

End of Life, IPv4 - IPv6 solutions

Markus Handte
Senior Systems Engineer
mhandte@a10networks.com
+49.171.4338628



A10 Networks Introduction

A10



2009



2008



2007



- Incorporated in 2004
- Mission: Leader in the Application Delivery Market
- Experienced Management Team
- Well-funded and Profitable
- 13 Consecutive Quarters of Growth
- Tracking to 140% Year on Year Growth
- 500+ Customers

CCW 计世网
com.cn

A10 Networks // Performance by Design //

What Do We Do?

- **Optimize Business Application Delivery and Performance**
- **Applicable to all Customers**
- **Specific Solutions for Telco's/Carriers/ISP' s**
- **Absolute Price / Performance Market Leader market**
- **Only 64-bit platform available**
- **Architecturally superior, and unique!**

AX Series Product Focus

IPv6 Migration

Large Scale NAT

Dual-Stack Lite

Application Delivery

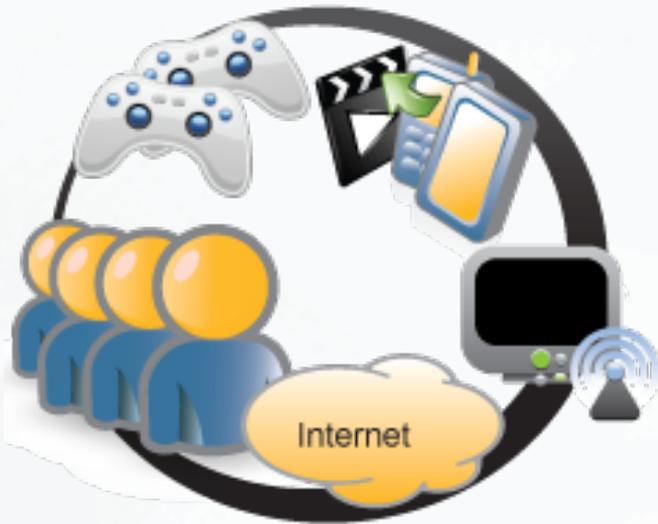
Application Delivery
Controller

Server Load Balancer

Cloud Computing & Virtualization

Carrier & ISP Challenges

➤ IPv6 Migration: Demand for IP addresses rapidly increasing



- ◆ New users coming online
- ◆ Smartphones
- ◆ Gaming devices (Xbox/PlayStation/Wii/DS)
- ◆ Many other network-aware devices (e.g. DVRs)
- ◆ **Good situation to have** ~ ISPs want to continue to increase customer base and grow their business

➤ However, IPv4 addresses = very short supply

- ▶ Tight control on new allocations
- ▶ Projected to run out by 2011/12

IPv4 Address Shortage Gaining Momentum

Try Beta

article discussion edit this page history

IPv4 address exhaustion

From Wikipedia, the free encyclopedia

IPv4 address exhaustion is the decreasing supply of unallocated IPv4 addresses available at the Authority (IANA) and the regional Internet registries for assignment to end users and local Internet service providers.

The growth of IPv4 address space is limited by the IANA and the regional Internet registries. The IPv4 address space is limited to 2³² (4,294,967,296) addresses. The IPv4 address space is divided into three regions: the global Internet, the IPv4 address space reserved for private use, and the IPv4 address space reserved for special purposes.

The IPv4 address space is divided into three regions: the global Internet, the IPv4 address space reserved for private use, and the IPv4 address space reserved for special purposes.

1.0.0.0/8 is Allocated by IANA
By *Michael Morris* on Sun, 01/24/10 - 7:31pm.

Something happened this month that probably didn't get much attention, but I always felt this would be a major psychological moment for IPv4 address space exhaustion. 1.0.0.0/8 was a conspicuous class-A block that had never been used in the public Internet. It just always sat

Navigation: Main page, Contents, Featured content, Current events, Random article

Search: Go Search

Interaction: About Wikipedia, Community portal, Recent changes, Contact Wikipedia, Donate to Wikipedia, Help

Toolbox: What links here, Related changes, Upload file, Special pages, Printable version, Permanent link, Cite this page

Languages: Español, Italiano

NETCARE: News, Blogs & Columns, Subscriptions

Security | LANs & WANs | VoIP | Infrastructure Mgmt | Wireless | Software

BACK TO CISCO SUBNET
From the Field
by Michael Morris

Previous Post

IPv4 Space is Getting Low - Really Low

1.0.0.0/8 is Allocated by IANA
By *Michael Morris* on Sun, 01/24/10 - 7:31pm.

Share | Tweet This | Email this page | Comments (6) | Print

IANA IPv4 Address Space Registry

Last Updated: 2010-01-19

Description: The allocation of Internet Protocol version 4 (IPv4) address space to various other registries to manage for regional areas of the world. RFC 1466 [RFC1466] documents most of these

This registry is also available in XML and plain text formats.

Prefix	Designation	Date	Whois
000/8	IANA - Local Identification	1981-09	
001/8	APNIC	2010-01	whois.apnic.net
002/8	RIPE NCC	2009-09	whois.ripe.net

APNIC can now allocate 1.x.x.x blocks to ISPs and organizations. Not saying it will happen soon, but Internet sites could start popping up with a 1.1.1.x address.

contact him.

Michael Morris's From the Field blog is also featured on the Cisco Learning Network. See it there, along with the blogs of other Cisco Experts.

