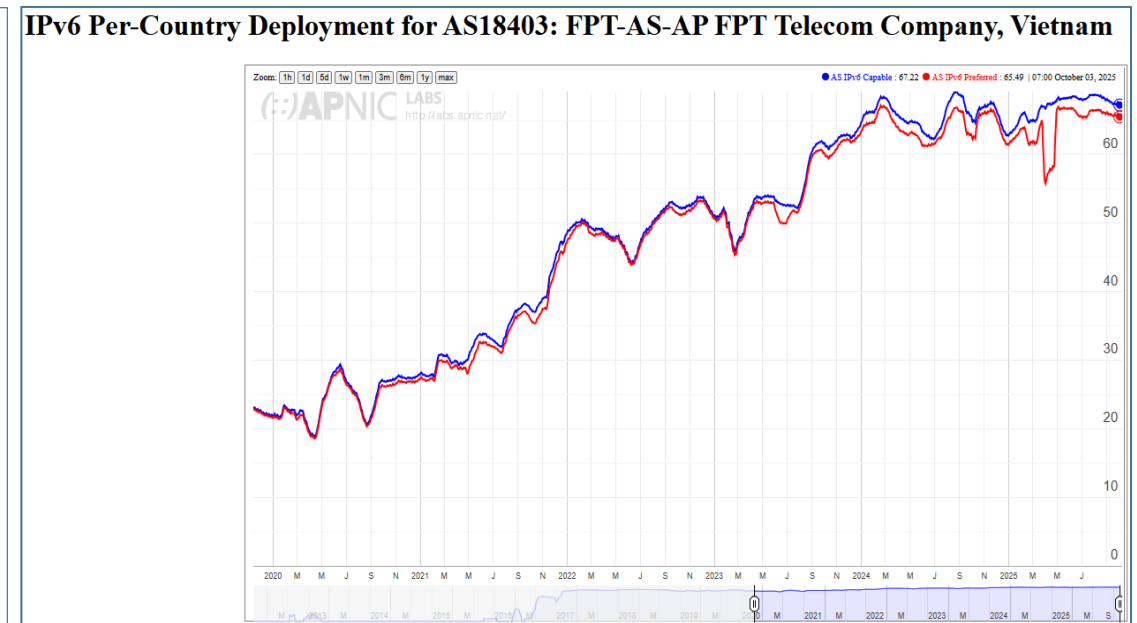
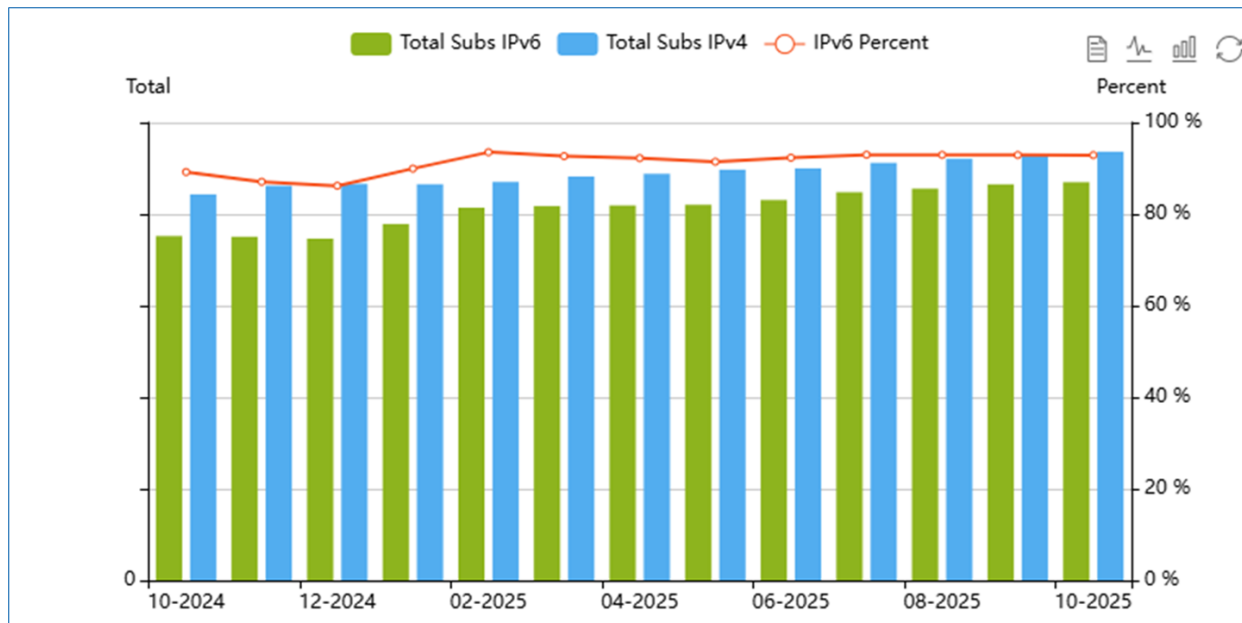
IPv6 Subscribers

