

Policy Implementation and Experience Report

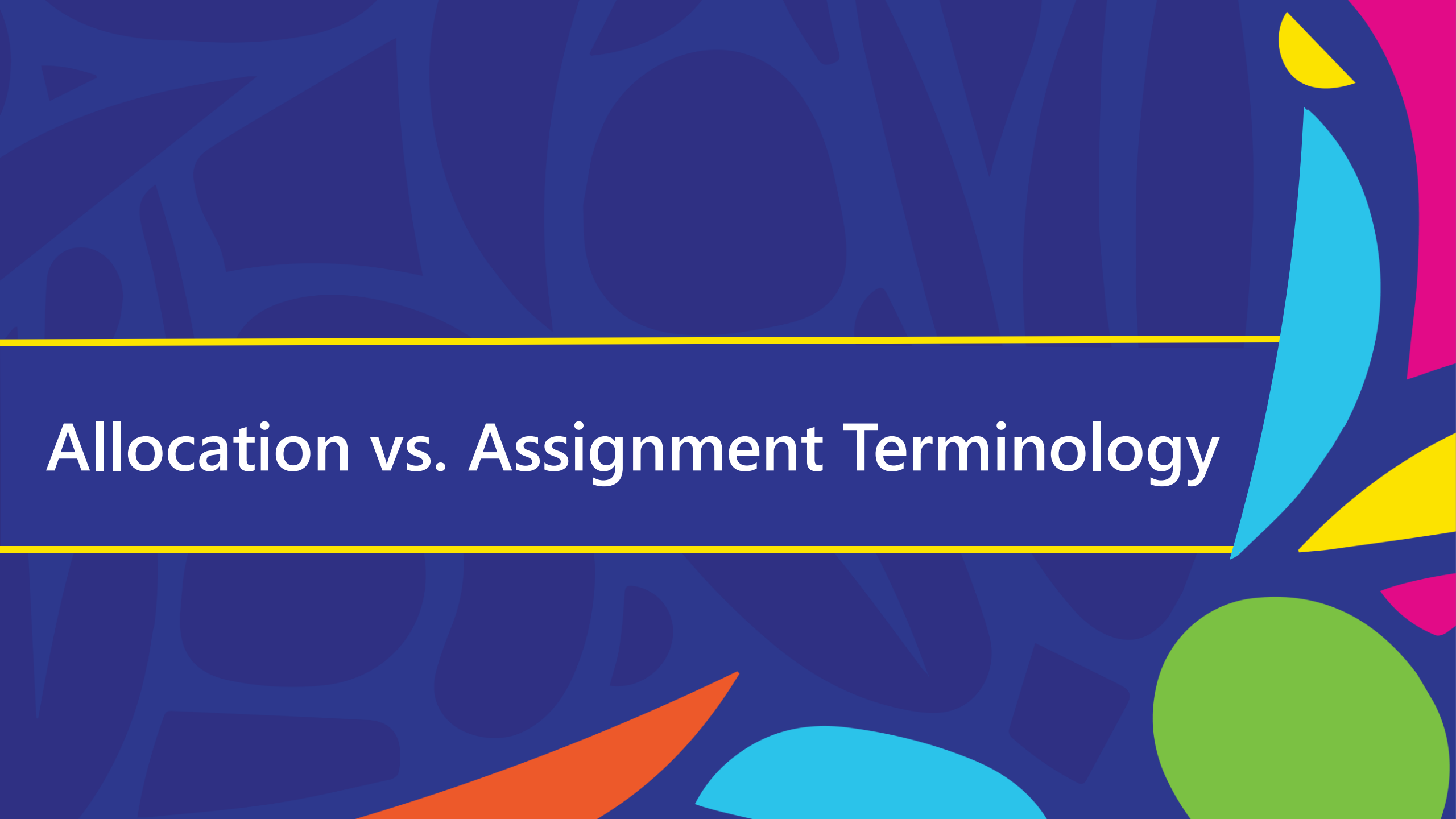
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Policies Reviewed