RSS Contact Requires Login

IPv4 Exhaustion Counter

Present status

Reserved blocks(IANA)

8%

22/256 blocks

X-day (estimation)

Sep 30, 2011

Until X-day (estimation)

566 days

Num of IPv4 Address

349,460,461

NetCore



IPv4 Address Report

This report is auto-generated by a daily script. The report you are seeing here was generated at 12-Mar-2010 07:58 UTC.

Unallocated Address Pool Exhaustion: 30-Sep-2011
Allocated Address Pool Exhaustion: 11-Sep-2012

IPv4 Exhaustion Counter

Present status

Reserved blocks(IANA)

8%

22/256 blocks

X-day (estimation)

Sep 30, 2011

Until X-day (estimation)

566 days

Num of IPv4 Address

349,460,461

NetCore

This gadget has been developed by Takashi Arano, Intec NetCore (<http://inetcore.com/project/ipv4ec/>). A range of other exhaustion

So what does it look like

➤ IPV4



➤ IPV6





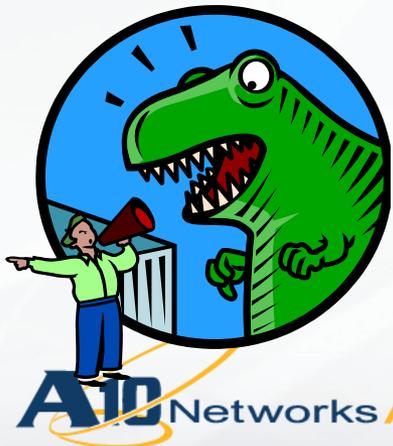
▶ Forward Thinkers

- ▶ Have been doing this for years – no translation necessary
- ▶ Don't Need A10 Help



▶ Confused

- ▶ Need to do something BUT WHAT??????
- ▶ Need our insight & products



▶ Dinosaur

- ▶ Needs to do something but have big old legacy network
- ▶ Need our products – probably won't listen too closely to our insight

Who should be worried and why?



▶ Consumer

- ▶ Buys service to get everywhere



▶ Content Provider

- ▶ Maintain 100% accessibility



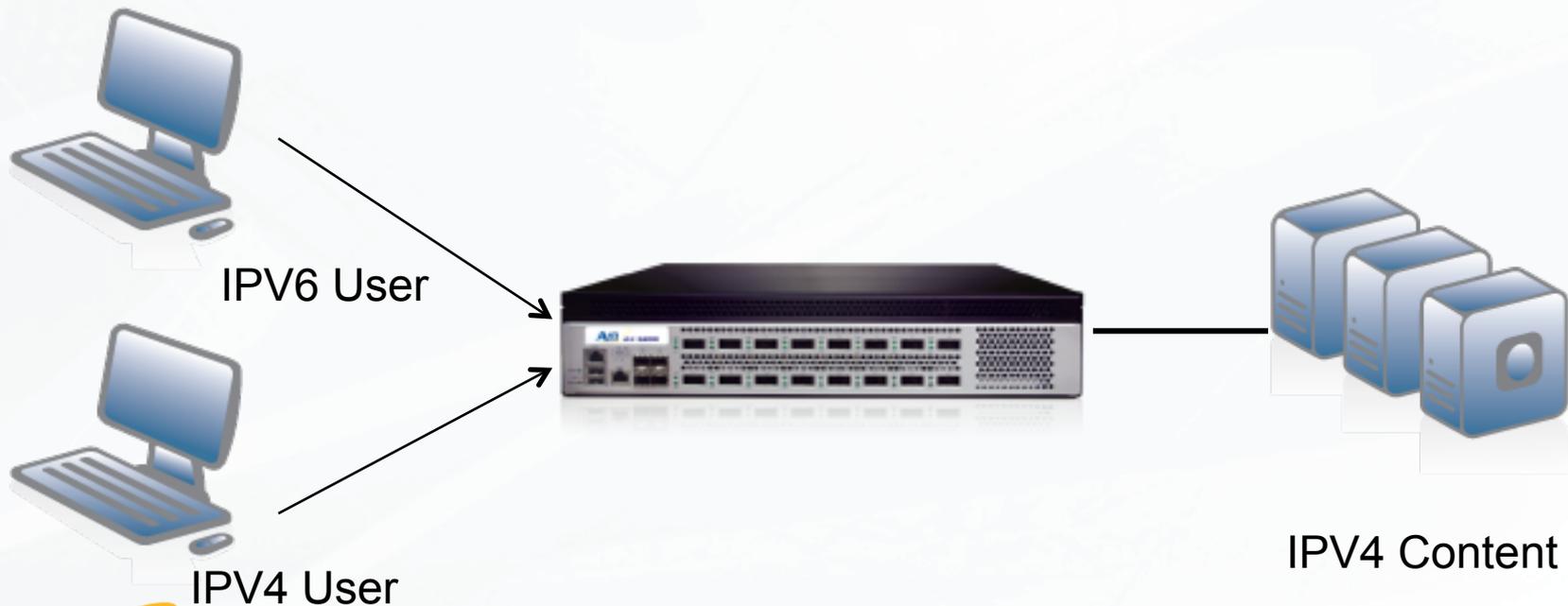
▶ Access Provider

- ▶ Real addressing issues
- ▶ More Users/Devices
- ▶ Competition

Solutions

► SLB-PT

- ▶ Use existing IPV4 content servers to server IPV6 Users
- ▶ Easy deployment
- ▶ Can use optimization technologies as well