67.48%

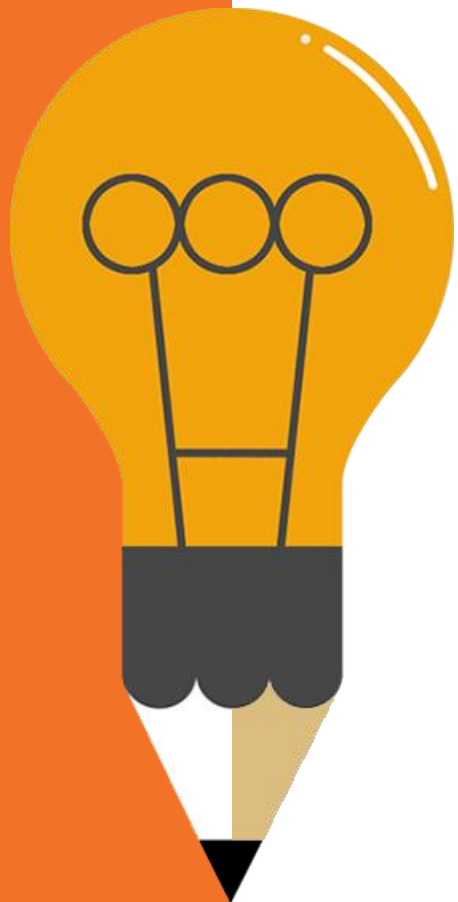
IPv6 Capable

65.88%

IPv6 Preferred



<https://stats.labs.apnic.net/ipv6/AS18403?a=18403&c=VN&x=1&s=0&p=1&w=30&x=0&p=0>

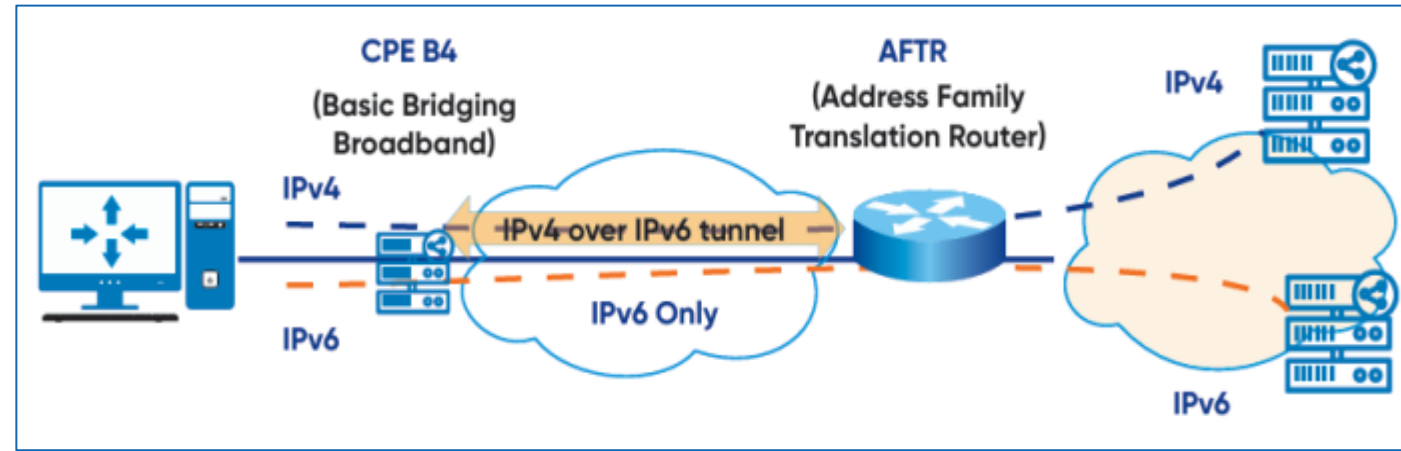


IPV6-ONLY WITH DS-LITE

DS-LITE ARCHITECTURE

Standardized in RFC 6333 and uses a tunnel mechanism between the CPE B4 and AFTR (ISP) to encapsulate IPv4 packets transmitted over IPv6 only networks.