- Allocation vs. Assignment Terminology
 - History of IPv4 allocations and assignments
 - In practice — where we are today
 - Internet Service Provider (ISP) vs. Local Internet Registry (LIR): Considerations and implications around these terms
 - 4.4. IPv4 Microallocation
 - 6.5.2.1. IPv6 Allocation Size
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Allocation vs. Assignment Terminology

IPv4 Assignments/Allocations: 1997-2004



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/19 minimum allocation based on documented use of provider-assigned space for customers showing efficient use of a /19	/19 minimum assignment size based on hardware numbering requirements; 25% immediate utilization rate, 50% one-year utilization rate; internal use only
Additional IPv4 Policy	Required 80% usage of all previous allocations; three-month supply based on demonstrated growth, not projected growth	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Cannot reassign/reallocate space; displayed as "Direct Assignment (DS)"
Membership	ISPs became members upon receiving an initial allocation; all members allowed to vote in ARIN Elections	No automatic membership; paid membership available

IPv4 Assignments/Allocations: 2004-2012



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/20 minimum allocation to single-homed ISPs, /22 minimum allocation to multi-homed ISPs , based on demonstrated use of provider-assigned space	/20 minimum assignment to single-homed End Users, /22 minimum assignment to multi-homed end user ; 25% immediate utilization rate, 50% one-year utilization rate; internal use only
Additional IPv4 Policy	80% usage of all previous allocations; supply based on demonstrated growth, not projected growth; block size based on 3/6/12 month need (varied over time)	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Cannot reassign/reallocate space; displayed as "Direct Assignment (DS)"
Membership	ISPs became members upon receiving an initial allocation; all members allowed to vote in ARIN Elections	No automatic membership; paid membership available

IPv4 Assignments/Allocations: 2012-2015



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/24 minimum allocation based on demonstrated customer use of provider-assigned space	/24 minimum assignment ; 25% immediate utilization rate, 50% one-year utilization rate; internal use only
Additional IPv4 Policy	80% usage of all previous allocations; supply based on demonstrated growth, not projected growth; block size based on 3-month need	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Cannot reassign/reallocate space; displayed as "Direct Assignment (DS)"
Membership	ISPs became members upon receiving an initial allocation; all members allowed to vote in ARIN Elections	No automatic membership; paid membership available

IPv4 Assignments/Allocations: 2015-2018



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/24 minimum allocation based on demonstrated customer use of provider-assigned space	/24 minimum assignment; 25% immediate utilization rate, 50% one-year utilization rate; internal use only
Additional IPv4 Policy	80% usage of all previous allocations; supply based on demonstrated growth, not projected growth; block size based on 3-month need	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Cannot reassign/reallocate space; displayed as "Direct Assignment (DS)"
Membership	ISPs became members upon receiving an initial allocation; all members allowed to vote in ARIN Elections	No automatic membership; paid membership available

IPv4 Assignments/Allocations: 2018-2021



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/24 minimum allocation based on demonstrated customer use of provider-assigned space	/24 minimum assignment; 25% immediate utilization rate, 50% one-year utilization rate; internal use only
Additional IPv4 Policy	80% usage of all previous allocations; supply based on demonstrated growth, not projected growth; block size based on 3-month need	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Cannot reassign/reallocate space; displayed as "Direct Assignment (DS)"
Membership	ISPs became members upon receiving an initial allocation; all members allowed to vote in ARIN Elections	Not available

IPv4 Assignments/Allocations: 2022-Present



	Internet Service Providers (ISPs)	End Users
Initial IPv4 Policy	/24 minimum allocation based on demonstrated customer use of provider-assigned space	/24 minimum assignment; 25% immediate utilization rate, 50% one-year utilization rate
Additional IPv4 Policy	80% usage of all previous allocations; supply based on demonstrated growth, not projected growth; block size based on 3-month need	Required 80% utilization of each previous assignment; same 25% immediate/50% one-year utilization rate
WHOIS	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"	Shared Whois Project (SWIP) used to display customer reassignments/reallocations; displayed as "Direct Allocation (DA)"
Membership	ISPs became Service Members upon receiving an initial allocation; may opt-in to vote in ARIN Elections	End users become Service Members upon receiving an initial allocation; may opt-in to vote in ARIN Elections

