

# Stateless automatic IPv4 over IPv6 Tunneling (SA46T)

draft-matsuhira-sa46t-spec-01.txt

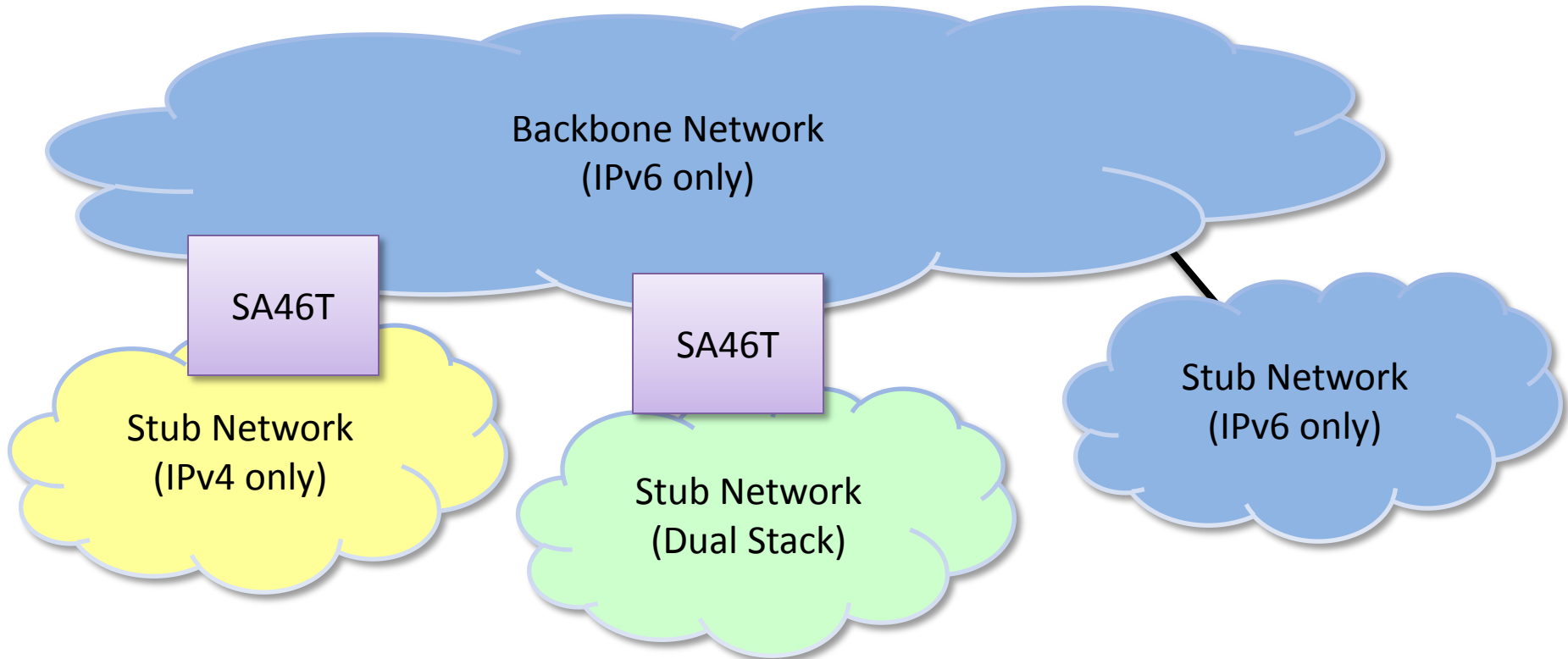
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78th IETF Maastricht, July 2010

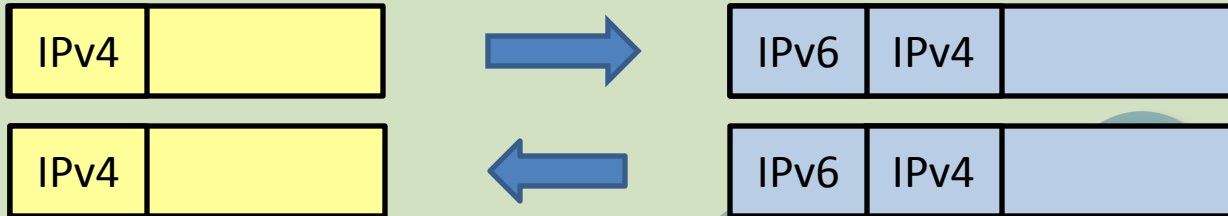
# Network Configuration



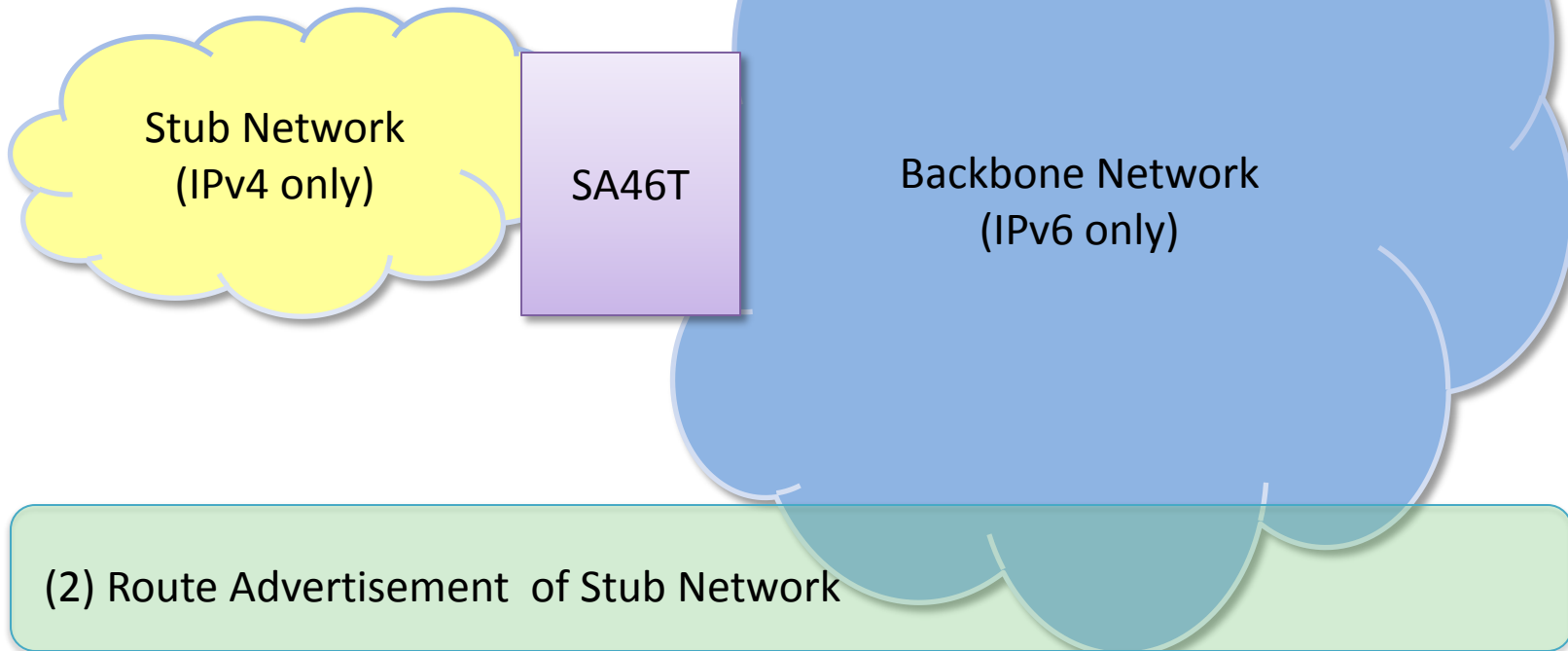
SA46T: Stateless Automatic IPv4 over IPv6 Tunneling

