

BSI Presents:

IPv6/VSE

A yellow starburst graphic with a black outline, containing text.

**1st IPv6
TCP/IP
Product For
z/VSE**

bsiopti.com

Barnard Software, Inc.

BSI has been providing VSE tools since 1993

1998 – BSI first TCP/IP based toolset

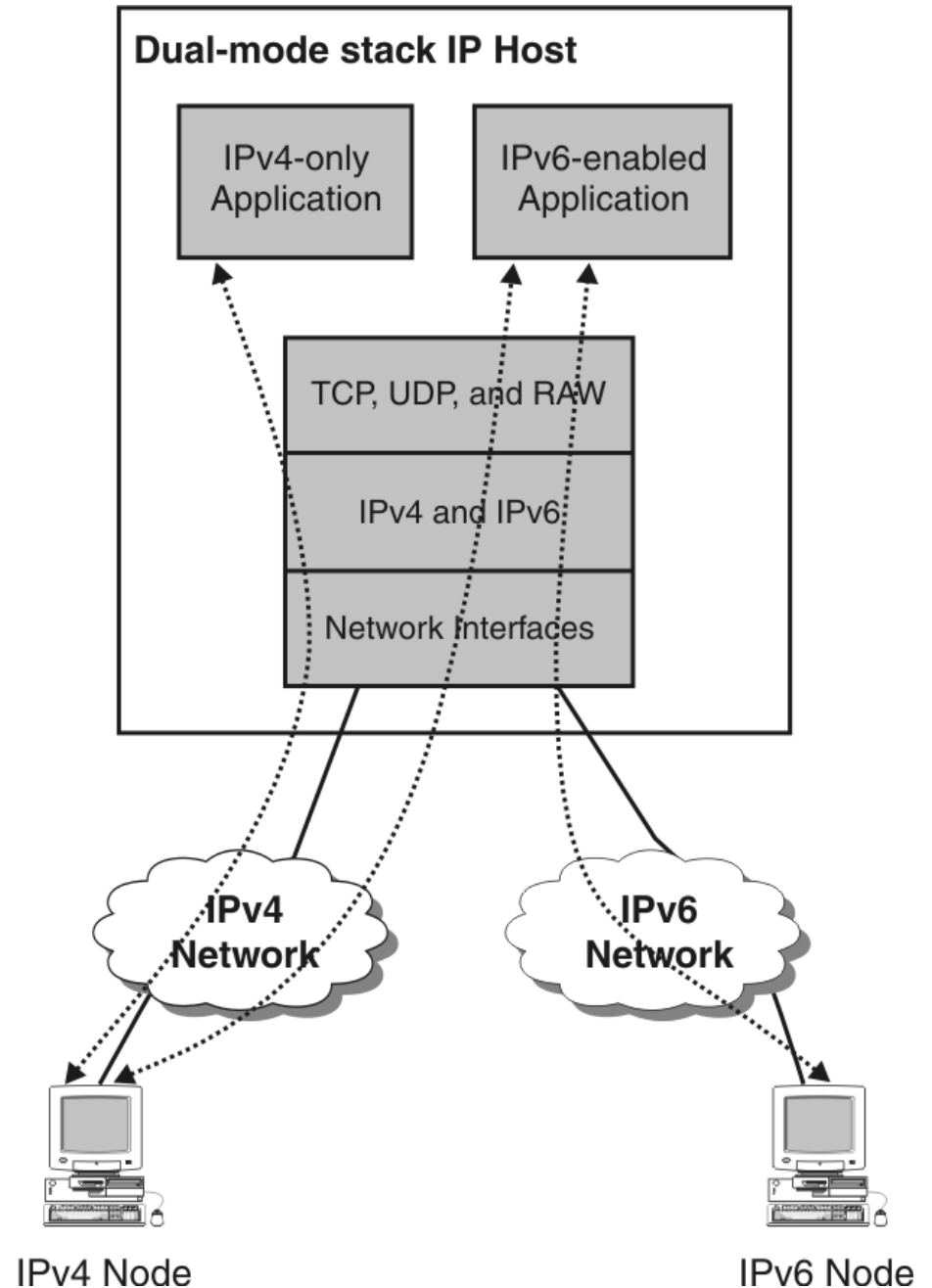
2000 – BSI introduced TCP/IP Tools IP Stack