Solutions

➤ IPv6

- ▶ Adoption underway
- ▶ IPv4-only nodes and content will still be around



➤ Large Scale NAT

- ▶ Sharing of “public” IPv4 addresses among multiple customers

➤ Dual-Stack Lite

- ▶ Supports both native IPv6 and traditional IPv4 concurrently

Solutions

▶ Large Scale NAT

- ▶ Sharing of “public” IPv4 addresses among multiple customers

▶ Dual-Stack Lite

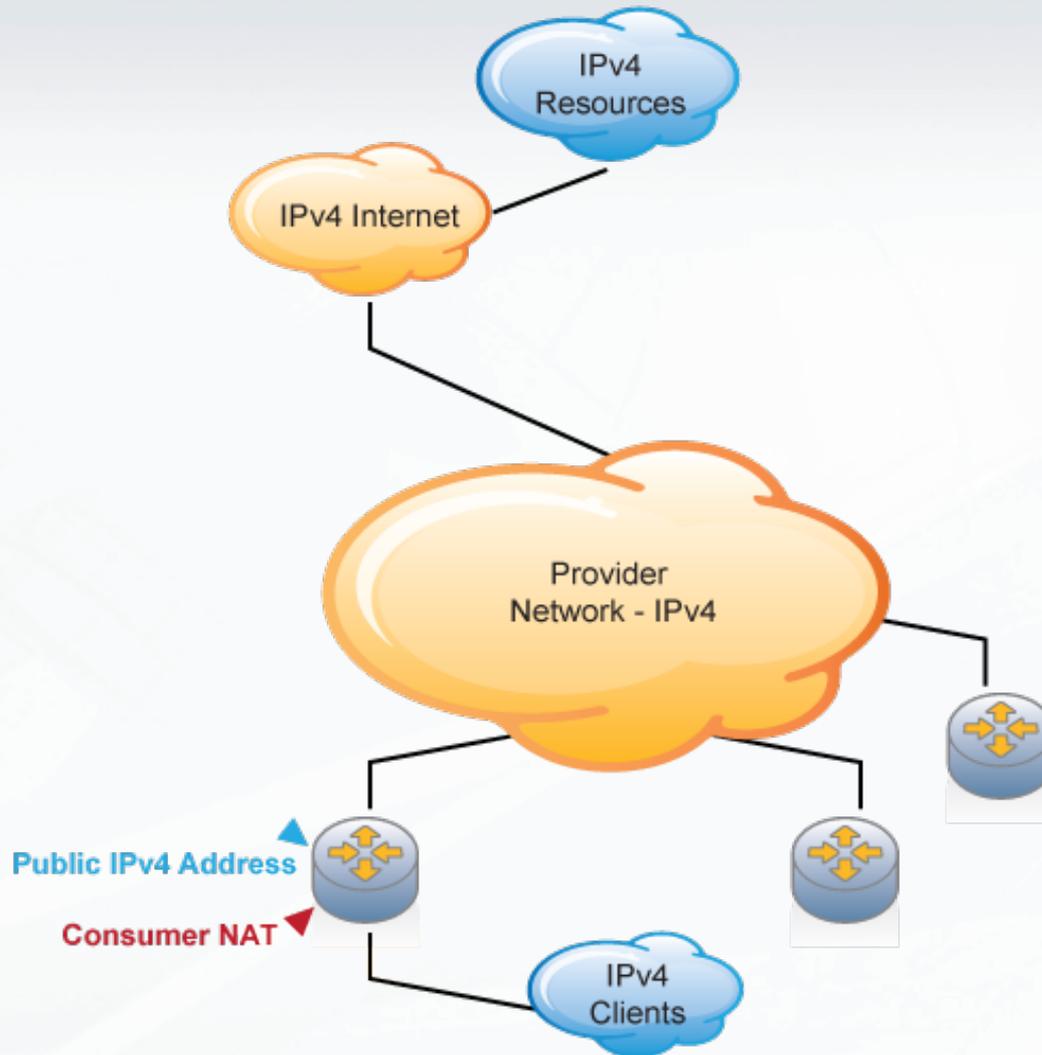
- ▶ Supports both native IPv6 and traditional IPv4 concurrently

