

# Planning Your IPv6 Network

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17 March 2024

# Organizational Updates





# ASN Fee Harmonization

The **Fee Harmonization** process, initiated on 1 January 2022, is now complete.

## Effective 1 January 2024:



Transitioned ASNs to the Registration Services Plan (RSP) Fee Schedule.



Removed the \$550 ASN issuance fee.



Converted ASN-only holders to Service Members, making them eligible for General Membership.

# ARIN Membership Updates

## Service Members

Organizations that have signed an ARIN Agreement for IPv4 or IPv6 address space and/or Autonomous System Numbers (ASNs).

As of 4 March:

23,396  
Service  
Members

1,971  
General  
Members



## General Members

If ARIN's governance is important to your organization, Service Members can elect to become General Members. General Members express commitment to participate in an ARIN Election at least once every three years to maintain their status.

*ARIN provides basic services to approximately 14,000 customers which hold Internet number resources that are not currently covered under any type of agreement with ARIN.*

# Expiration of Legacy Fee Cap

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As of **1 January 2024**, ARIN no longer offers a Fee Cap for Legacy resources brought under an Agreement.

The Fee Cap **will** continue for Legacy resources that were brought under an Agreement before **1 January 2024**.



# Overview



- Transitioning to IPv6 Thinking
- IPv6 Basics
- ISP or End User
- The Right Block Size
- Supporting IPv4
- Putting It All Together

# Transitioning to IPv6 Thinking



# Scarcity

We knew in the mid-1990s IPv4 would run out

This led to a scarcity mindset

- Go to ARIN multiple times a year
- (Probably) get less than you wanted
- Divide it into small chunks and distribute where needed

This mindset does not work for IPv6





# IPv4 mindset doesn't work for IPv6

The biggest risk is an IPv4 mindset

- "Only get as much as you need now"
- "Only give each customer/site what is needed now"
- "Add additional space as needed"

This will hinder your IPv6 deployment



# IPv6 = Abundance



Get a very large block from ARIN  
(more than you think you need!)

Give every customer/site a very large  
block

At each level of your hierarchy, use the  
same block size based on the largest  
block needed

# IPv6 Basics



# Comparison

## IPv4

## IPv6

<p>/32 (single IPv4 address)</p>	<p><b>Counting Unit</b></p>	<p>/64 (subnet with a near infinite number of IPv6 addresses)</p>
<p>/24 (contains 256 IPv4 addresses)</p>	<p><b>Smallest Routable Block</b></p>	<p>/48 (contains 65,536 /64 subnets)</p>
<p>/24</p>	<p><b>Typical Initial Block Size</b></p>	<p>/32 (contains 65,536 /48 blocks to assign to customers/sites)</p>

# IPv6 Address Structure

2001:0DB8:0234:AB00:0123:4567:8901:ABCD

/32 assigned  
to you

/48 assigned to  
customer/site

/64 subnet

64 bits device autoconfiguration

# ISP or End User?



**IPv6**  
let's grow!

# BEFORE ... In IPv4

An ISP is a business whose primary service is providing Internet access

Education, government, etc. were end users

This worked for IPv4 because  
ISPs and end users got the  
same block sizes





# NOW ... in IPv6

If you assign blocks to users of your services, you are an ISP

End users will never make assignments to users of services



# The Right Block Size



# End User Block Size

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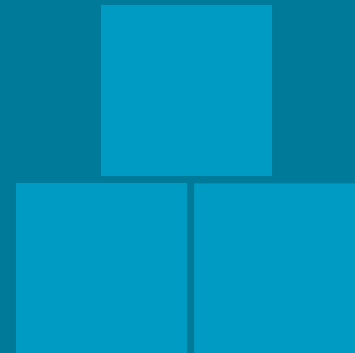
Remember —

If you assign addresses to users, request as an ISP!

If you're sure you will never do that, the end user block size is based on # sites in your network

Site = any location at which you operate

- Datacenters, offices, warehouses, etc.
- But not people working from home





# End User Block Size Chart

<b>Number of Sites</b>	<b>Block Size</b>
1	/48
2-12	/44
13-192	/40
193-3,072	/36
3,073-49,152	/32

# ISP Block Size

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Know your three numbers

1. Block size to assign to users  
/48 is the industry standard
2. # serving sites in your network  
Sites at which you aggregate customer connections  
Fiber hubs? Dorms? Buildings?
3. Largest # customers at a single serving site

1

# Block Size to Assign to Users

What is the right size for your organization and its users?

/48 is the industry standard

2

## Block Size per Serving Site

1. Which site has the largest number of customers?
2. Identify a nibble-aligned block that can hold that many /48s without going over 75% usage.

Example:

My largest wireless tower serves 3,567 customers, so...

