

# An Incremental Carrier-Grade NAT (CGN) for IPv6 Transition

**draft-jiang-v6ops-incremental-cgn-03**

**Dayong Guo**  
**Sheng Jiang**  
*Huawei*

**Brian Carpenter**  
*University of Auckland*

*November 2009*

# Updates since last time

- Applied all review comments received (special thanks to Fred Templin)
- Mention IPv4-in-IPv6-in-IPv4 DSLITE as theoretical option
- Mention 6over4 and 6to4
- Restored reference to 1500 byte MTU (see next slide)
- Various minor wording improvements

# Careful MTU wording

- ...a user behind the [dual stack home gateway] will see normal IPv6 service.

We therefore observe that an IPv6 tunnel MTU of at least 1500 bytes would ensure that the mechanism does not cause excessive fragmentation of IPv6 traffic nor excessive IPv6 path MTU discovery interactions.

# FYI: Implementation plan

- Experimental implementation (Huawei collaboration with Tsinghua University) is currently going on, internal test may take before IETF 77, open source may be published May 2010.
- Commercial product: Huawei has plans to support both incremental CGN and DS-lite, depending on customer requests.

# Request for WG adoption

- We have only seen positive comments on the list since -03 version

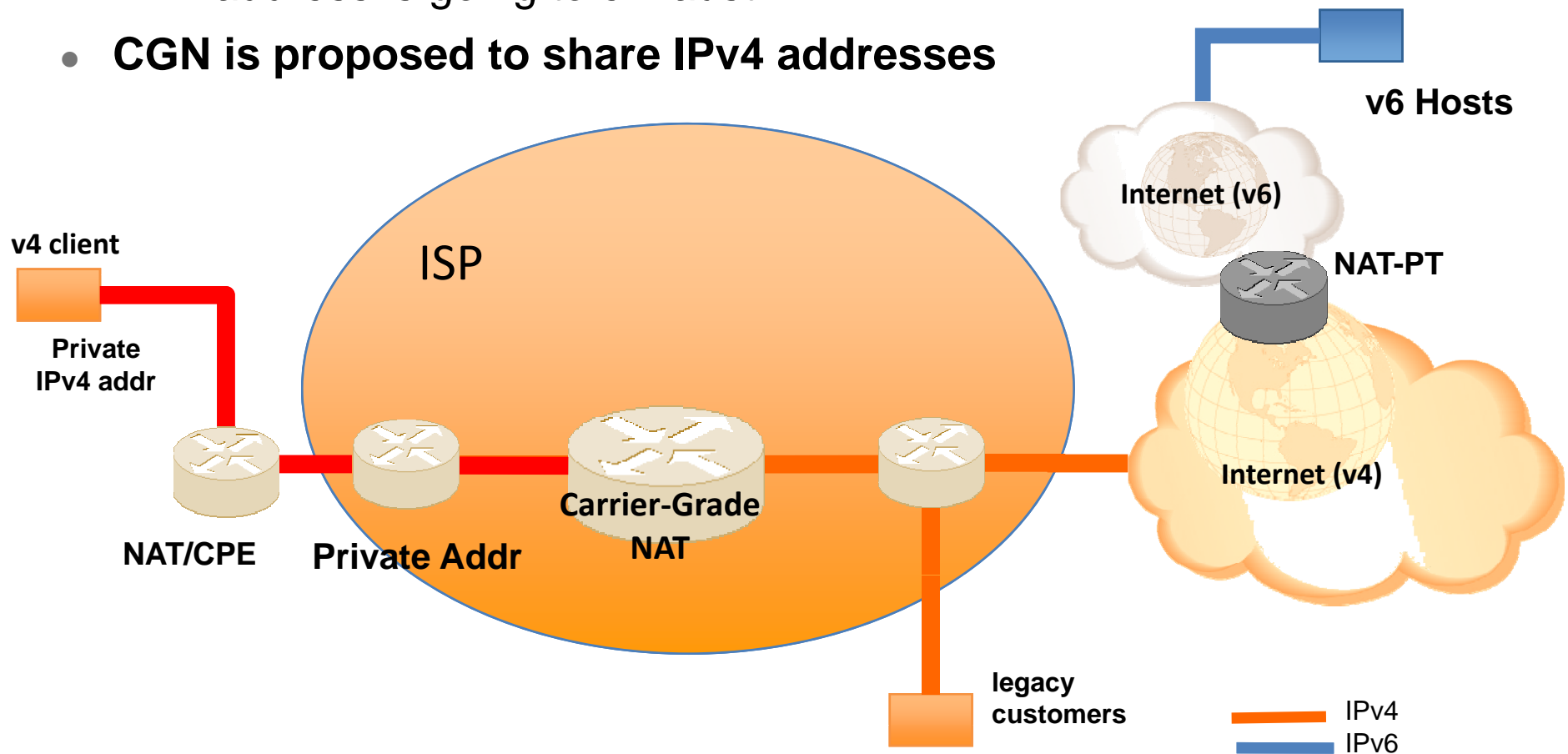
(Appendix: introductory slides used at IETF75)