NAT-PT

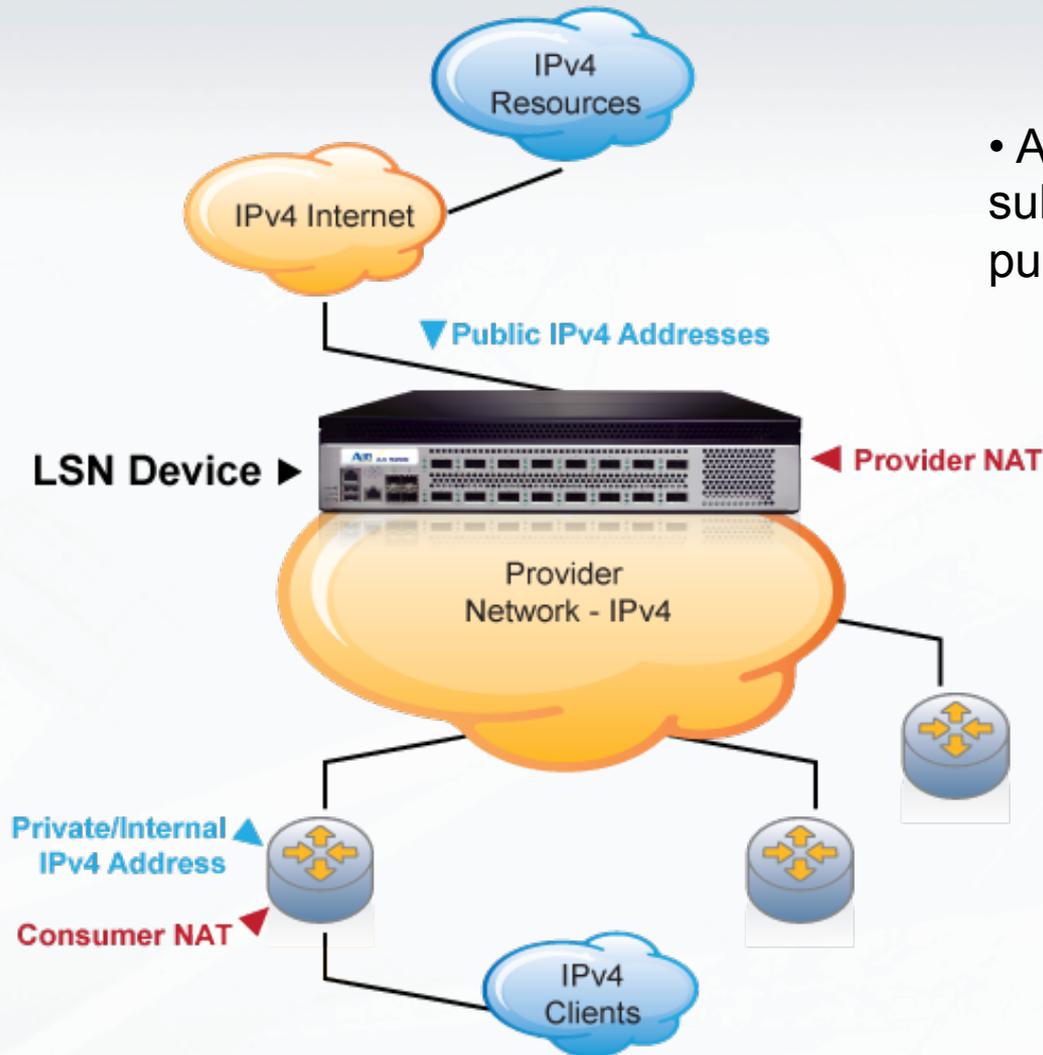
- ▶ Supports translation at the edge of the network
- ▶ Last resort if this is your stance



Service Provider Network Today Relies on Public IPv4 Addresses

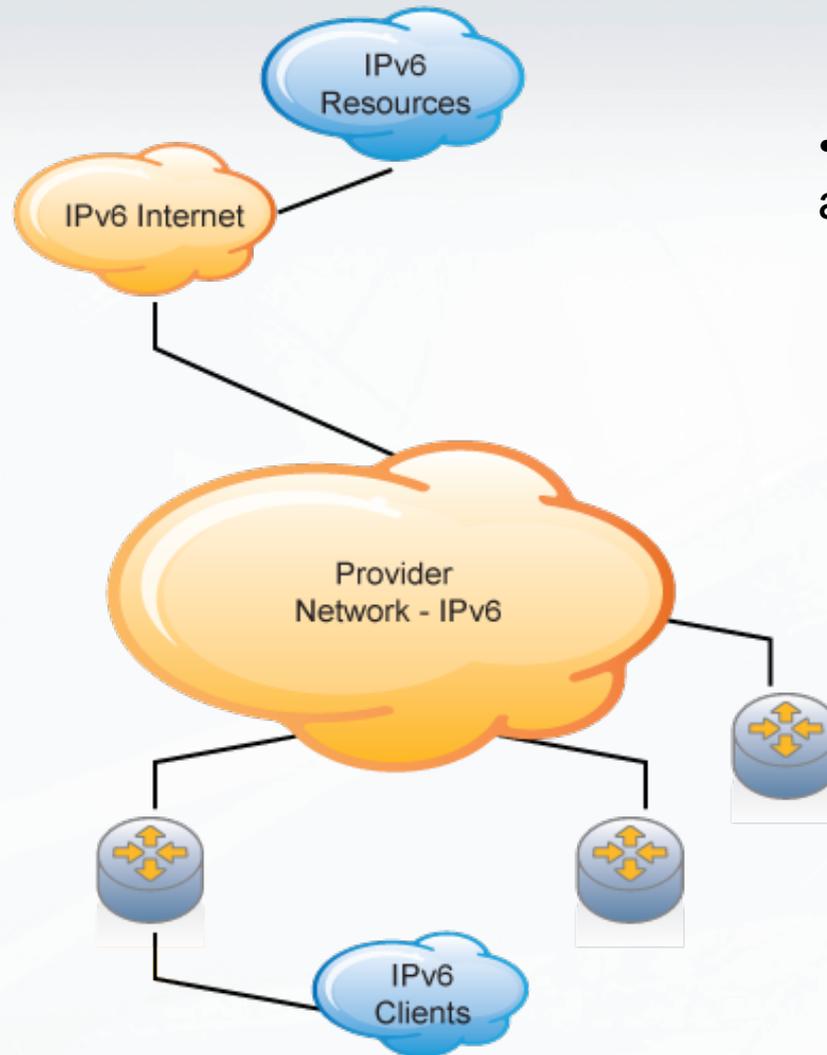


Large Scale NAT Allows Service Providers to Use Private/Internal IPv4 Addresses Within Their Network