# Function of SA46T

(1) Encapsulation / Decapsulation of IPv4 packet



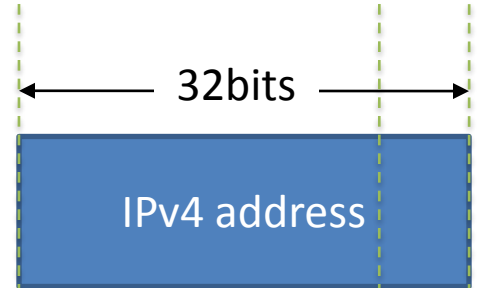
(1-1) Return ICMP Packet too big message (if exceed MTU)



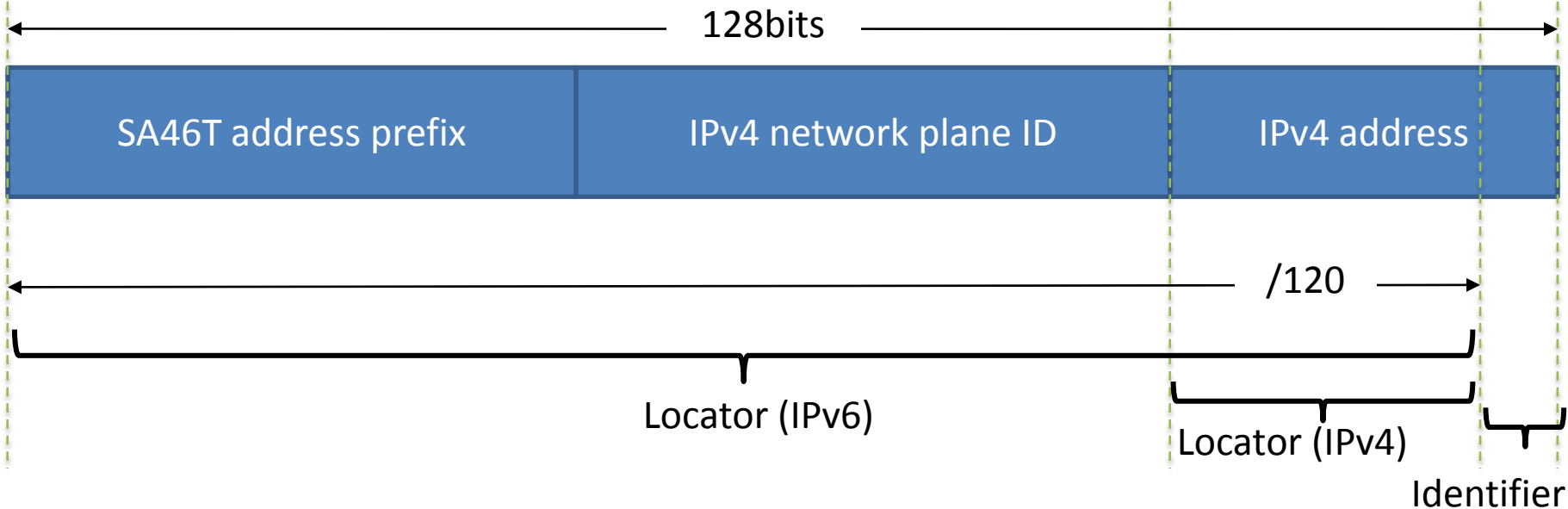
(2) Route Advertisement of Stub Network

# SA46T address architecture and routing

■ IP address of inner IPv4 header

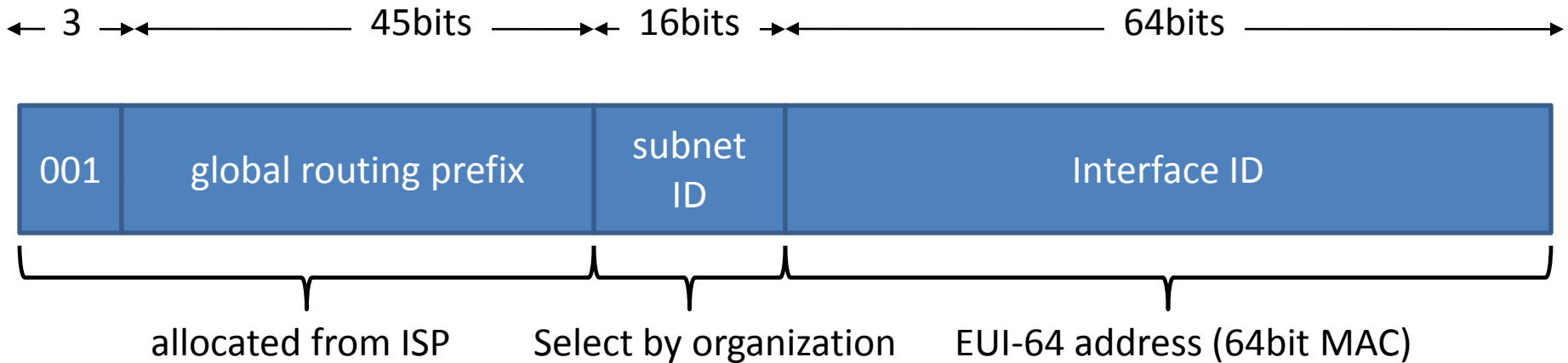


■ IP address of outer IPv6 header (SA46T address)