/36 (4,096 /48s) too small — 87% usage

/32 (65,536 /48s) is the right choice

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## Overall Block Size

1. Identify block that can hold enough for every serving site without going over 75% usage
2. Identify a nibble-aligned block that can hold that many /48s without going over 75% usage.

Example:

- I need a /32 for each of my wireless towers since the largest needs a /32
- I have 13 wireless towers
- /28 (16 /32s) too small — 81% used
- **/24 (256 /32s) is the right choice**

# Supporting IPv4







# IPv4 Will Be Around for a While



Networks are paying significant sums per IPv4 address or spending years on ARIN's IPv4 Waiting List



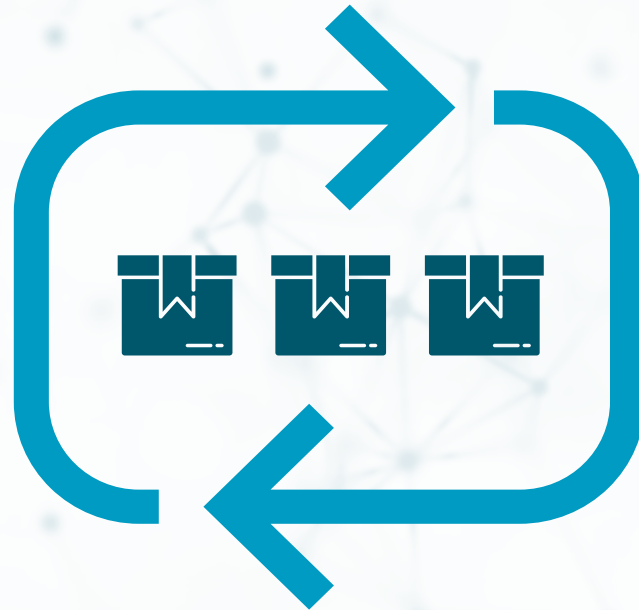
Plan to speak both IPv4 and IPv6 for the foreseeable future

But how?

# IPv6/IPv4 Translation

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Get one /24 for dual-stacking internal infrastructure



Ask for an additional /24 as frequently as every six months until the pool is large enough

**Note:** ARIN has 16,384 IPv4 /24s reserved to help IPv6 networks talk to IPv4 networks and **90%** of these are still available.  
(Number Resource Policy Manual/NRPM 4.10)

# Putting It All Together



# ISP or End User?



Generally, apply for a /32 as an ISP/LIR unless:

- You're sure you will not assign addresses to users
- You're sure a /40 or /36 will provide enough for your network's lifetime

Apply as an end user if you do not assign addresses to users/customers and do not provide connectivity to any users/customers

# Know Your Numbers

End User



ISP

# sites in your network

1. Block size to be assigned to customers
2. # serving sites in your network
3. # customers served by the largest site



# Start the Process Today



# Request IPv4 Transition Space

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After receiving your IPv6 block,  
request an IPv4 /24 for transition support

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Permitted uses:

- dual-stacking nameservers,
- IPv6/IPv4 translation pools

If your pools are oversubscribed, you may request an additional /24 in six months

Note: Under NRPM 4.10



# Resources for IPv6 Adoption



Recorded  
Webinars



Events



Business case  
blog series



How-To  
Videos





# Challenges to IPv6 Adoption

- “Training your teams to be aware, educated, and familiar with IPv6.”
- “Finding the right approach to convincing executive management teams that IPv6 deployment should happen.”
- “Getting the service and applications deployment teams involved much earlier.”
- “Known knowns ... known unknowns ... [and] unknown unknowns.”





# Contact Us



ARIN Helpdesk:

Voice: 7:00 AM - 7:00 PM ET  
+1.703.227.0660

Chat: 10:00 AM – 4:00 PM ET  
Monday-Friday

Ask ARIN

Feedback Button and Report Service Issues

Billing Support Help Desk:

9:00 AM – 5:00 PM ET  
Monday-Friday

# Powered by Participation



**ARIN 53 Public Policy & Members Meeting:** 14-17 April - Bridgetown, Barbados

*\* In person or virtual attendance*

ARIN on the Road: 30 April - Reno, NV

ARIN on the Road: 2 May - Kansas City, MO

ARIN on the Road: TBD September - Ottawa, Canada

**ARIN 54 Public Policy & Members Meeting:** 24-25 October - Toronto, Canada

*\* In person or virtual attendance*



# Do you have a Project that needs Funding?



The ARIN Community Grant Program supports operational and research projects that improve the overall Internet industry and Internet user environment. Projects must fit into one of four categories:

Internet technical improvements

Registry processes and improvements

Informational outreach that advances the Internet

Research related to ARIN's mission and operations

*Next application cycle opens 24 April 2024*

ANY QUESTIONS



Thank You