- Allows more subscribers with less public IPv4 addresses

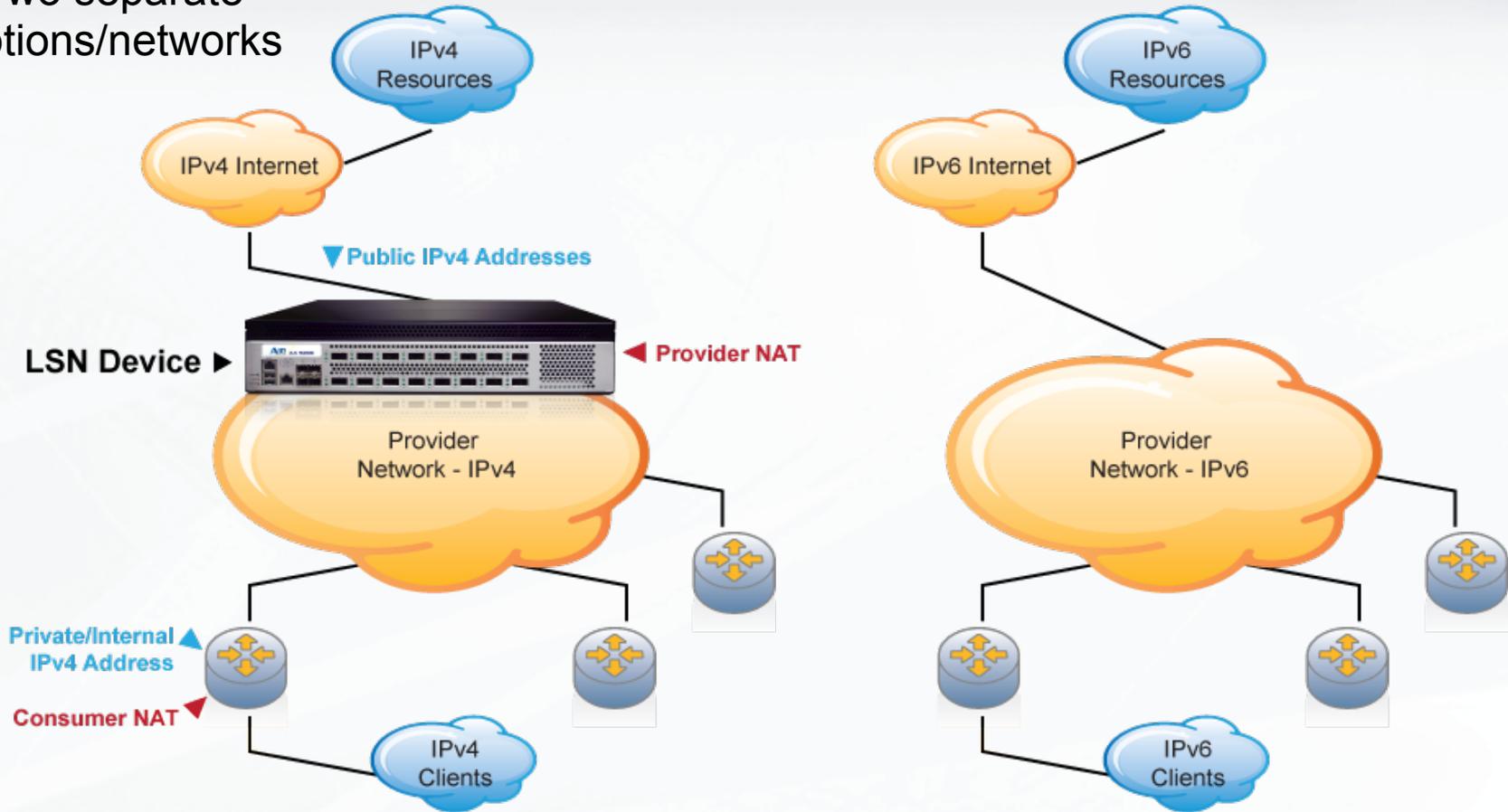
The Ideal IPv6 Network Removes the Issue of IPv4 Address Shortages