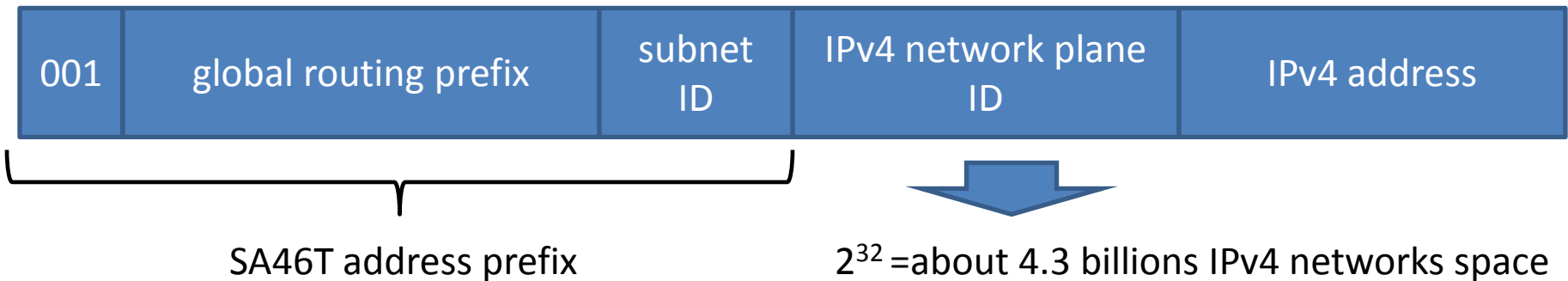


# Example of SA46T address format

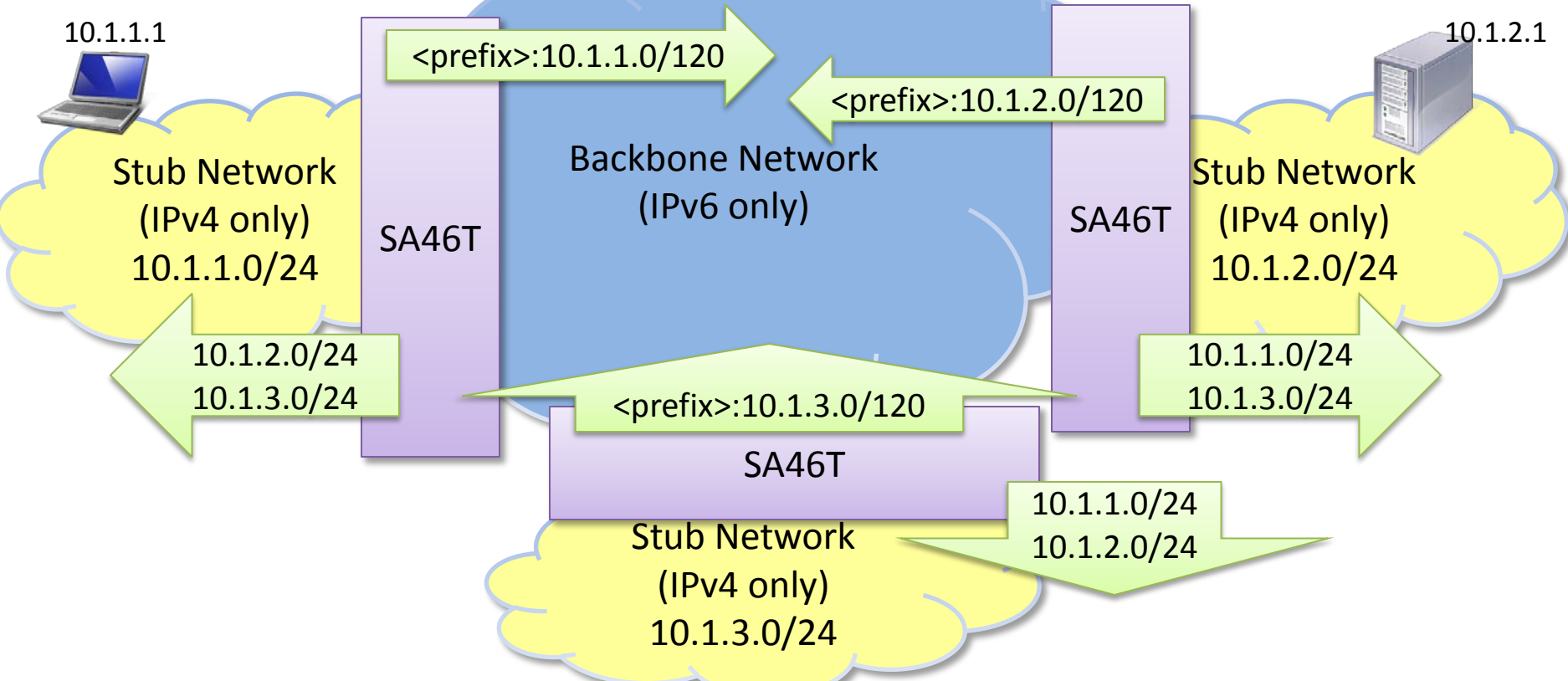
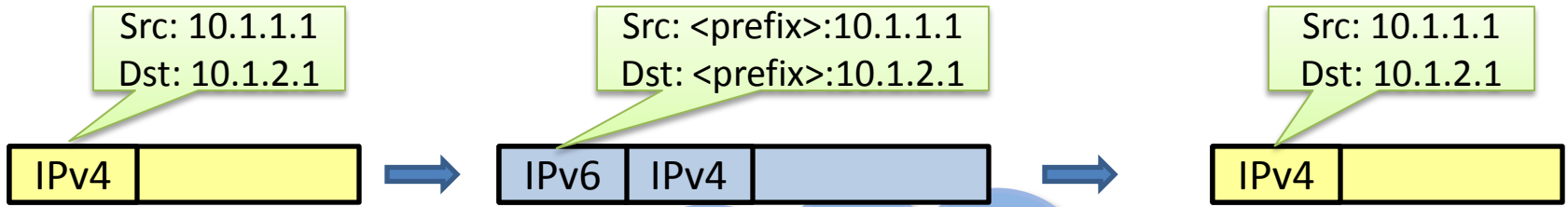
IPv6 Global Unicast Address Format(RFC3587)



SA46T address      Use part of global address space (e.g. one subnet)