DS-Lite is a commonly used solution for the conversion of fixed broadband networks of telecommunications enterprises.



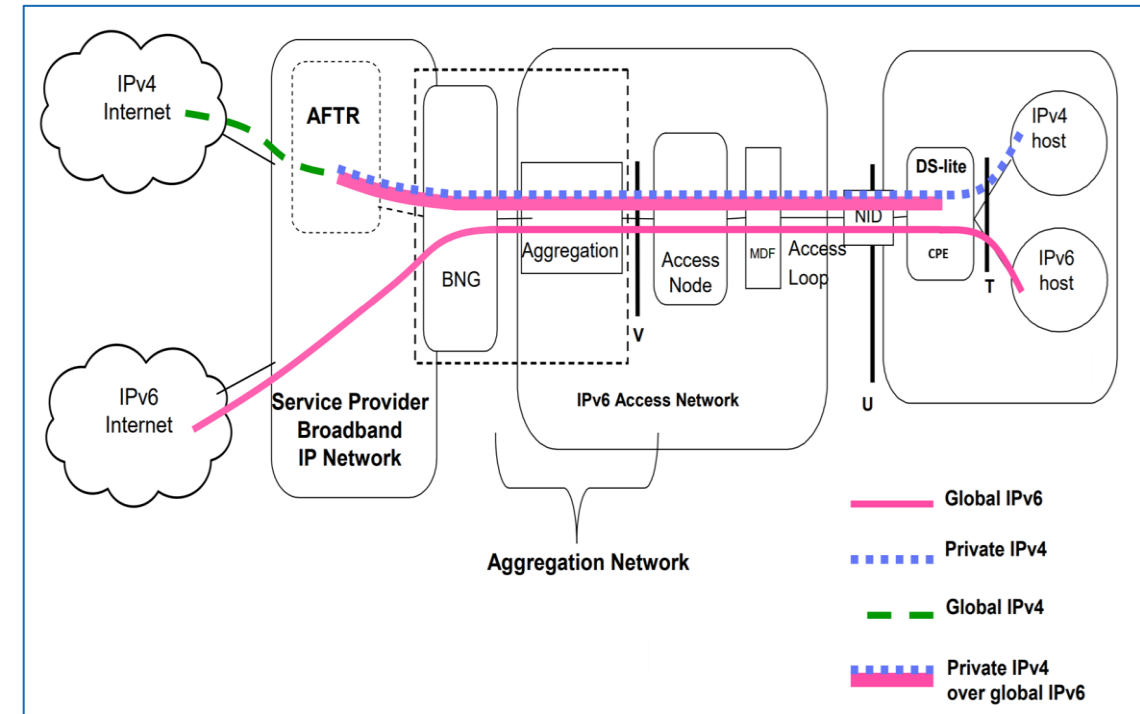
CPE B4 (Basic Bridging Broadband): At the **user side**, it runs IPv4/IPv6, creates an IPv4-over-IPv6 tunnel to the AFTR, and encapsulates IPv4 traffic for transmission over the IPv6 network.

AFTR (Address Family Transition Router): Placed at the ISP side, it is the **tunnel endpoint** from the CPE B4, unwraps the IPv6 to retrieve the IPv4 packet, and then uses **NAT44** for continued transition to the IPv4 Internet.

DS-LITE WITH PPPOE ACCESS

PPPoE session runs between the **CPE** and the **BRAS/BNG** (IPv6-only). A **DS-Lite softwire** (IPv4-in-IPv6) is established between the **CPE (B4)** and an **AFTR** (CGNAT).