May 2009 – BSI introduced BSI IPv6/VSE

BSI IPv6/VSE

z/OS Affinity: Dual-Stack Implementation

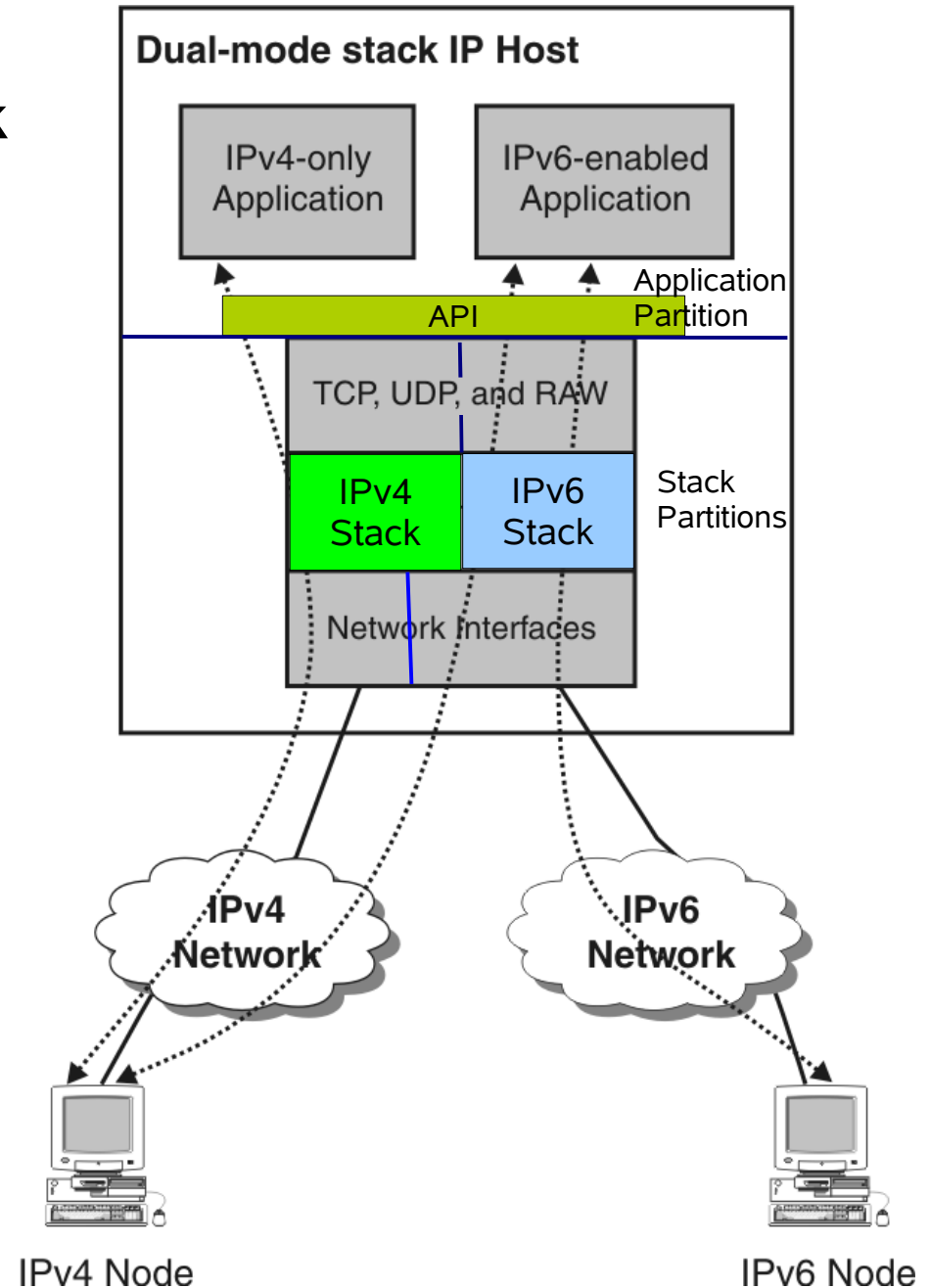
z/OS Dual-mode Stack Implementation



Graphic source:
z/OS V1R9.0 Communications Server:
IPv6 Network and Application Design Guide
SC31-8885-05
Figure: 22

BSI Pseudo-dual-mode Stack Implementation

Although there are actually two stacks running in two separate partitions, the Application Programming Interface (API) phase (located in the application partition) controls which stack is used for a specific request. The application thinks it is talking to a dual-mode stack, yet the stacks are still isolated from each other enhancing performance and reliability.



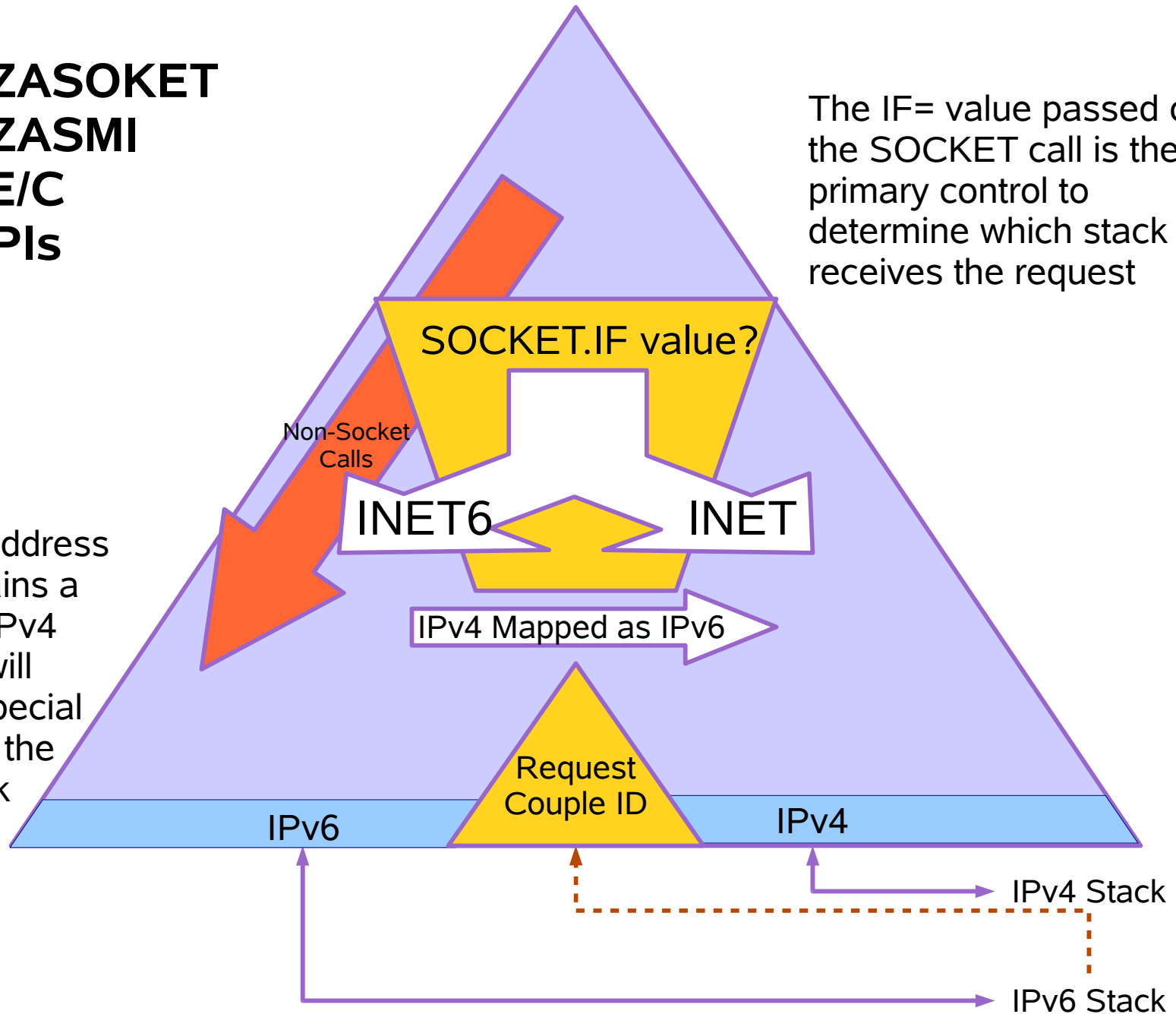
It's all in the API layer!
(No mirrors involved)



**EZASOCKET
EZASMI
LE/C
APIs**

The IF= value passed on the SOCKET call is the primary control to determine which stack receives the request