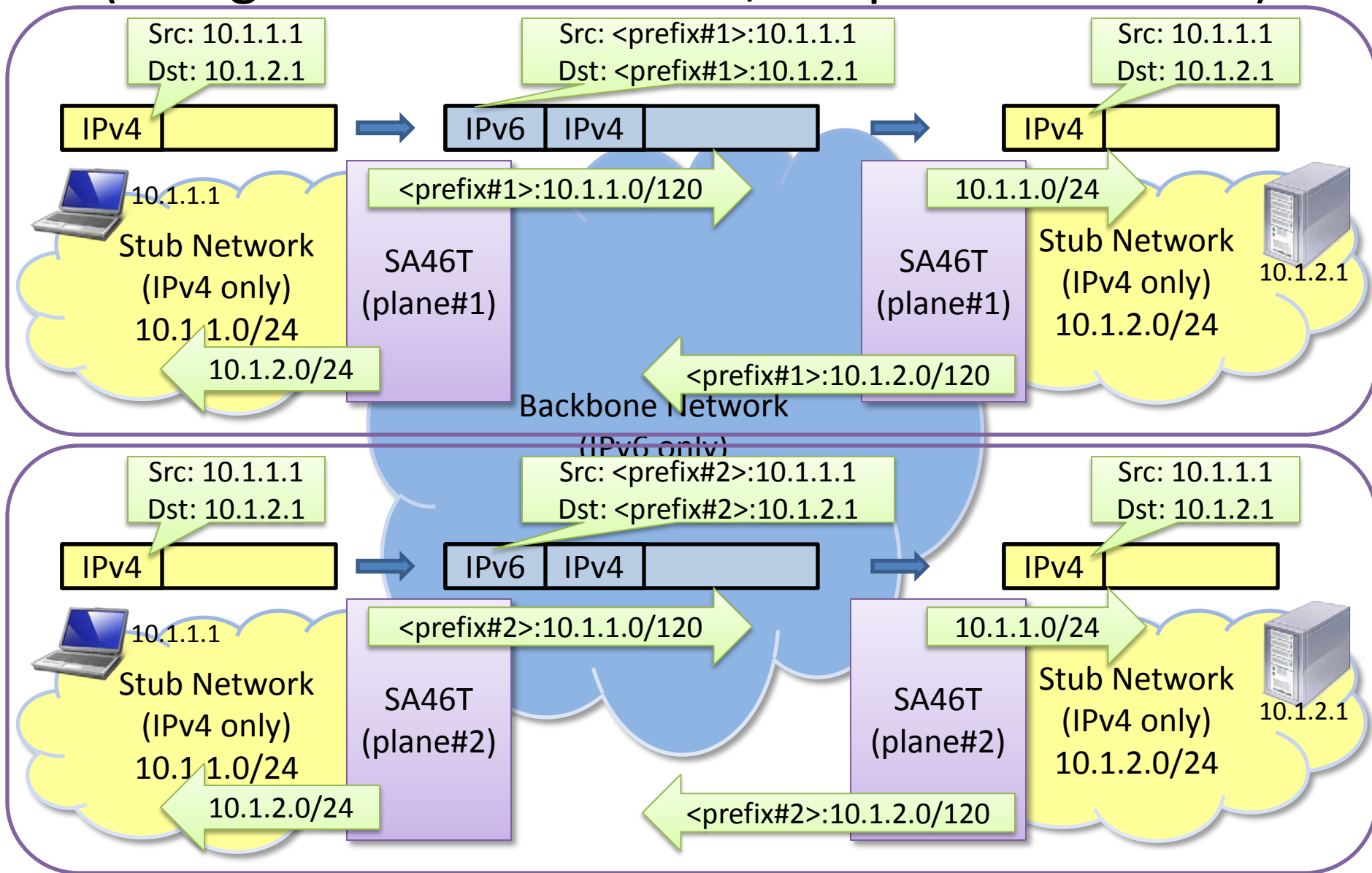
# Route Advertisement



<prefix>: 001+global routing prefix + subnet ID + IPv4 network plane ID

# Stacking Multiple IPv4 Networks

(Using same IPv4 Address, i.e. private address)