- User **IPv4** traffic is encapsulated into the DS-Lite softwire and carried inside the PPPoE IPv6 session toward the BRAS. The **BRAS** terminates PPPoE and forwards the encapsulated traffic to the **AFTR**; the AFTR **decapsulates** and performs **NAT44** to translate the user's private IPv4 to a public IPv4 address.
- **Native IPv6** traffic also rides the PPPoE session and is forwarded **without NAT**



References: Broadband Forum TR-242

DS-LITE TECHNICAL REQUIREMENTS



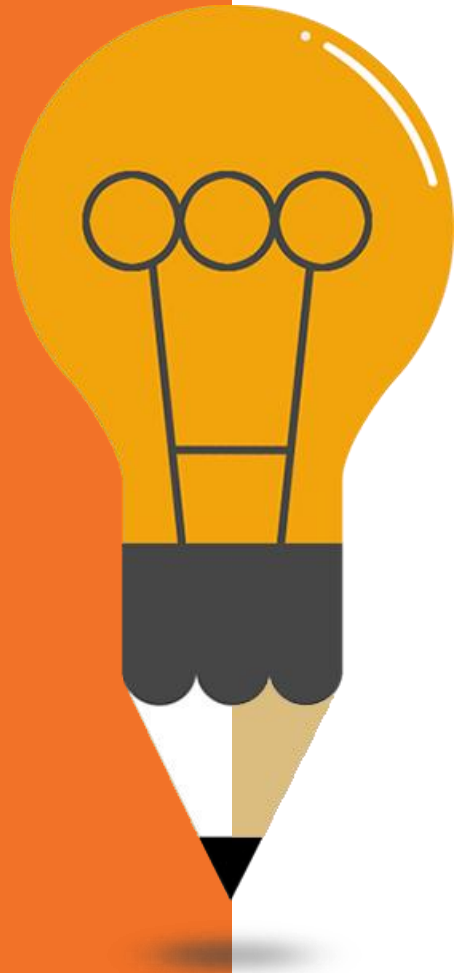
CPE (B4 Element)

- IPv4-in-IPv6 tunnel endpoint (software indicator)
- Deactivate NAPT on DS-Lite interface
- IPv4-in-IPv6 encapsulation support
- AFTR acquisition via DHCPv6, TR-069, or manual
- Static IPv4 default route configuration
- TCP MSS rewriting capability
- IPv4 DNS proxy support (RFC 5625)