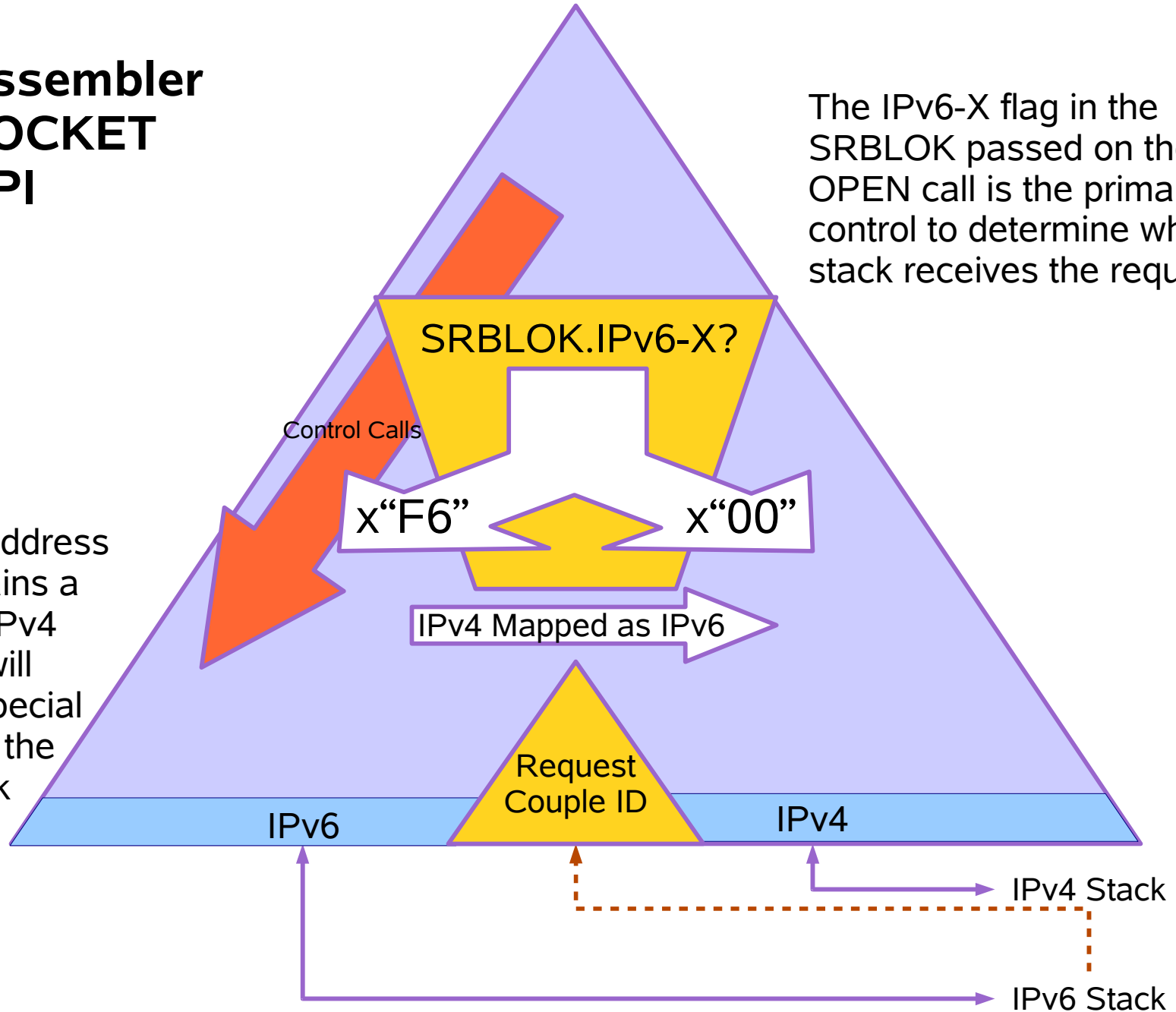
An IPv6 address that contains a mapped IPv4 address will receive special routing to the IPv4 stack



Assembler SOCKET API

The IPv6-X flag in the SRBLOK passed on the OPEN call is the primary control to determine which stack receives the request

An IPv6 address that contains a mapped IPv4 address will receive special routing to the IPv4 stack



Protocol-Independent Clients/Servers

Protocol-independent client applications are possible with IPv6/VSE using the same methods as described in:

z/OS Communications Server
IPv6 Network and Design Guide
Version 1 Release 9
SC31-8885-05

Protocol-independent server applications are also possible with IPv6/VSE using the EZA interface. Since IPv6/VSE provides a Pseudo-Dual-Mode Stack and not a true Dual-Mode stack, the API emulates listening for both IPv4 and IPv6 using automatic Dual-Listens. The application only issues one Bind-Listen-Accept, yet the API will post the Bind-Listen-Accept on both the IPv4 and IPv6 stacks. In IPv6/VSE, this is called the “Dual-Listen” feature.

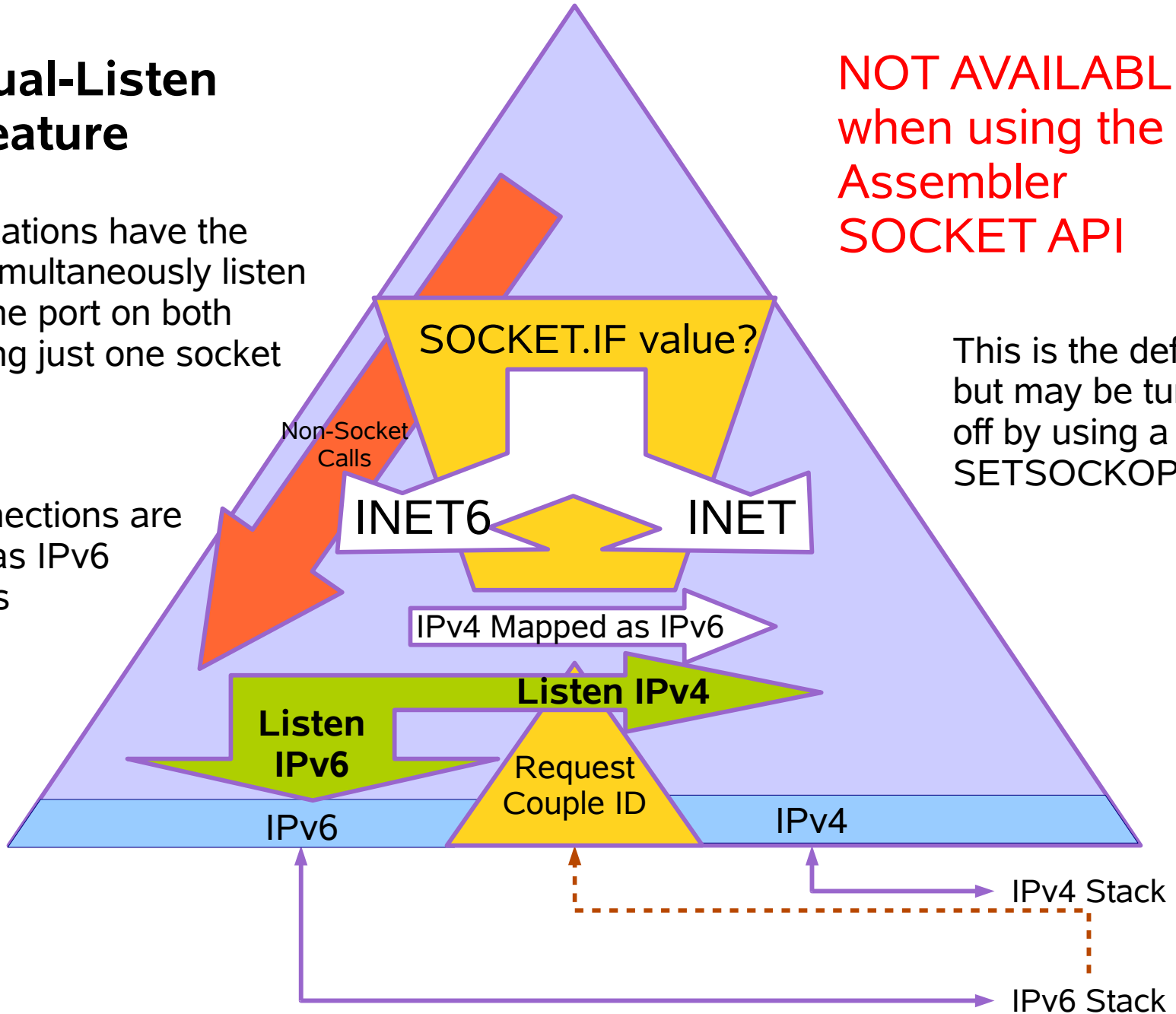
Dual-Listen Feature

EZA applications have the ability to simultaneously listen on the same port on both stacks using just one socket