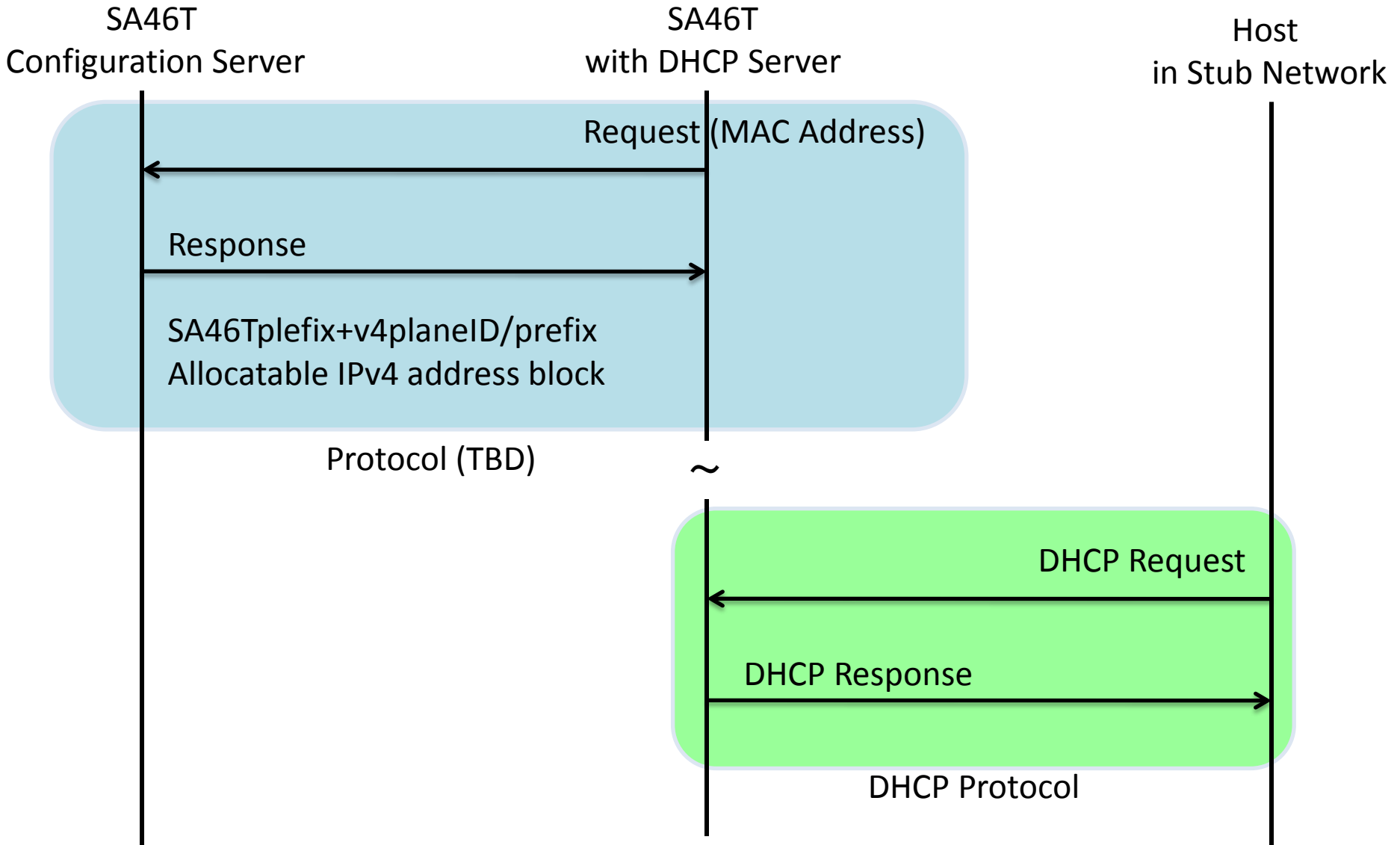


# Configuration of SA46T

- Only one line per SA46T
  - Three information needed, can represent in one line
    - SA46T address prefix + IPv4 network plane ID /Prefix Length
- N numbers of SA46Ts in a Network
  - One line per SA46T x N = N lines in the network
    - static tunneling require  $N(N-1)$
- Adding new SA46T
  - Configure one line to new SA46T
  - No change needed to existing SA46Ts



# Host Configuration in Stub Network

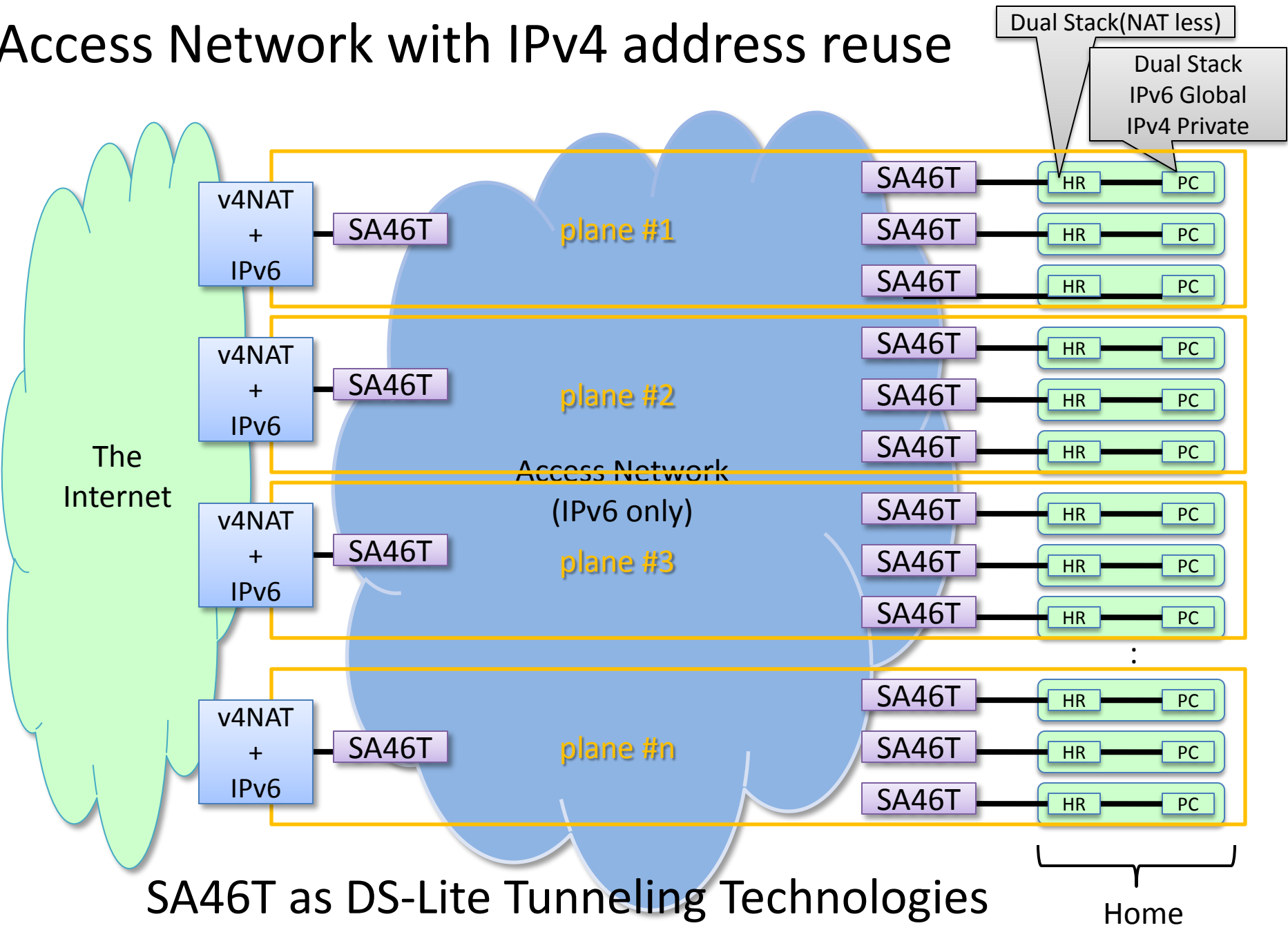


# Applicability of SA46T

(draft-matsuhira-sa46t-applicability-00.txt)

- IPv6 only Campus / Enterprise / ISP Backbone Network
  - Possible transition scenario, edge based solution
- IPv4 VPNs over IPv6 backbone
  - Pure L3 solution, can mix different L2 (wire and wireless)
  - Over 4096 possible, 4.3 billion with 32bits plane ID
  - Inter AS VPN with SA46T Global address
- IPv4 address reuse (IPv4 address sharing)
  - Possible solution for IPv4 Global address running out
  - Can reuse Net10 in each IPv4 plane
  - 4.3 billion IPv4 plane with 32bits plane ID
- Possible Option of Tunneling technology for DS-Lite ?

# Access Network with IPv4 address reuse



SA46T as DS-Lite Tunneling Technologies

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# Current Status and Next Step

- Current Status
  - Initial I-Ds (spec & gaddr) submitted in Feb 2010
  - Presentation at v6ops WG, 77th Anaheim meeting
    - Suggested continuing in software wg
  - update spec and gaddr I-Ds and applicability I-D submitted in July 2010
- Next Step
  - Implementation
  - Experiment in testbed network
  - Planning to report both implementation and experiment at next IETF meeting
- Interests ?
  - WG documents ?