- Does not require IPv4 addresses

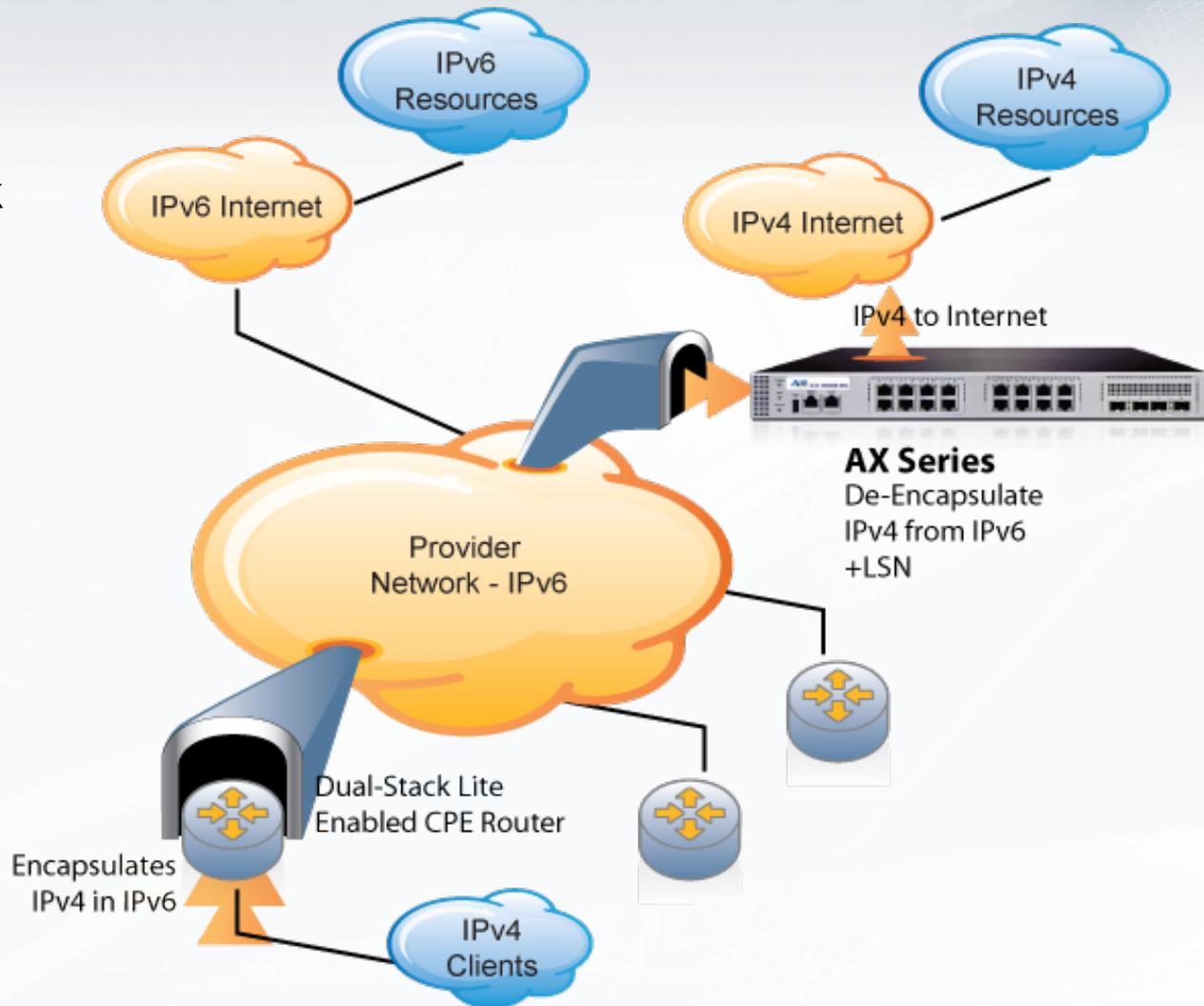
Both LSN on IPv4 Networks and Pure IPv6 Networks Relieve IPv4 Address Shortages

- Two separate options/networks



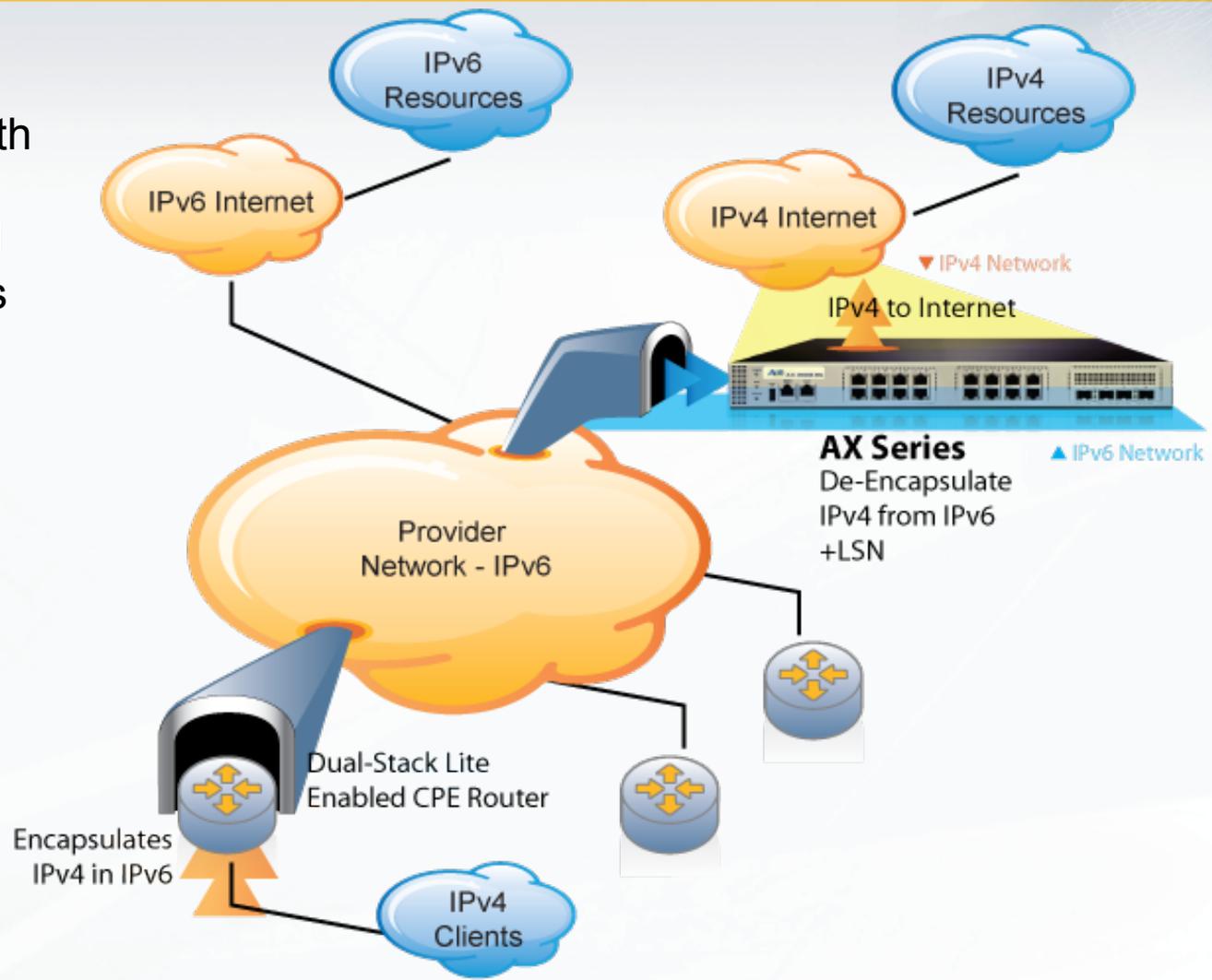
DS-Lite Solutions Allow IPv4 Clients to Connect Over the Service Provider IPv6 Network to the IPv4 Internet

