

# The Approach for IPv4-only users to access IPv6-only Content

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# Motivation

- Currently, IPv4 addresses for servers are also facing address shortage problem.
- The upcoming new applications, e.g. cloud computing, etc., are consuming more IPv4 addresses.
- When IPv6 content are becoming more and more popular, it is imperative to ensure that IPv6-only content can be reachable from legacy IPv4-only clients.

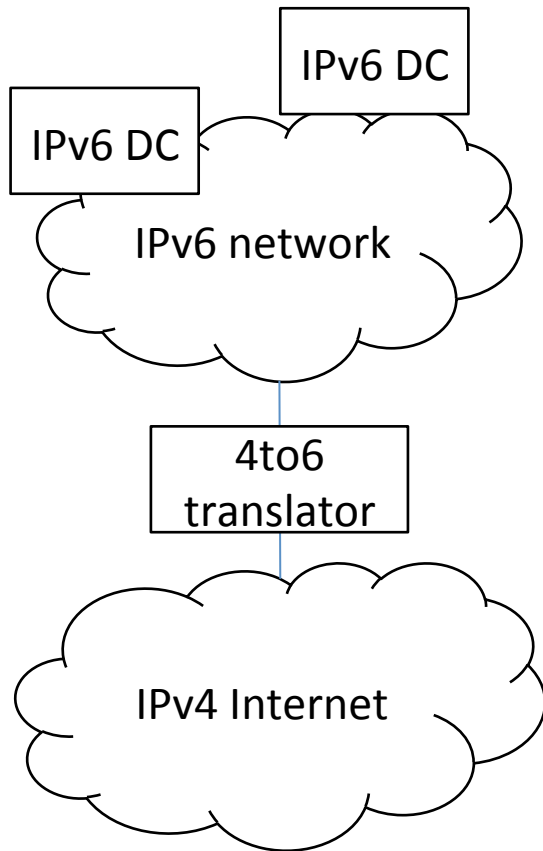
# Business incentive For IPv4→IPv6 Translation

- Scenario 2: IPv4 Internet → IPv6 Network
  - Target: Data Center Operator/ISP with DCs
  - Benefits:
    - ICP:
      - Save money by requiring less IPv4 addresses
      - Reduce the operation complexity by using single-stack
      - IPv6 is future, need to upgrade to IPv6 eventually
    - Data Center Operator:
      - Offer service to more ICPs with limited IPv4 address
      - IPv6 is future, need to upgrade to IPv6 eventually
  - Requirement:
    - Less impact on server and client
    - Achieve IPv4 address sharing for multiple servers
    - Good scalability

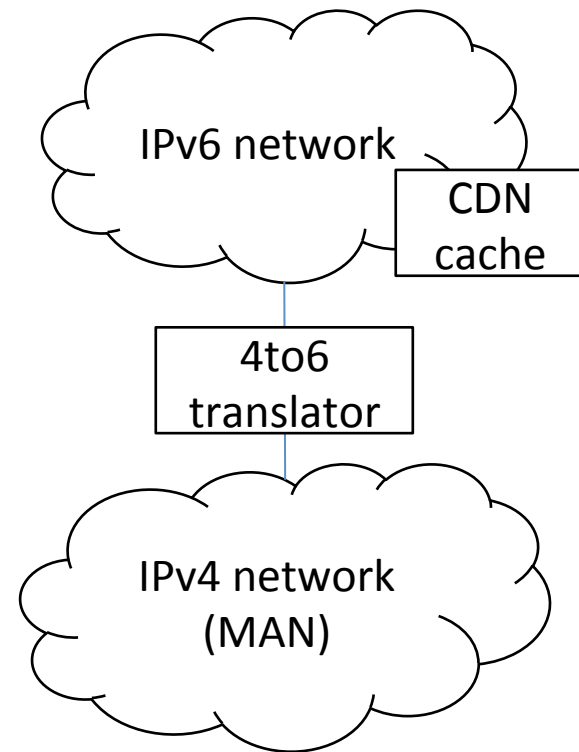
# Business incentive For IPv4→IPv6 Translation

- Scenario 6: IPv4 Network→IPv6 Network
  - Target: ISP/Some local services, e.g. CDN, etc.
  - Benefits:
    - Local service provider:
      - save money by using less IPv4 addresses
      - Reduce the operation complexity by using single-stack
      - IPv6 is future, need to upgrade to IPv6 eventually
    - ISP
      - offer service to more local services with limited IPv4 address
      - Part of ISP network has been upgraded to IPv6 only
  - Requirement:
    - ISP may need to use public address within the IPv4 network depending on the coverage of the IPv6 server
    - Achieve IPv4 address sharing
    - Good scalability