# Introduction

- **This document proposes a incremental IPv6 deployment scenario/requirement that**
  - combines v4-v4 CGN and IPv6-in-IPv4 tunnels
  - combines various existing proposals including tunnel, nat64, etc.
  - easily migrate towards Dual-stack Lite
  - actively encourages IPv6 adoption
- **This is an operational model, not a protocol proposal**
  - do NOT propose any new transition mechanisms or protocols
  - is complementary to the ongoing work

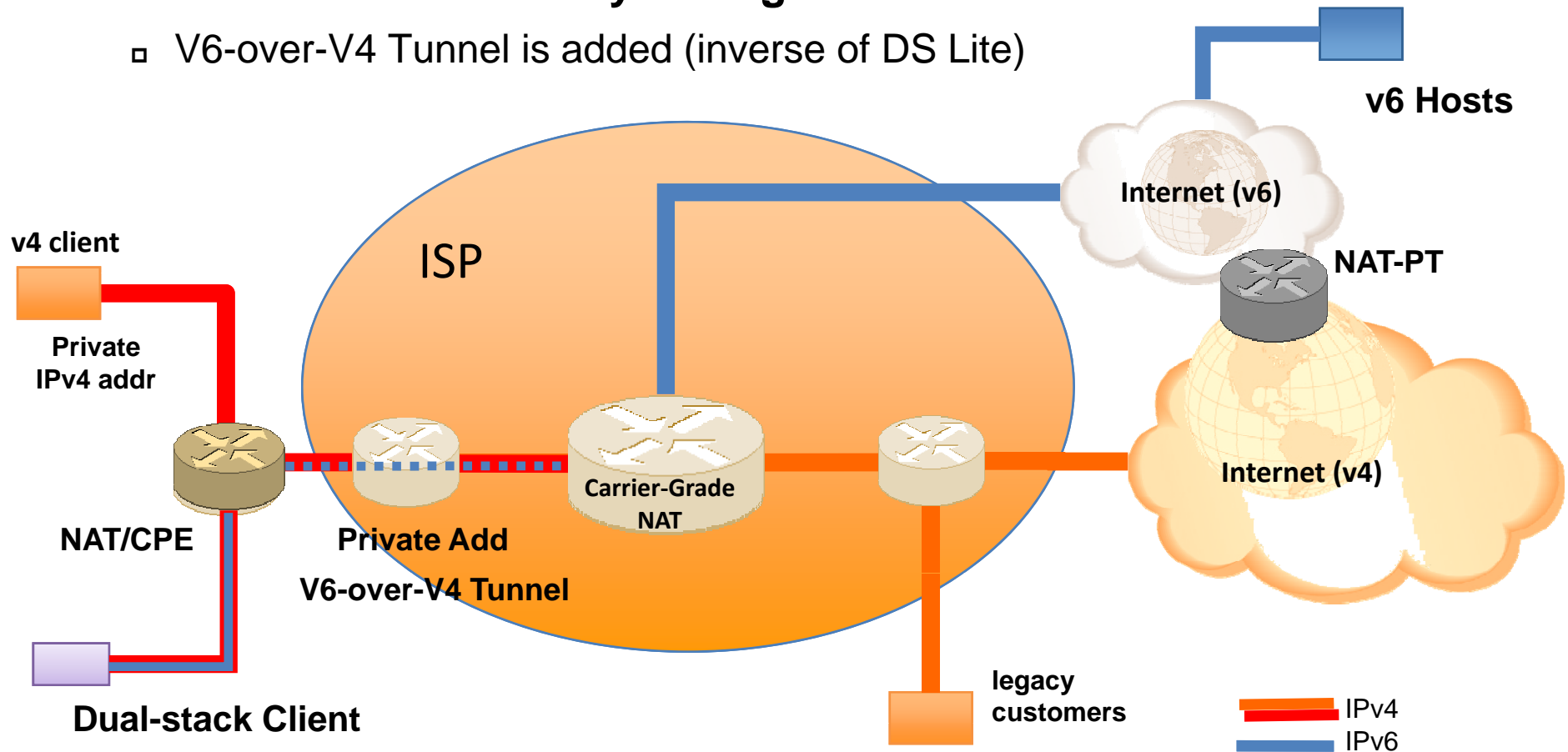
# Carrier-Grade NAT (2008+)

- IPv6 global deployment is slower than expectation
- IPv4 address is going to exhaust
- **CGN is proposed to share IPv4 addresses**



# Incremental CGN Phase 1 (2009+)

- CPE & CGN add more functions
- Enable IPv6 connectivity through ISP IPv4 network
  - V6-over-V4 Tunnel is added (inverse of DS Lite)