# Summary

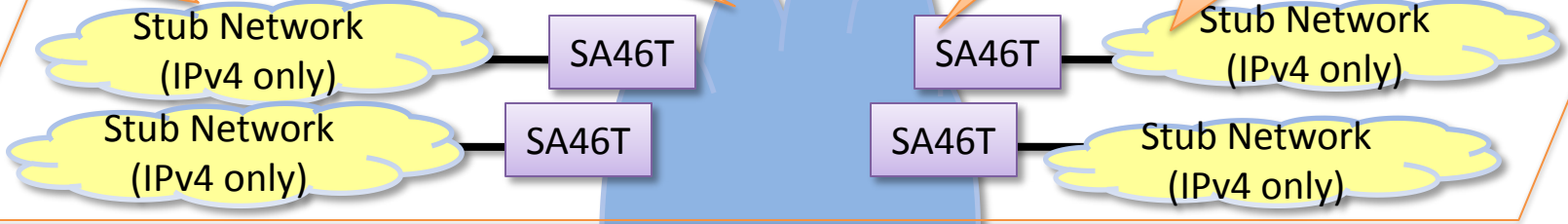
(1) Reduce operation cost by IPv6 only

(2) Reallocate IPv4 addr from B.B. to Stub

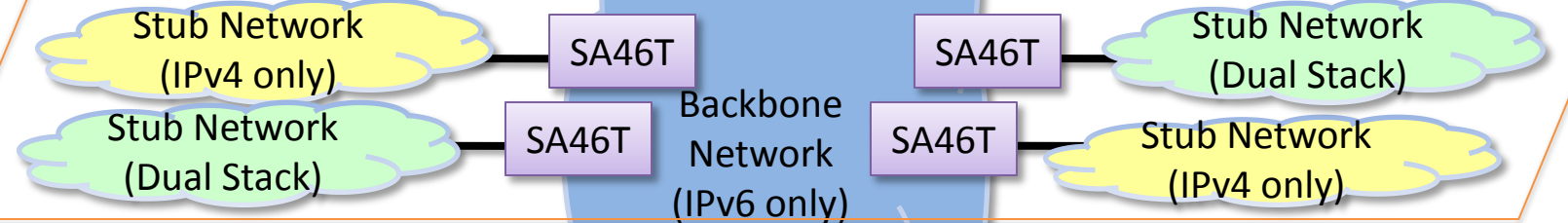
(4) No special protocol

(3) Less configuration

plane#1



plane#2

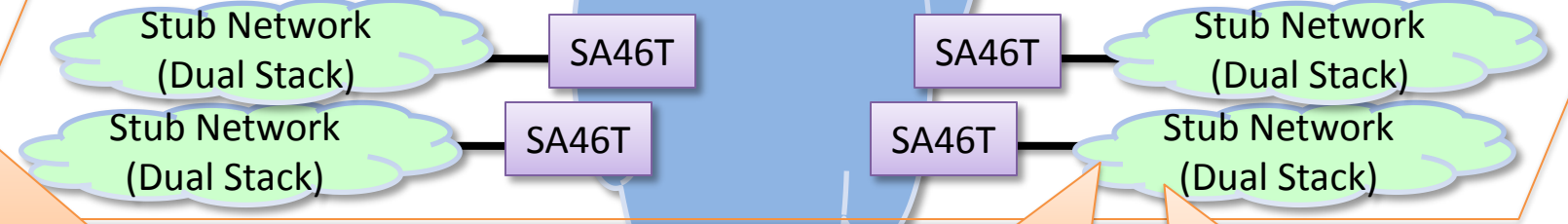


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plane#n



(6) Stacking IPv4 Private networks

(5) No dependence with L2

(8) Provide Redundancy

(7) Easy stop IPv4 operation (just remove SA46T)