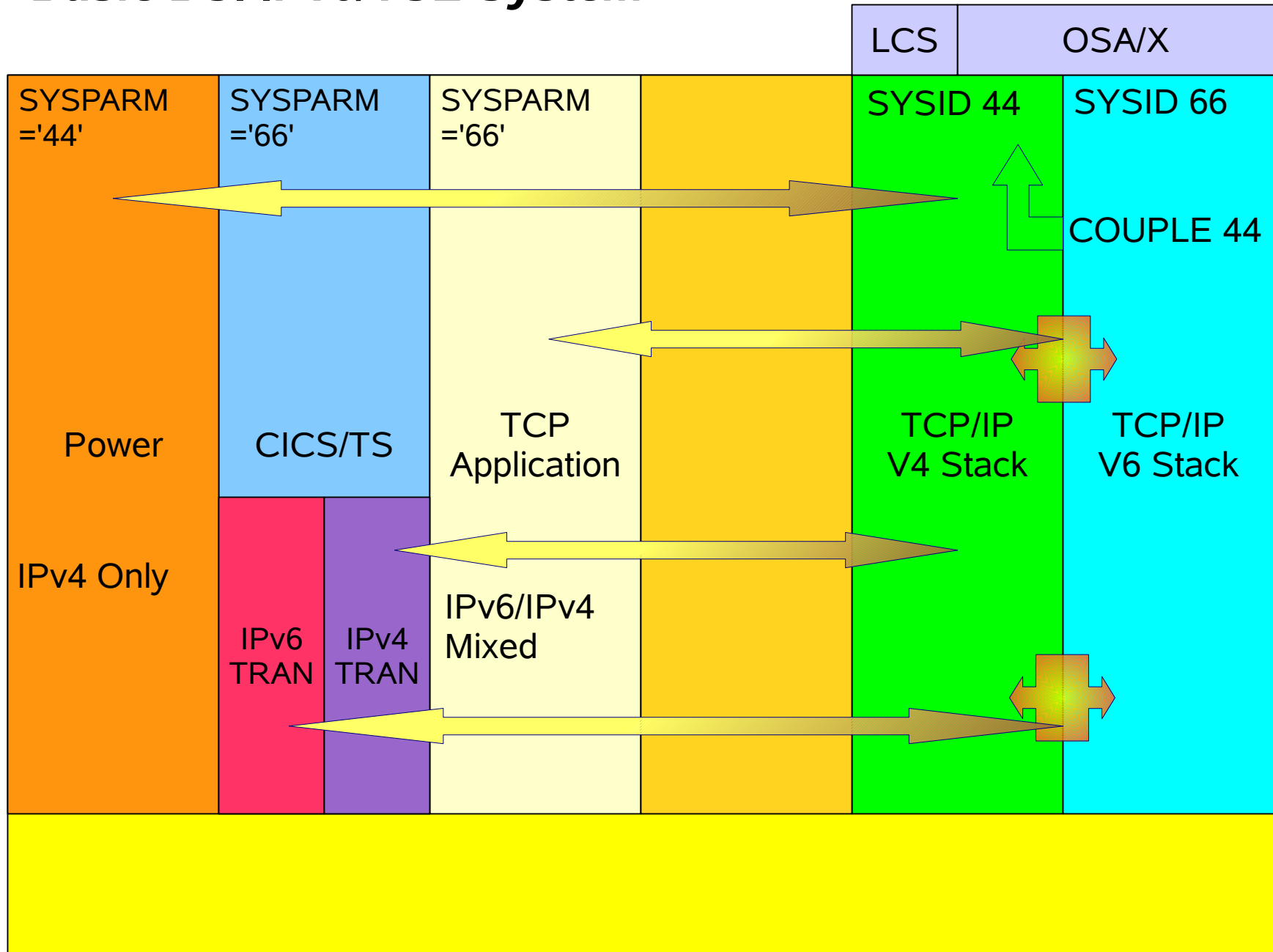
IPv4 connections are reported as IPv6 addresses

NOT AVAILABLE
when using the
Assembler
SOCKET API

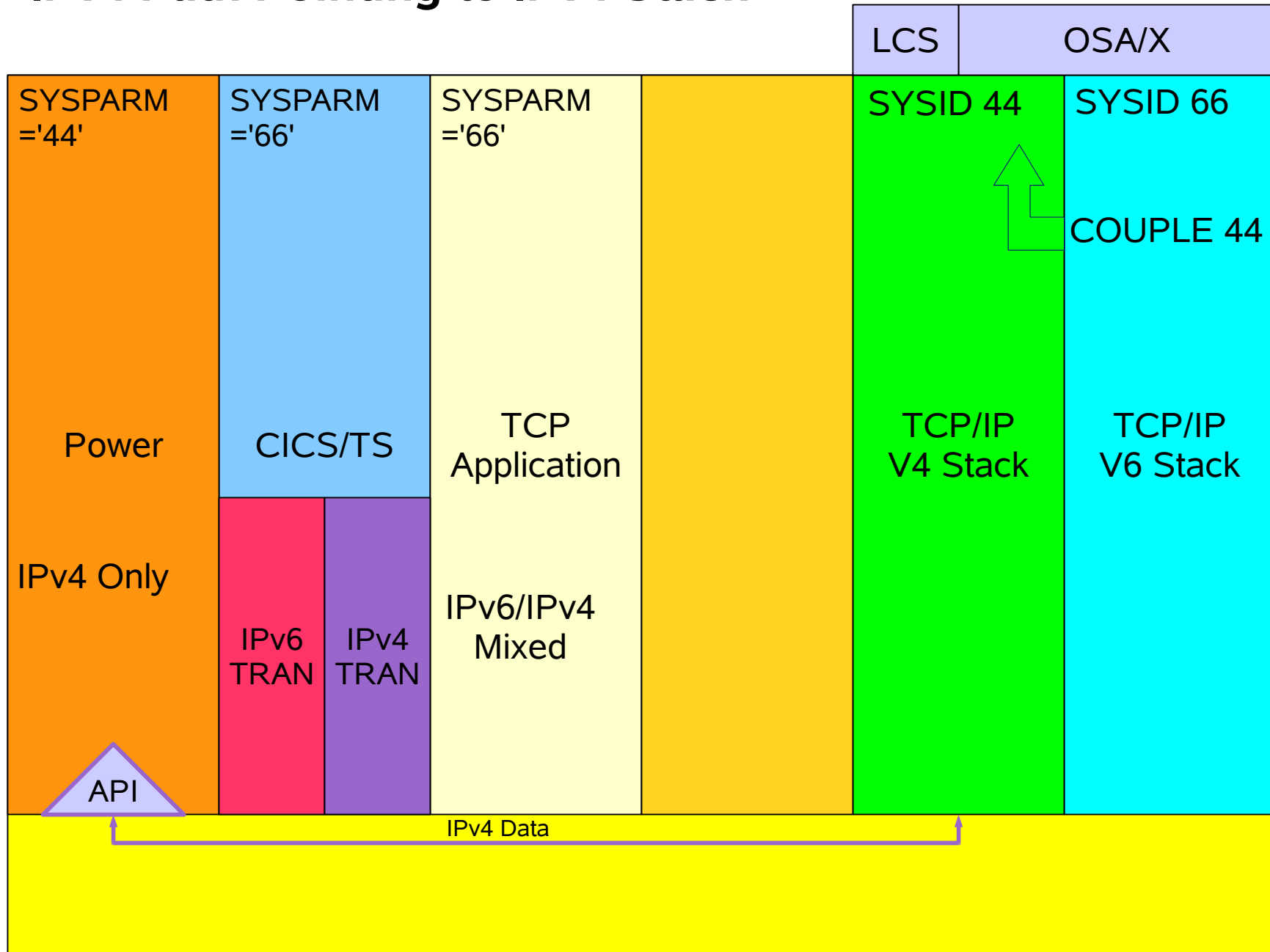
This is the default but may be turned off by using a SETSOCKOPT call