2022 Fee Harmonization



- The distinction for fees between end users and ISPs was eliminated.
 - All organizations with IPv4 and IPv6 addresses from ARIN were invoiced under a common fee structure, the Registration Services Plan (RSP)
 - All have access to the same tools and services
 - All are Service Members and eligible for General Membership
 - All received allocations of IP address space
- The distinction remains that an organization that uses “external connected customers” to justify their request are deemed ISPs and must qualify under the ISP policies.
- *All distributions are now labeled “DA” for Direct Allocation in ARIN Online and ARIN’s databases, which allows for reassignment/reallocation action.*

Where are we today?



- Customers may still request resources using either end user or ISP policies, but ARIN only **allocates** IP addresses
- End users can reassign/reallocate addresses to their internal departments or networks
- ISPs may use external customers to justify their need; end users cannot
- At this point, it is not clear if there is any need to have two distinct IPv4 policies (one for ISP vs. a different one for end user). The community might want to consider the merits of a single policy vs. status quo.



LIRs and ISPs are not the Same

- Number Resource Policy Manual (NRPM) defines a Local Internet Registry (LIR) as an IR that primarily assigns IP addresses to the users of the “network services” that it provides, noting that LIRs are generally Internet Service Providers (ISPs) whose customers are primarily end users and possibly other ISPs.
- The terms LIR and ISP are not 100% interchangeable
- Example: An organization that only provides address management services (e.g. IPv4 leasing) without connectivity cannot be considered providing network services and thus are not an ISP.

Additional Policy/NRPM Considerations



- NRPM 6.5.1a says ISP and LIR are equivalent terms, but NRPM Section 4 has been interpreted to use the community's present "ISP" definition contained in NRPM section 2 ("Definitions")
- Changing this ISP definition can impact policy implementation beyond what an errata can (or should) address
- While that should not inhibit policy (or language) changes, if sought by the community, it does highlight the need for the community to be explicit in its desired policy outcomes



Community Feedback: ISP vs. LIR

- “ISP is a very ambiguous term which carries a lot of different connotations to different people, most of which don’t describe the full range of ARIN member LIRs.”
- “LIRs include cloud providers, CDNs, certain government entities, colocation facilities, “eyeball” providers, backbone providers, tunnel/vpn service providers, SDWAN providers, SAAS providers, etc.”
- Should we prefer the term LIR over ISP?

NRPM 4.4. IPv4 Microallocations



Policy Text (4.4. Micro-allocation)

- ARIN will make IPv4 micro-allocations to critical infrastructure providers of the Internet, *including public exchange points ...*
- *Exchange point allocations* MUST be allocated from specific blocks reserved only for this purpose.

Issues



- “Must be issued from specific blocks” suggests the blocks should be grouped together for routing/filtering purposes
- Blocks are typically not routed to keep IX traffic from being publicly visible
- Policy does not specify this as a requirement



Question for the Community

- Current staff understanding is that IX space must be used for IX switch fabric and not routed
- Should this requirement be specified in the policy? Or should exchange points be able to use space for other purposes which necessitate routing?

NRPM 6.5.2.1. - IPv6 Allocation Size



NRPM 6.5.2.1.a Size & Current Practice

- *"All allocations shall be made on nibble boundaries"*
- Current practice: if a request shows justification for more than a given block size (even if just one /32 more), we issue the larger block
- Reservation typically one nibble boundary up (e.g. /32 from /28 reserve)



Questions for the Community

- If an ISP demonstrates they need slightly more than a /20, should ARIN approve a /16? Or a /20 from a /16 reserve? Or a /20 and a /32 (reserved to a /28)?
- Should the ISP be required to show more utilization?
- Should larger allocations be exempt from the nibble boundary requirement?
- If so, then where is the correct size to impose that?

Thank You

Questions or Comments?

