# Application Aspects of IPv6 Transition

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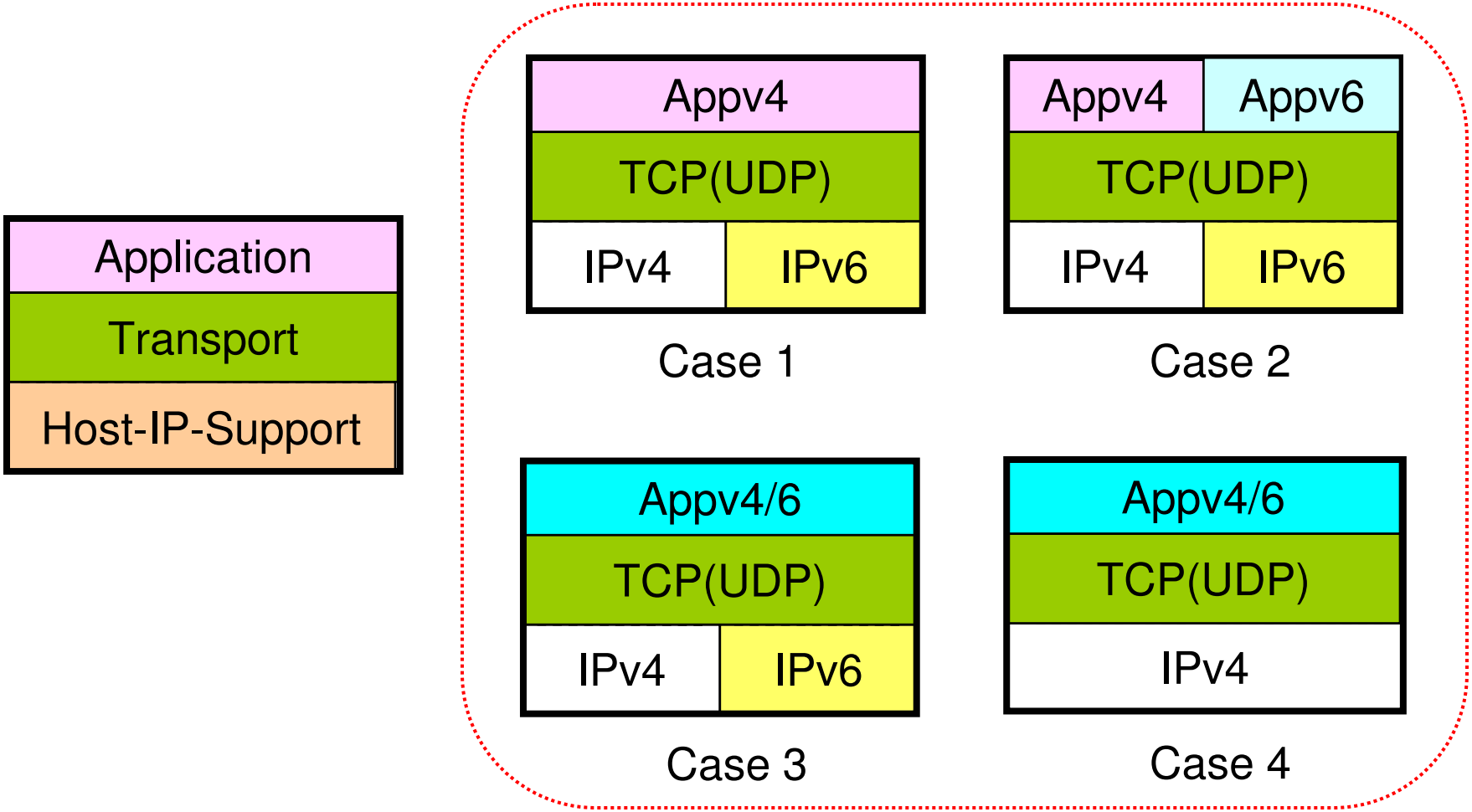
# Why this draft ?

- As IPv6 is deployed, the application developers and the administrators will face several problems
  - clarifies the problems and considerations
  - application transition scenarios (cases)
  - proposes guidelines on developing IP version-independent applications
- One of the charter items of this wg
  - good starting point for this topic

# Changes and comments (00->01)

- Technical (some issues have been clarified)
  - Transition scenarios(cases) and guidelines
  - IP version dependencies in applications
  - Developing IP version-independent applications
    - Some simple working examples are added
- Non-technical
  - Editorial changes
  - Eva was newly joined on the author team
  - Large amount of support from the mailing list for this effort
  - Apps AD's comments
    - Persons from Apps Area will join on the author team (Apps Area Meeting on Mon. 14)

# IPv6 Application transition cases



# General Problems with IPv6 application transition

- Dual-stack vs. application versions
  - Operating system being dual stack does not mean having both IPv4 and IPv6 applications
- DNS name resolution
  - A client application can not know the version of peer application by only doing a DNS name lookup
- Application selection
  - Users may be confused by their various application versions (IPv4-only, IPv6-only, IPv4/IPv6) because they don't know the version of peer application by DNS query results

# Case 1 & Case 2

- Case 1 : IPv4 applications in a dual-stack node
  - the first priority is to port applications to IPv6
  - In some cases (e.g. no source code is available), existing IPv4 applications can work if the [BIS] or [BIA] mechanism is installed in the node
- Case 2 : IPv6 applications in a dual-stack node
  - The easiest way to port an IPv4 application is to substitute the old IPv4 API references by theIPv6 new ones, one-to-one API mapping
  - This case is undesirable since maintaining two versions of the same source code per application, could be a difficult task

# Case 3 & Case 4

- Case 3 : IPv4/IPv6 applications in a dual stack node
  - Applications should prefer IPv6 if the remote node and application support it. However if IPv6 connections fail, dual applications will automatically try IPv4 ones
- Case 4 : IPv4/IPv6 applications in an IPv4-only node
  - An example is an application that issues a socket() command, first trying AF_INET6 and then AF_INET. However, if the kernel does not have IPv6 support, the call will result in an EPROTONOSUPPORT or EAFNOSUPPORT error. Typically, if errors are encountered, this leads to exiting the socket loop, and AF_INET will not even be tried

# Application porting considerations

- IP version dependencies in applications
  - Presentation format for an IP address
    - dotted-decimal string for IPv4 vs. hexadecimal string for IPv6
  - Transport layer API
    - functions to establish communications and to exchange information
  - Name and address resolution
    - conversion functions b/w hostnames and IP addresses
  - Specific IP dependencies
    - IP address selection, application framing, storage of IP addresses

# Developing IP version-independent applications

- In order to allow applications to communicate with other IPv6 nodes, the first priority is to convert the applications supporting both IPv4 and IPv6
  - IP version-independent structures & APIs
- The applications should do iterated jobs for finding the working address out of addresses returned by getaddrinfo()
- The applications will have to work properly in IPv4-only nodes (whether IPv6 protocol is completely disabled)

# Open Issues

- Transition mechanism considerations
  - Handling NAT-PT(DNS-ALG) address prefix
  - Any other mechanisms ?
- Security considerations
  - Handling IPv4 mapped IPv6-addresses
  - …

# Discussion

# Plan and Apps AD comments