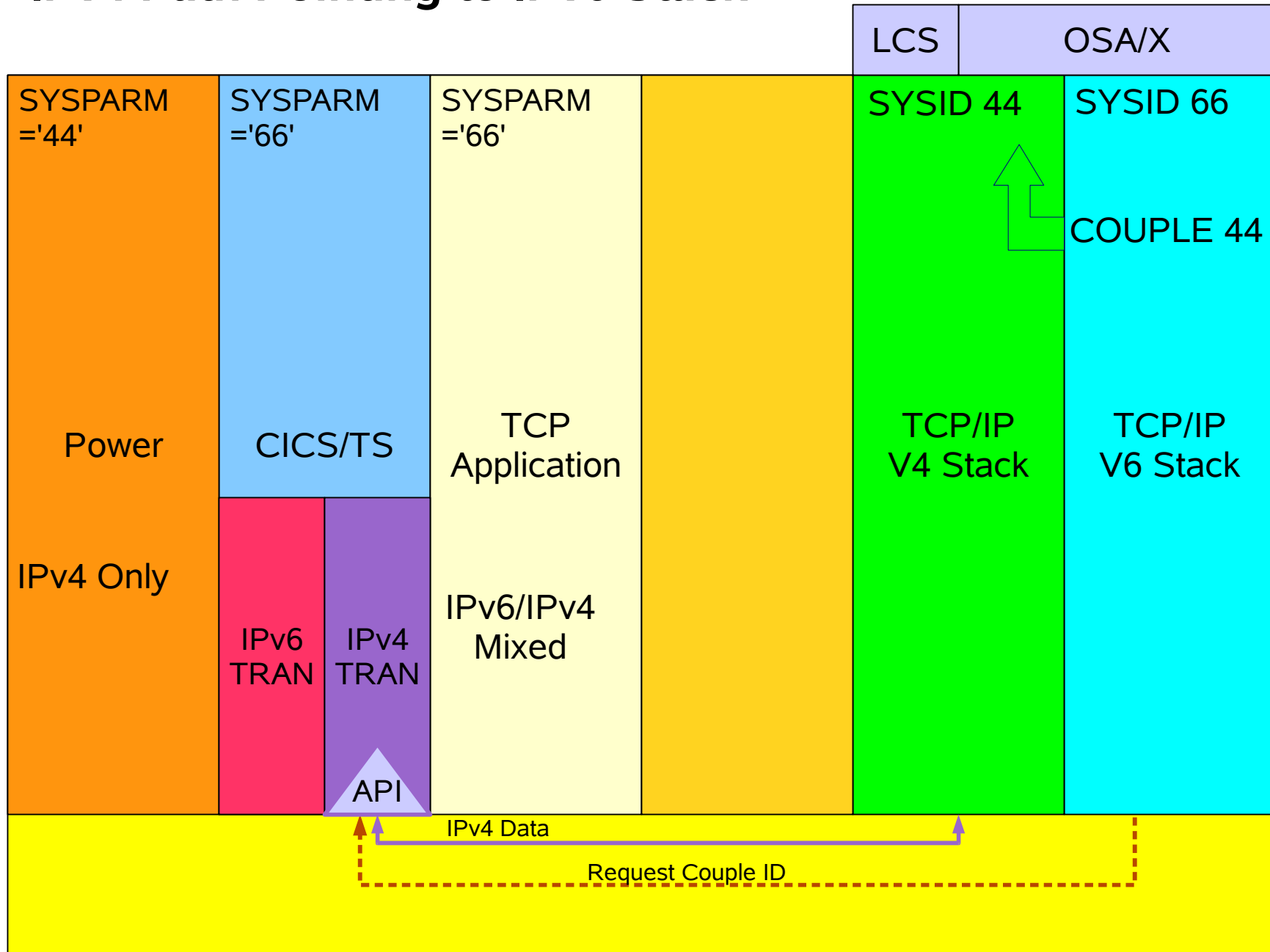
Basic BSI IPv6/VSE System



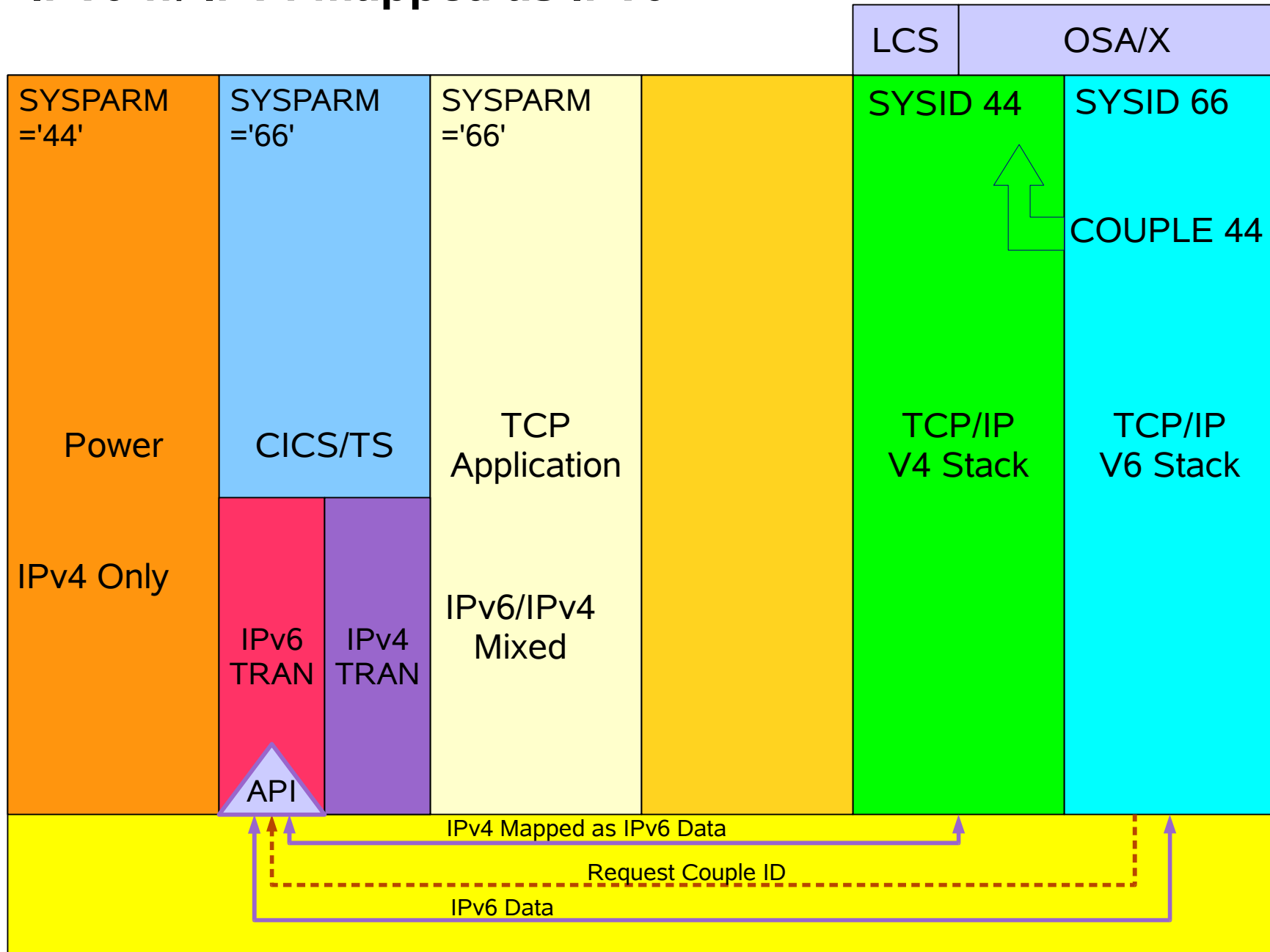
IPv4 Path Pointing to IPv4 Stack



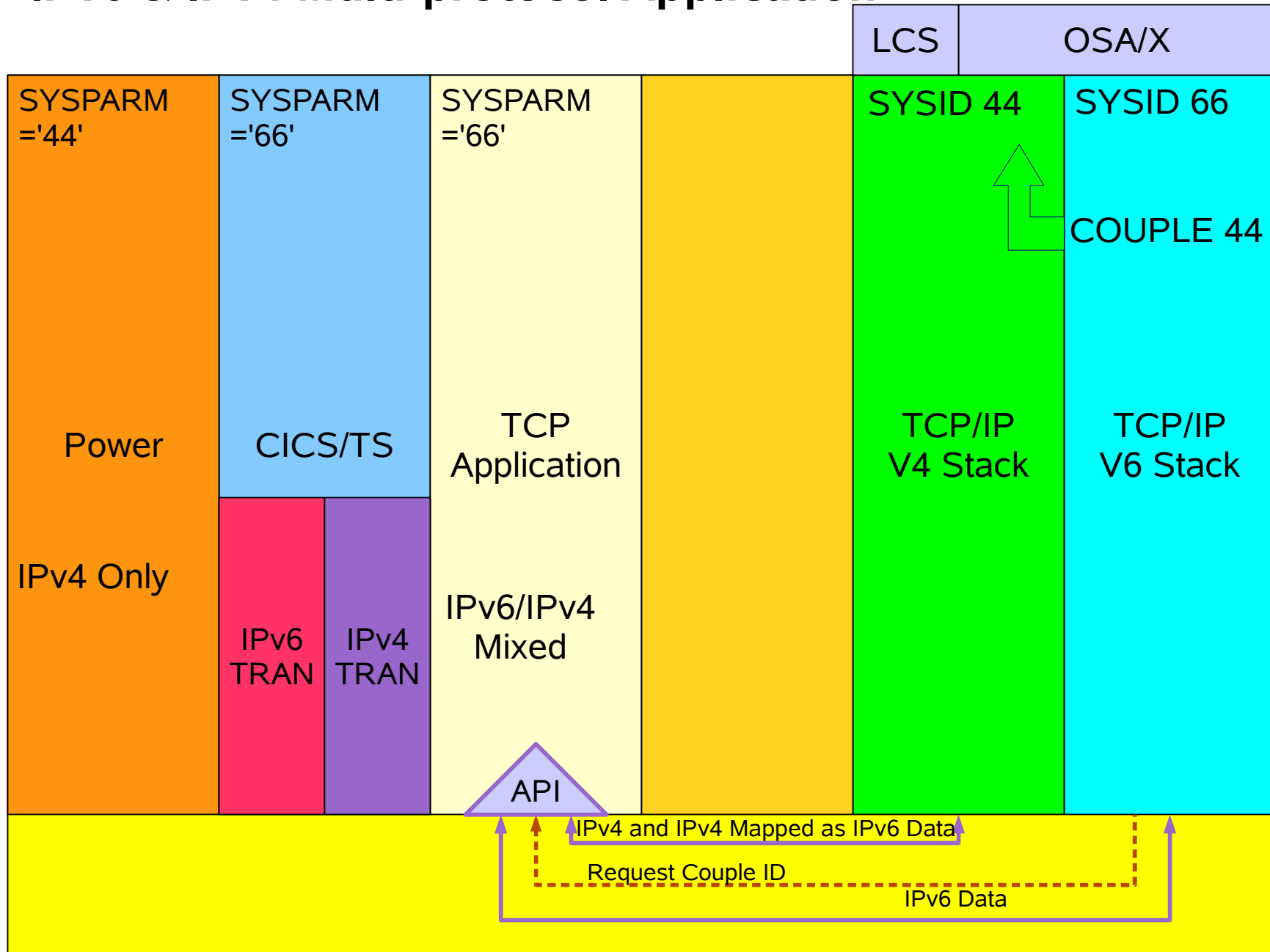
IPv4 Path Pointing to IPv6 Stack



IPv6 w/ IPv4 mapped as IPv6



IPv6 & IPv4 Multi-protocol Application



BSI IPv6/VSE

IPv6 Enabled Assembler Socket API

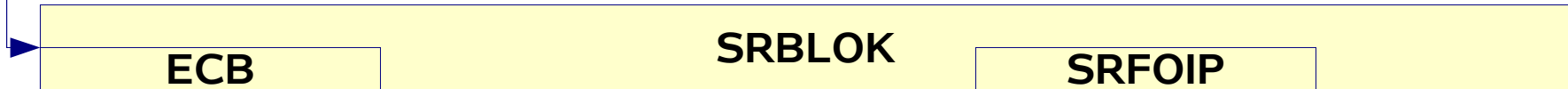
IPv4 Assembler Socket API

```
SOCKET OPEN, TCP,  
DESC=WKDESC,  
FOPORT=WKPORT,  
FOIP=WKIPADDR,  
ECB=WKECB
```