# Possible location for translator



Scenario 2



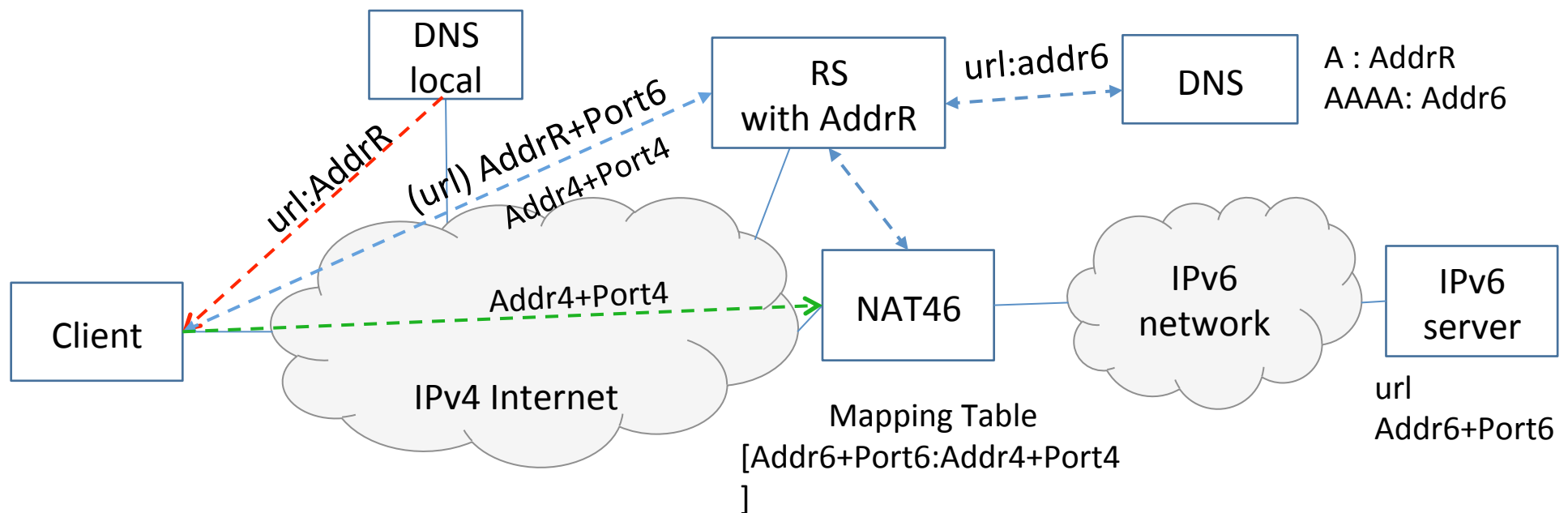
Scenario 6

## Basic idea

- Use public IPv4 address for translation
- Static mapping
  - (IPv4 address, Port, IPv6 address)
  - No dynamic problem in NAT-PT/DNS cache
  - Better scalability than CGN/LB
- No impact on existing DNS architecture
  - Pre-configured with A record for IPv6 server

# Approach 1: Redirect-based solution

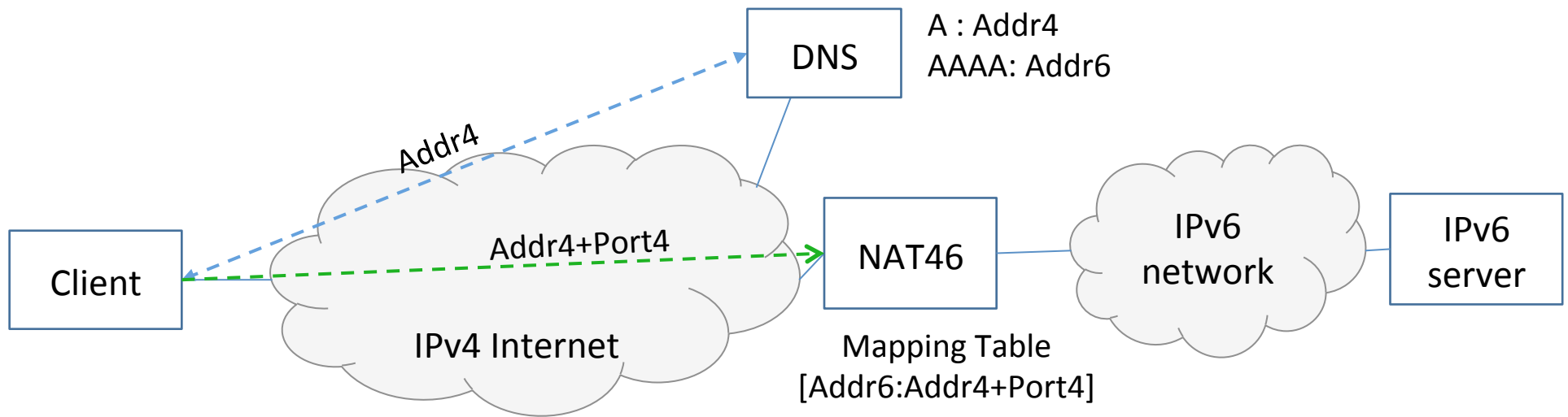
- Used for HTTP App



- Single IPv4 address is shared by multiple servers, achieve high address sharing ratio
- No impact on server/client and DNS architecture

# Approach 2: Non-redirect solution

- Used for other protocol app



- IPv6 servers with different service ports can share the same IPv4 address, IPv6 servers needs to be grouped based on their port number
- No impact on server/client and DNS architecture



# Comparison with CGN

- Differences:
  - Static mapping (no lifetime, no change)
  - One mapping per server
  - Easy to implement in hardware
- Similarities:
  - Network-layer translation
  - IP/ICMP translation (RFC6145)
  - ALG issue

# Summary

- Translation requirements from IPv4 client to IPv6 server are now emerging.
- More work needs to be taken on this area.

# Next Step

- Is there interest for this topic in the WG?
- How to move forward ?