- Support legacy IPv4 clients on new IPv6 network

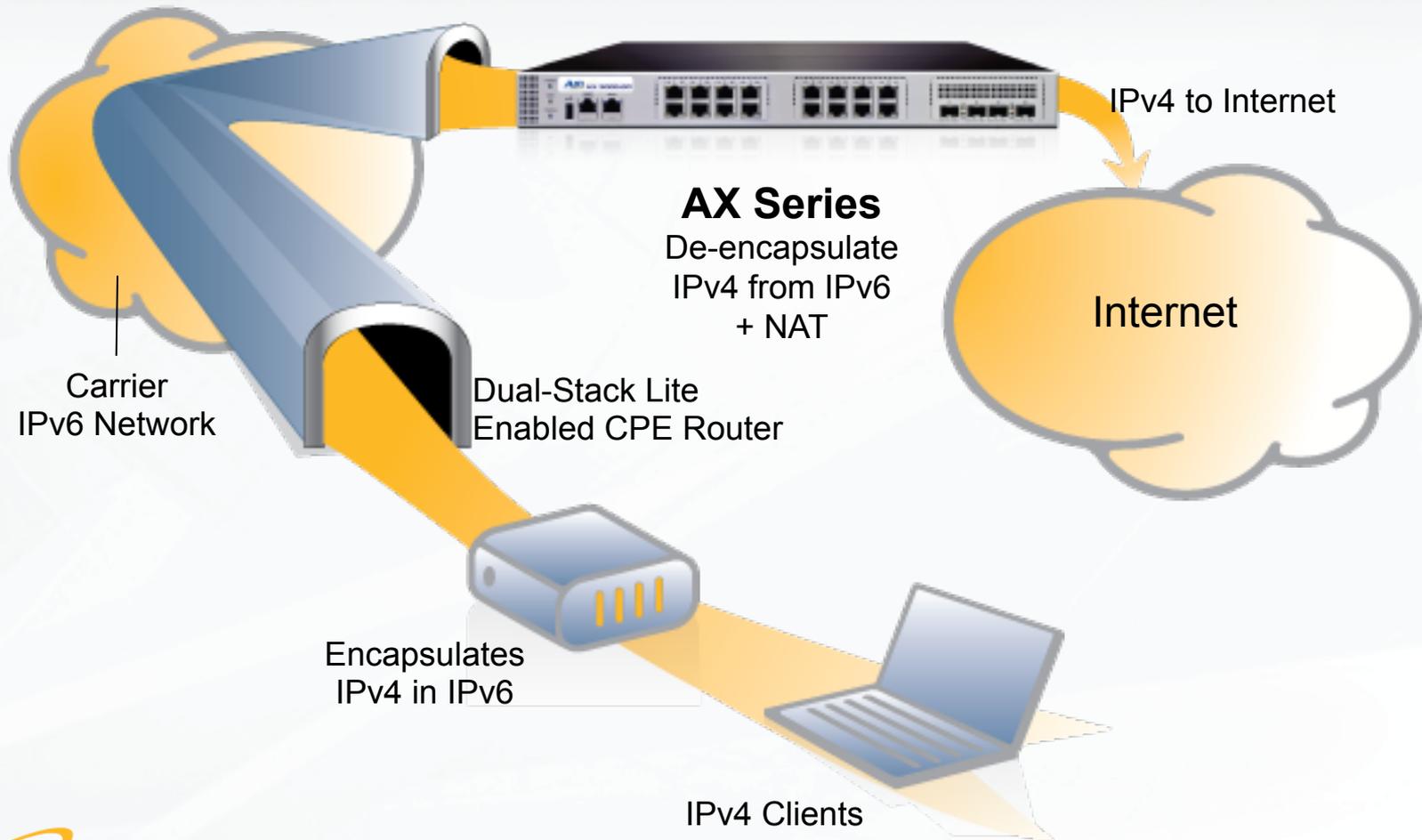


The AX Series DS-Lite Solution Enables IPv6 Deployment

- The AX Series communicates with the service provider IPv6 and the IPv4 networks