# **IPv4 Networks as IPv6 application**

**provided by SA46T**

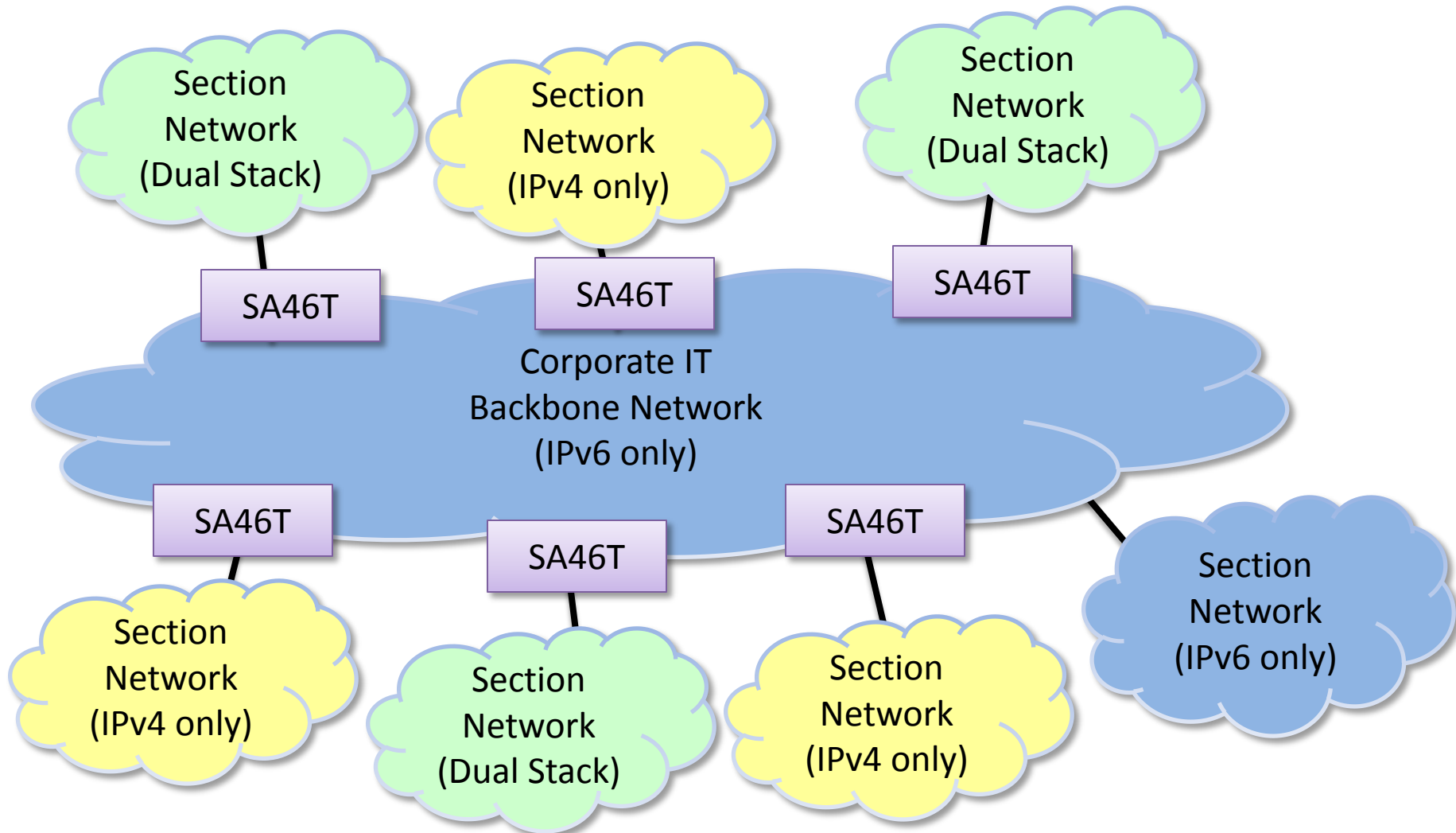
# Prepare for questions

# SA46T Route

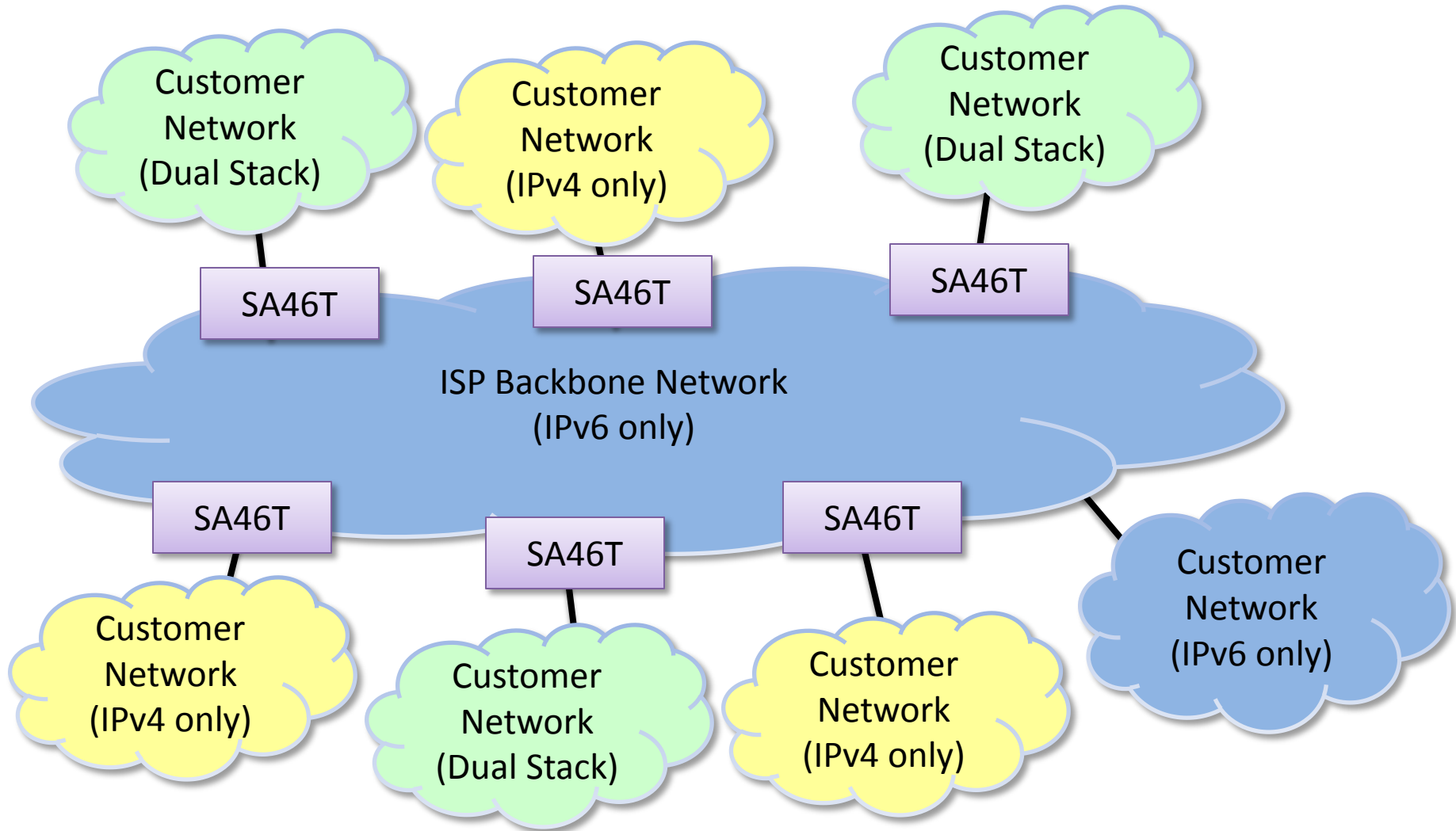
- # of SA46T route is same as # of IPv4 route
  - Total # of route (both IPv6 and IPv4) is remain the same with Dual Stack operation
- Route aggregation may possible
  - same manner with IPv4 route aggregation
- Default route may used
  - SA46T prefix / 96 is example of default route
  - Can reduce # of SA46T route