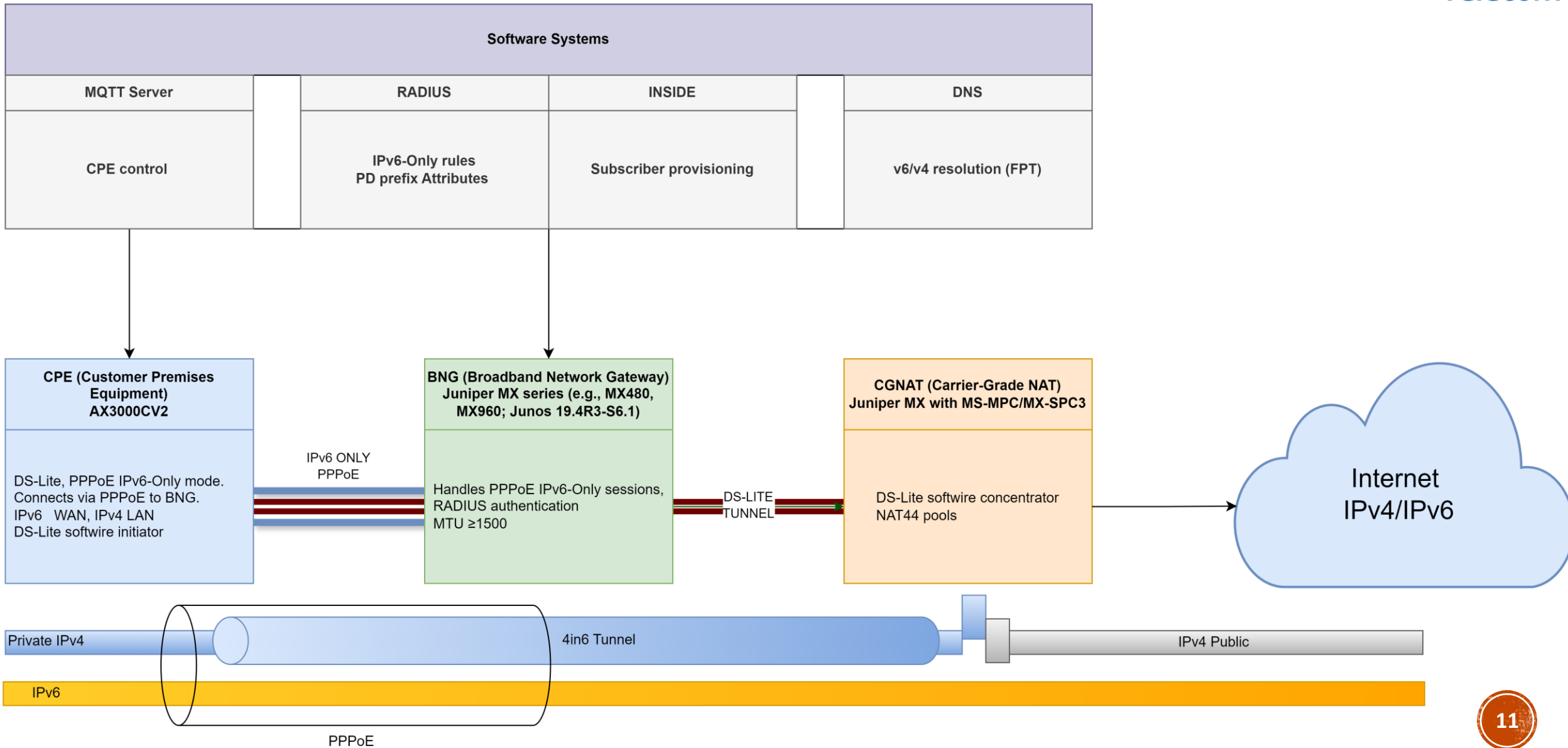
AFTR Element

- IPv4-in-IPv6 tunnel endpoint (software concentrator)
- IPv4-IPv4 NAPT (NAT44)
- Standalone node (CGNAT) or BNG-embedded
- TCP MSS rewriting for software packets