DS-Lite Alternate View



AX Series Offers the Ideal Platform

- ▶ Flexible high performance hardware & software platforms
- ▶ Scalable
 - ▶ Very high session establishment rate
 - ▶ Large number of concurrent sessions
 - ▶ Very high NAT Processing (packets per second) & throughput
- ▶ Stateful high availability for robustness
- ▶ Cost effective



64-bit AX Series Models



Price

AX Series



AX 2500

10 Gbps
250W Max
SSD



AX 2600

18 Gbps
291W Max
SSD



AX 3000

22 Gbps
308W Max
4 x 10 Gb
SSD



AX 5100

40 Gbps
660W Max
8 x 10 Gb
SSD
PFTA
S+R ASIC



AX 5200

40 Gbps
680W Max
16 x 10 Gb
SSD
PFTA
S+R ASIC

Medium to Large Enterprise

Large Enterprise or
Service Provider



Overall Performance

64-bit: AX Series Family Performance Chart



	AX 2500	AX 2600	AX 3000	AX 5100	AX 5200
Application Throughput	10 Gb	18 Gb	22 Gb	40 Gb	40 Gb
Layer 4 CPS	310,000	355,000	440,000	2,000,000	3,020,000
Layer 7 RPS (Max)	700,000	740,000	800,000	1,400,000	3,500,000
DDoS Protection (SYN Flood) SYN/Sec	2.1 million	2.3 million	2.6 million	50 million*	50 million*
SSL CPS	7,900	11,000	11,000	70,000**	70,000**
SSL TPS (10 trans/con)	57,000	85,000	85,000	300,000**	300,000**
SSL Bulk Throughput	1.2 Gb	2 Gb	2 Gb	9,1Gb**	9,1Gb**

* 0% CPU utilization

**Multi-ASIC SSL Card Option w/ 2 Cards

Summary - Large Scale NAT and Dual-Stack Lite

A10

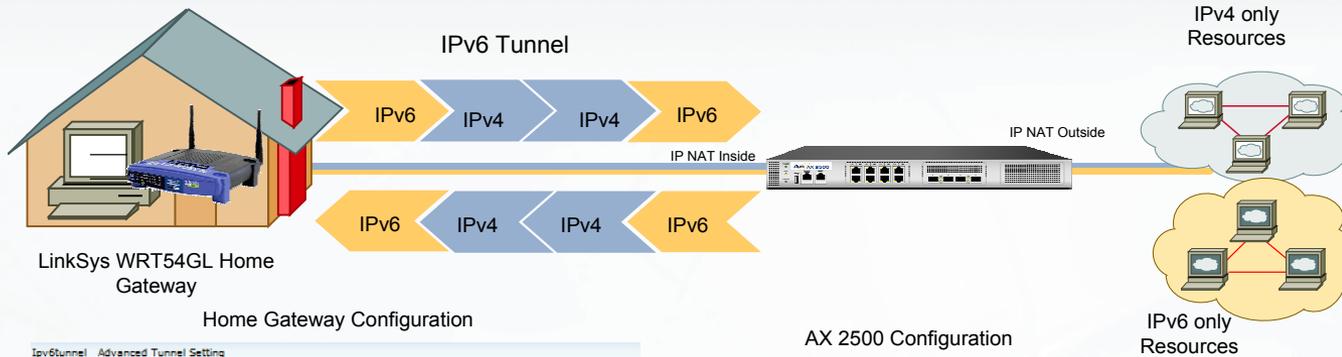
- Leader in IPv6 migration technologies
- Ensure rapid Internet growth can continue despite IPv4 address shortage



Demo Setup & Configuration Details

Demonstration Setup

DS-Lite Demonstration



LinkSys WRT54GL Home Gateway

Home Gateway Configuration

Ipv6Tunnel Advanced Tunnel Setting

Tunnel type

DHCP or Static

DS-Lite Configuration

CGN IPv6 address
e.g. 2001:a::1

WAN IPv6 Address
e.g. 2001::2/64

IPv6 WAN Default Gateway
e.g. 2001::1

Primary DNS
e.g. 2001::2

IPv6 Prefix Delegation
e.g. 2001:2::/56

IPv6 LAN Default address
e.g. 2001::2::1

AX 2500 Configuration

```
hostname AX2500
!
class-list dslite
 2006::/96 lsn-lid 1
!
interface ethernet 6
 ip address 172.16.206.213 255.255.255.0
 ipv6 address 2006::213/96
 ip nat inside
!
interface ethernet 7
 ip address 172.16.204.213 255.255.255.0
 ipv6 address 2004::213/96
 ip nat outside
!
ip nat pool dslite 172.16.204.60 172.16.204.60 netmask /24 lsn
lsn-lid 1
 source-nat-pool dslite
!
ip nat inside source ds-lite class-list dslite
!
s1b new-path-enable
```

IPv4 only Resources

IPv6 only Resources

QUESTIONS?