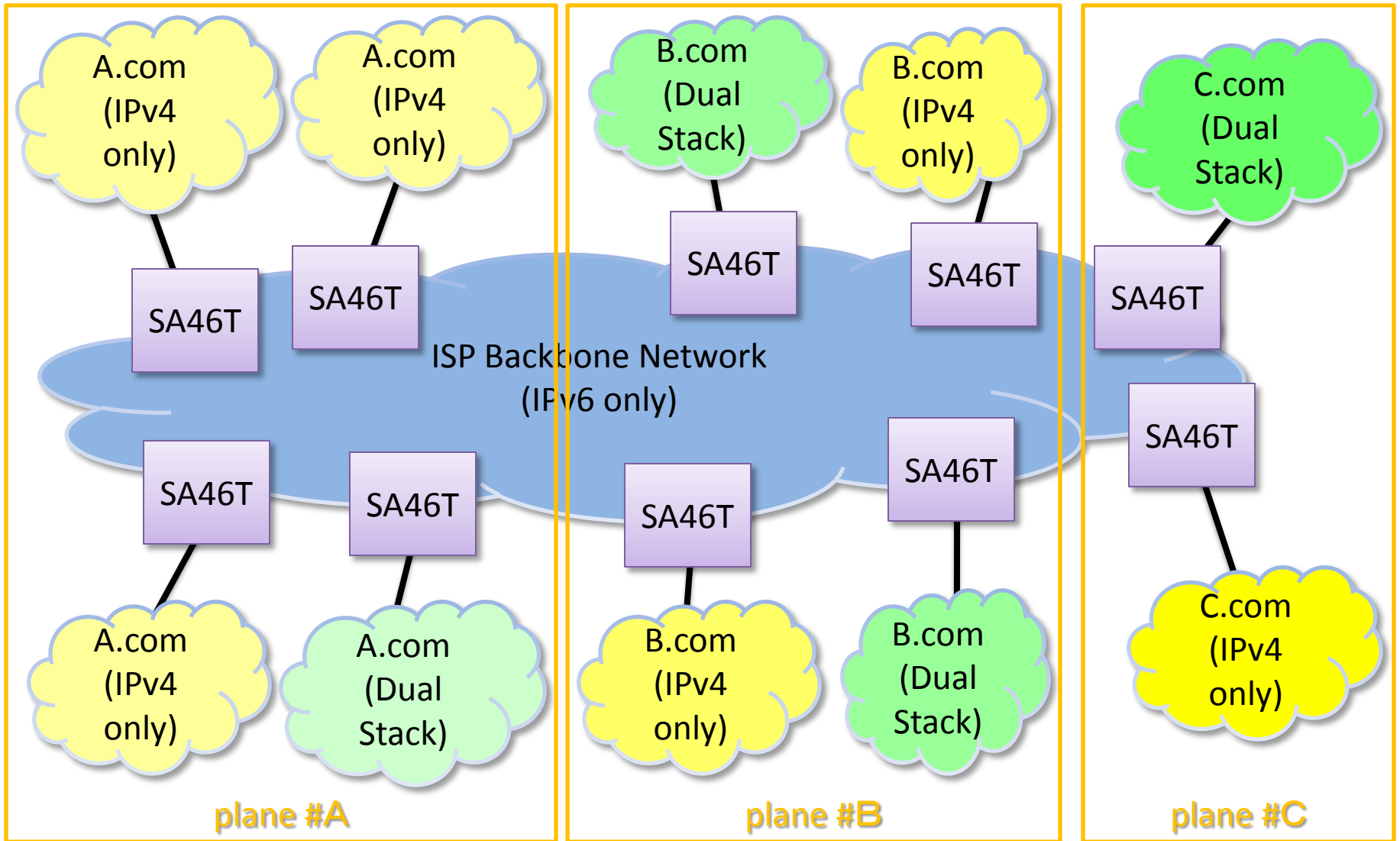
# Enterprise / Campus Network



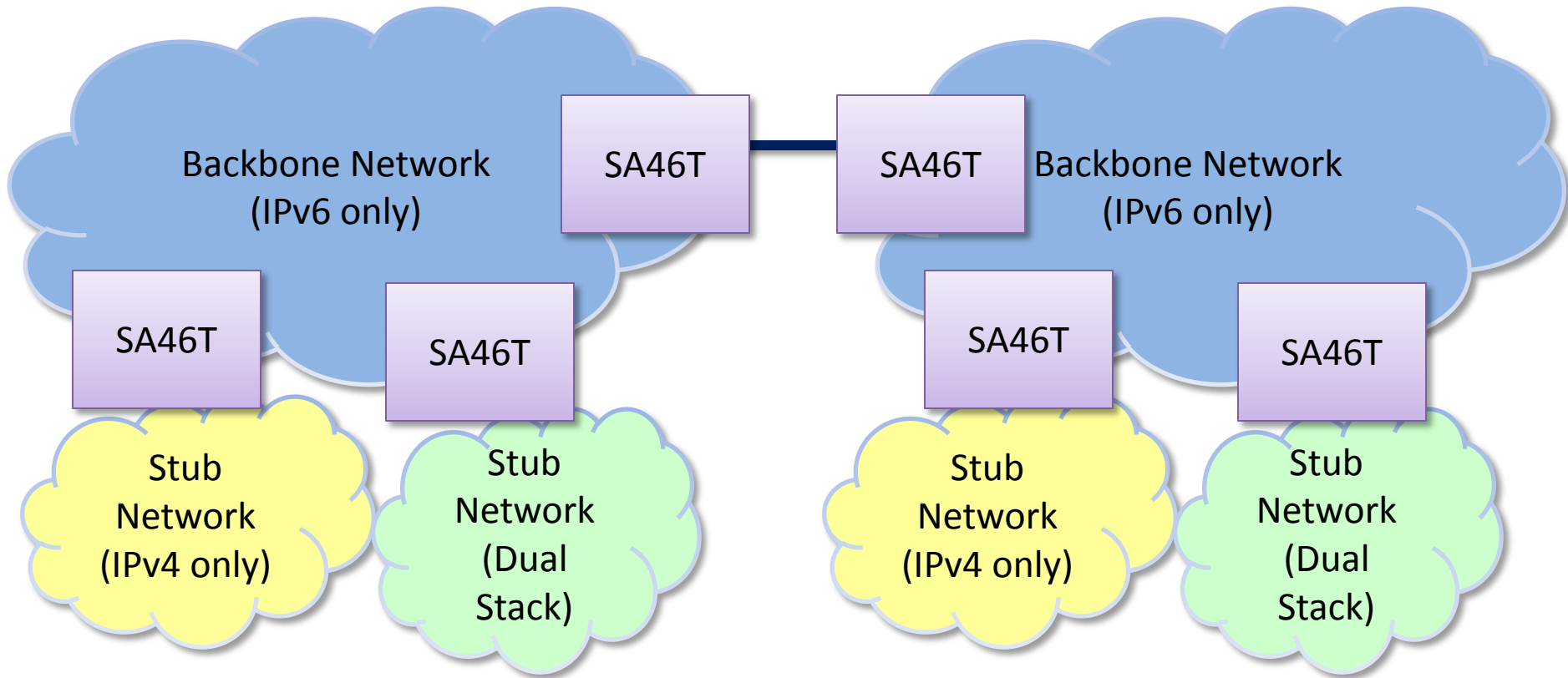
# ISP Backbone Network



# VPN service by ISP



# Network Configuration without Global SA46T address



# Network Configuration with SA46T

## Global address