IPv6-ONLY DEPLOYMENT AT FPT TELECOM

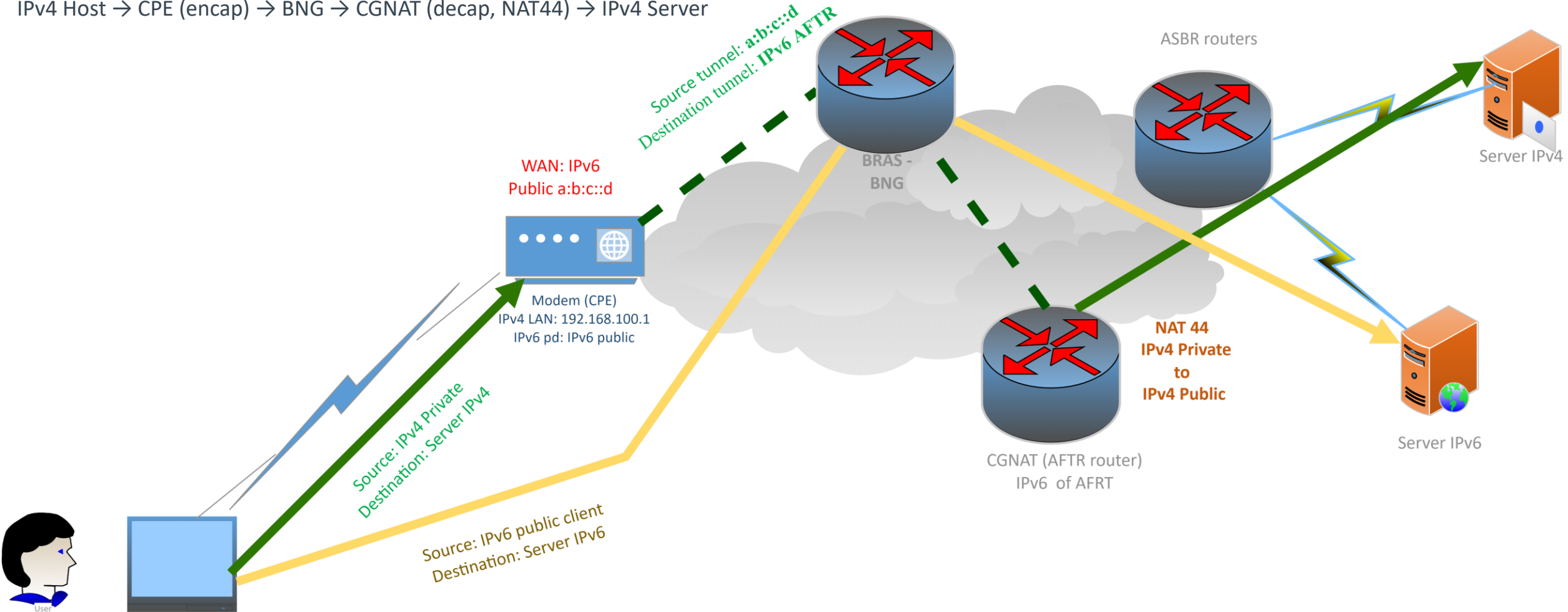
TOPOLOGY



TRAFFIC FLOW

IPv4 via DS-LITE

IPv4 Host → CPE (encap) → BNG → CGNAT (decap, NAT44) → IPv4 Server



IPv6 Native Path

Host → CPE → BNG → Core IPv6 → IPv6 Server

RESULTS ACHIEVED



Mar 2025

Infrastructure Deployment

CPE, BNG/BRAS, and
AFTR/CGNAT production-ready.

Jul 2025

System Integration

RADIUS for policy, Inside for
subscriber management, MQTT for
device control, internal ops tools.

Sep 2025

Pilot & Internal Testing