Descriptor

Port

IPv4 Address

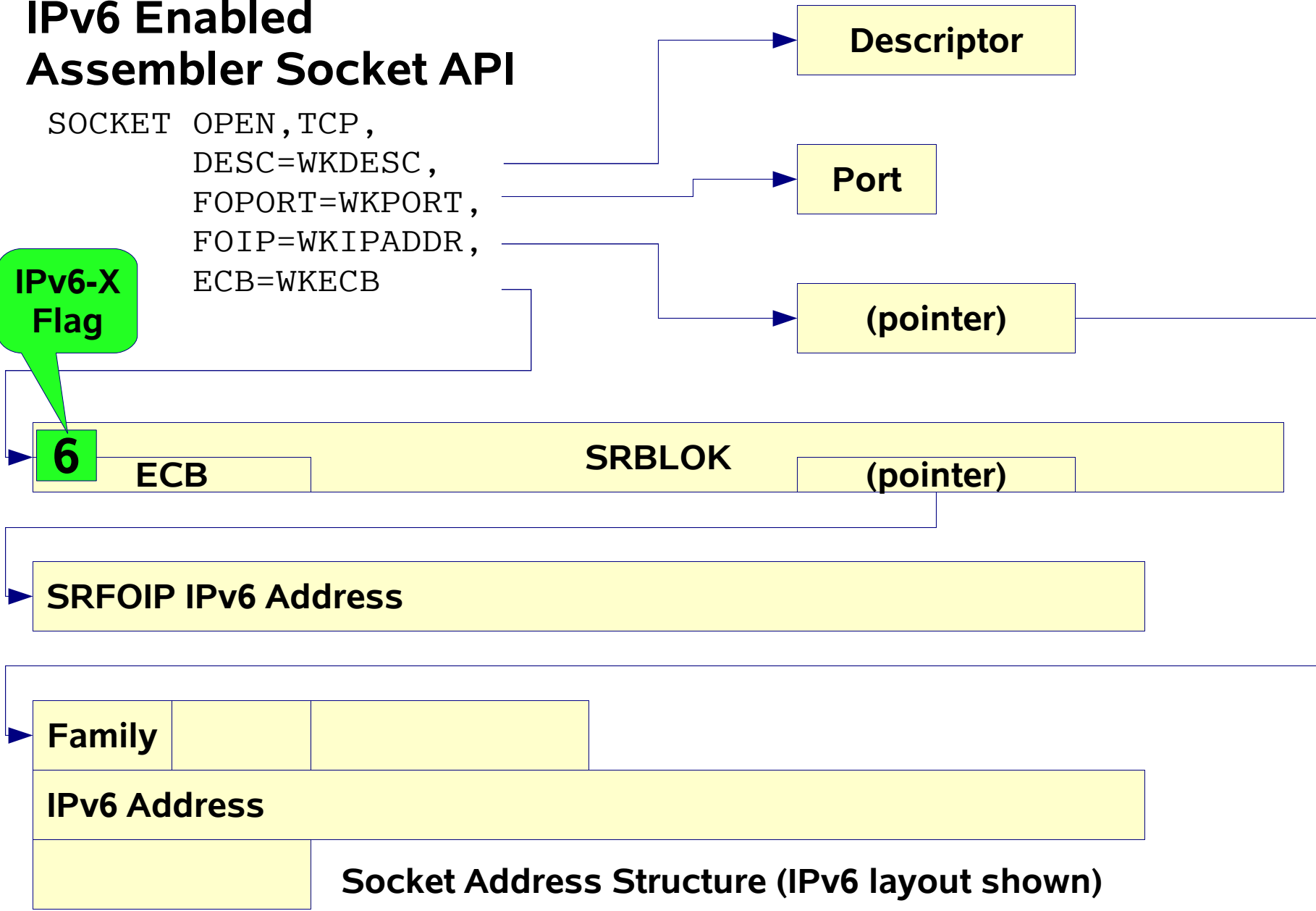


No IPv4 application changes needed even if the SYSPARM is changed to point to an IPv6 stack

IPv6 Enabled Assembler Socket API

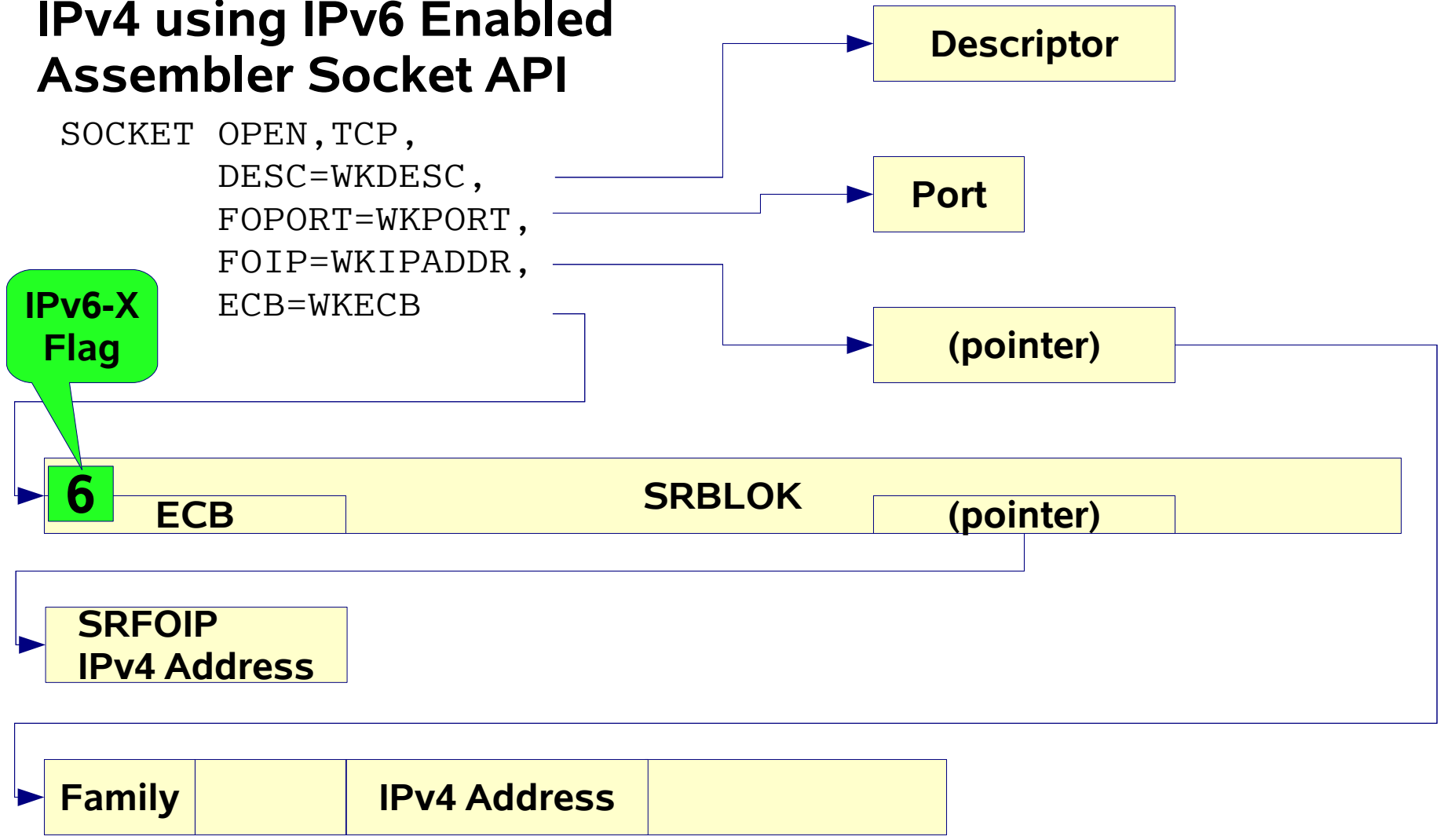
```
SOCKET OPEN, TCP,  
DESC=WKDESC,  
FOPORT=WKPORT,  
FOIP=WKIPADDR,  
ECB=WKECB
```