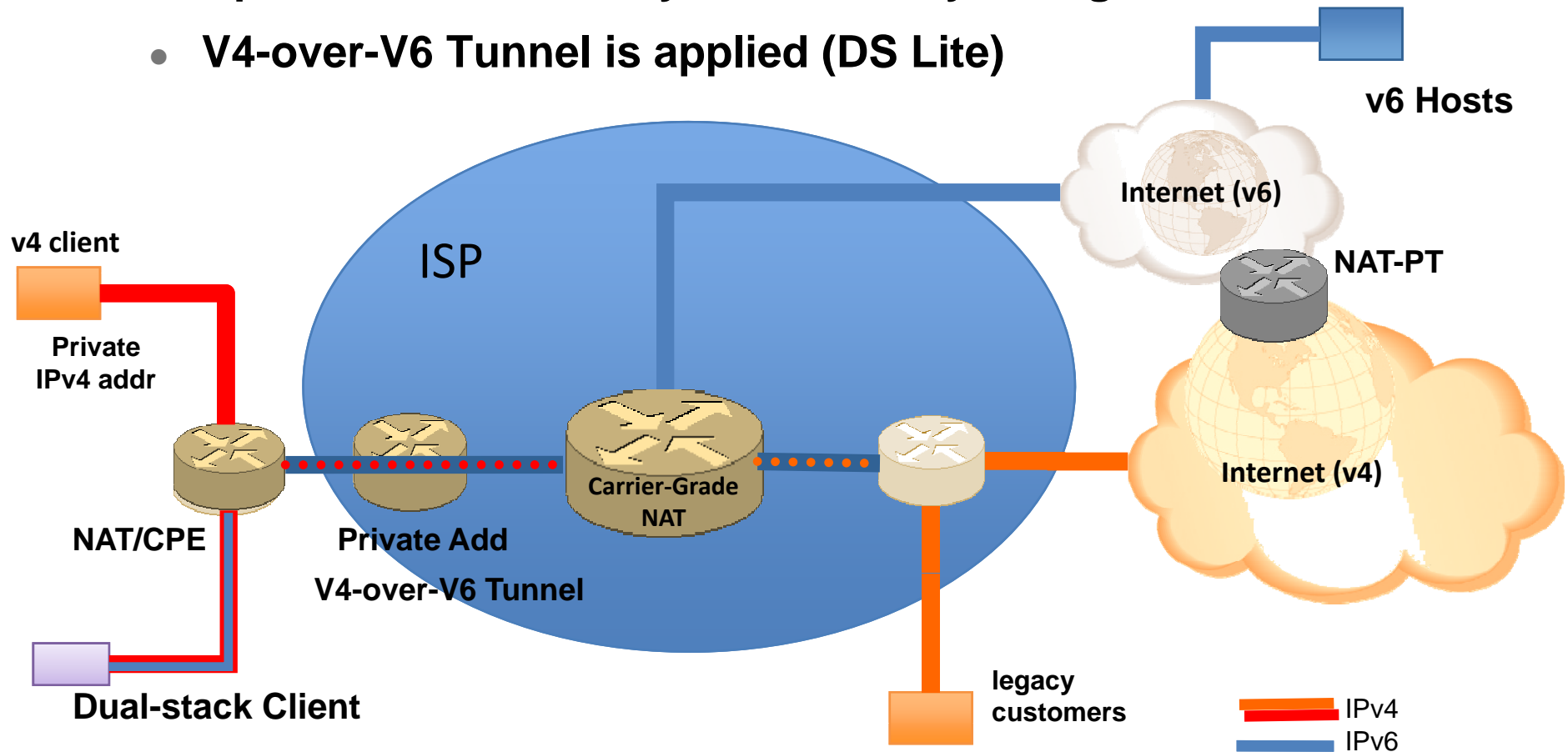




# Incremental CGN Phase 2 (201x+)

When ISP decides to switch the whole network to IPv6\*

- Update CGN; CPE may not need any change
- V4-over-V6 Tunnel is applied (DS Lite)



\*avoiding dual stack

# Details

- **Like 6RD and DS Lite, the CPE must know what's going on.**
  - CPE should auto-detect the change from Phase 1 to Phase 2.
- **ISP gains IPv6 experience and confidence during Phase 1, with no risk to IPv4 operations.**
  - Defers most IPv6 deployment effort to Phase 2.
  - Allows ISP never to run dual stack routing.
    - But does not prevent dual stack routing if preferred.
- **Phase 1 tunnels could be 6RD, ISATAP, VET, Auto GRE or 6PE**
  - Tunnel technical should be scalable with minimum operational cost
- **Phase 2 tunnels are DS Lite**
  - No tunnels if ISP chooses full dual stack ISP network