Pilot with 100 internal customers to evaluating general service
performance and user experience..

KEY TECHNICAL ACHIEVEMENTS

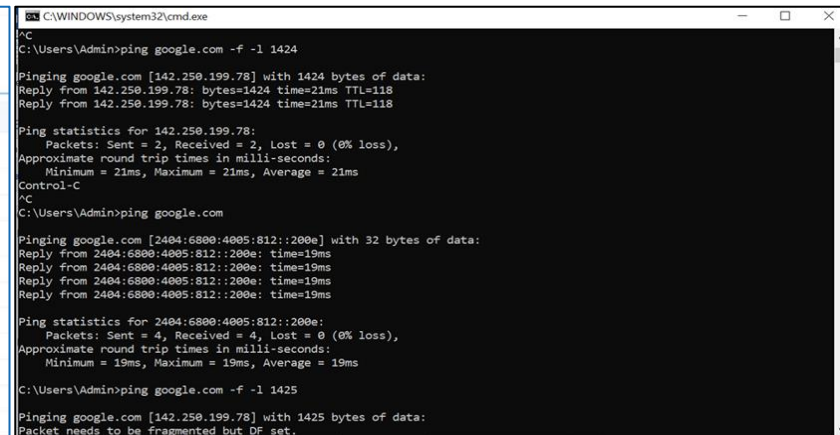
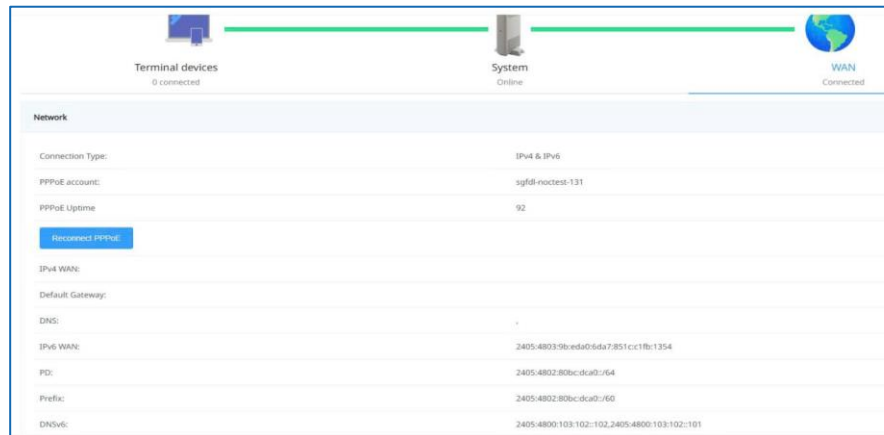
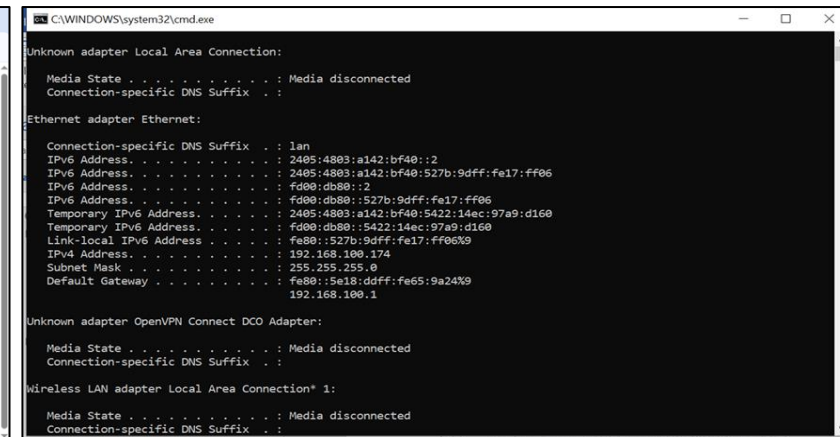
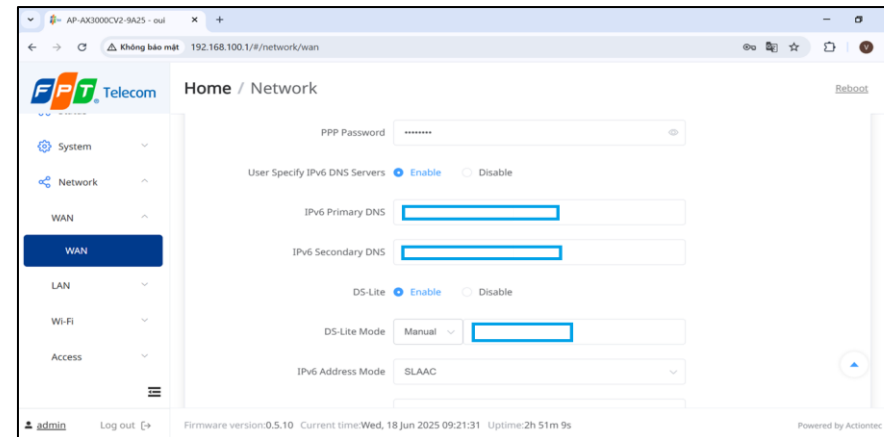
PPPoE IPv6-Only with a DS-Lite softwire delivers mainstream Internet access for the vast majority of FTEL customers—smooth performance with no perceptible difference versus today's PPPoE dual-stack with NAT444