IPv6-X
Flag



IPv4 using IPv6 Enabled Assembler Socket API

```
SOCKET OPEN, TCP,  
DESC=WKDESC,  
FOPORT=WKPORT,  
FOIP=WKIPADDR,  
ECB=WKECB
```

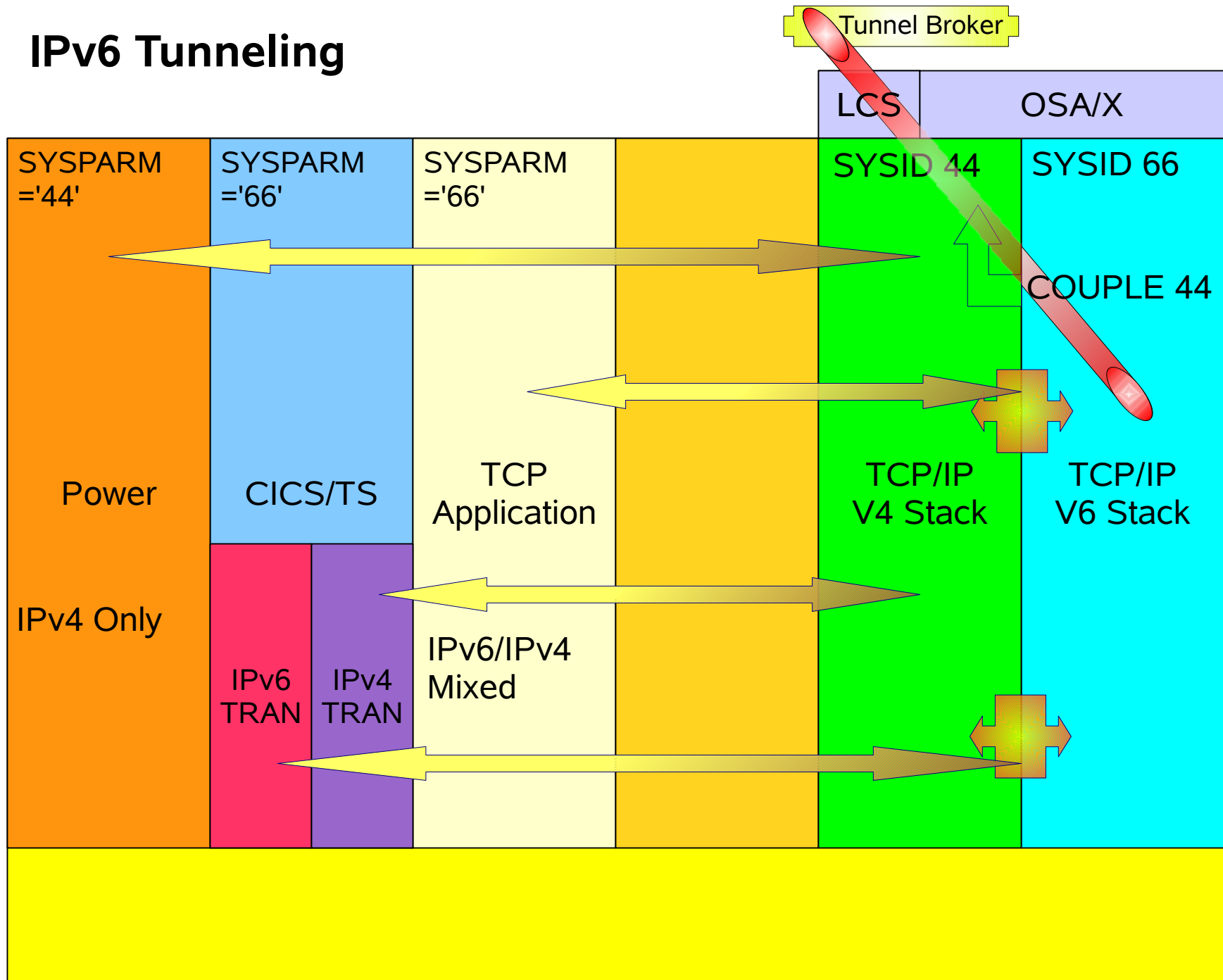


Socket Address Structure (IPv4 layout shown)

BSI IPv6/VSE

IPv6 Tunneling

IPv6 Tunneling



IPv6 Tunneling Support

Using IPv6 Tunneling it is possible to communicate with external IPv6 networks even if the local infrastructure does not support IPv6.

The remote end of the IPv6 tunnel (Tunnel Broker) could be one of several commercial vendors or just local hardware.

IPv6 Tunneling overcomes:

- Lack of OSA Express hardware
- Pre-VSE 4.2 levels
- Old local network infrastructure
- Lack of ISP support for IPv6

IPv6 Tunneling is an internet protocol designed for testing and migration. As such it has limits. It is not recommended for high-volume production workloads.

The IPv6 tunnel is simply a network interface definition.

GOOD NEWS!

- ✓ IPv6/VSE provides an unchanged image to an IPv4 only application
 - ✓ Existing Assembler SOCKET applications run unchanged
 - ✓ Existing EZA applications run unchanged
 - ✓ No IPv4 application changes needed even if the SYSPARM is changed to point to an IPv6 stack
- ✓ IPv6/VSE provides a Dual-mode Stack image to any IPv6 enabled EZA application
 - ✓ User applications transported from z/OS should run without significant, if any changes
 - ✓ New z/VSE applications are transportable to z/OS
 - ✓ New IPv6 conforming applications can automatically talk to both IPv6 and IPv4 clients
- ✓ Only minor changes are required to IPv6 enable Assembler SOCKET applications
- ✓ IPv6 Tunneling is available for network migration