DS-Lite Implementation

IPv4-over-IPv6 softwire (B4/AFTR),
no client IPv4 allocation.

RADIUS Integration

IPv6-only policy and subscriber
provisioning integrated.



MQTT Control

Dynamic CPE configuration
management in place.

Service Support

Web, streaming, email, DNS
verified.



UPCOMING PLANS

Our strategic three-phase approach to modernizing network infrastructure and transitioning to IPv6-only services.

1

Q4 2025

Infrastructure Foundation

Complete estate-wide CPE upgrade and operationalize end-to-end IPv6 service-quality monitoring across the network.

2

Q1 2026

Customer Pilot Launch

Complete customer pilot program, onboarding up to **10,000 IPv6-Only users** to validate service delivery.

3

Q1 2027

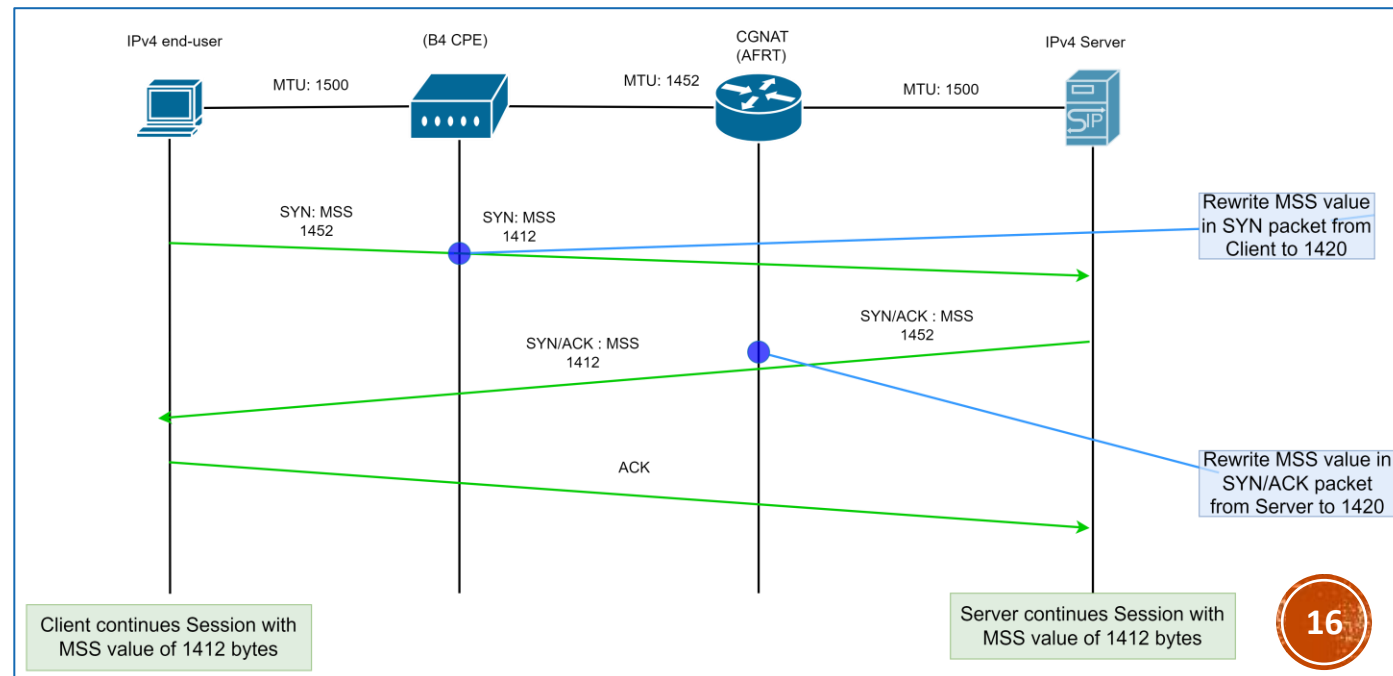
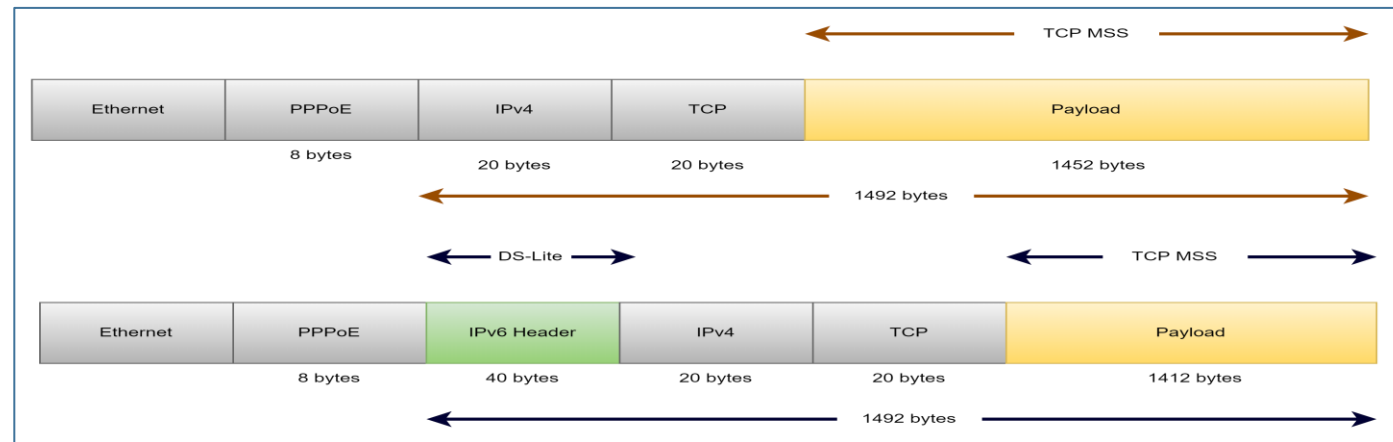
Commercial Rollout

Enter broad commercial deployment with phased regional expansion leading to full network availability.

ISSUES AND RESOLUTIONS

❑ MTU on IPv6-Only use DS-Lite

- DS-Lite adds **+40 B** (outer IPv6 header). So the **inner IPv4 MTU = IPv6 MTU – 40**.
- DS-Lite tunnels may drop high-MSS packets that exceed path MTU.
- Ensure **IPv6 MTU** on the PPPoE WAN is known (1500 preferred; 1492 if legacy).
- Enable **MSS rewrite** only on the **DS-Lite software direction** (egress toward AFTR).
- In practice, clamp TCP MSS within **1280–1400** bytes



THANKS!

Do you have any questions?

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