RIPE NCC
RIPE NETWORK COORDINATION CENTRE

How to Get IP Addresses for Your Network

October 2024

Introduction

The scarcity of IPv4 addresses and the ability to transfer unused addresses from one network to another has resulted in a dynamic secondary market with fluctuating prices. In response, organisations today are using various approaches to acquire IPv4 addresses: receiving small amounts directly from the Regional Internet Registries (RIRs), purchasing addresses through marketplaces, entering into rental arrangements, and other secondary market transactions.

Many organisations are also exploring ways to stretch their existing IPv4 addresses further. Some are deploying technologies such as Carrier Grade Network Address Translation (CGNAT), or else optimising their address space utilisation through various subnetting and IP address reclamation strategies.

While the approaches above can offer temporary relief, the long-term sustainability of IPv4-only networks remains a concern for the industry. Undoubtedly, the only real viable solution that allows the Internet to continue growing over the long term is to complete the transition to IPv6.

Whether you are planning to launch an entirely new network, or want to grow your existing one, this document outlines the options available to you, based on research conducted by external consultancy NEXOP in spring 2024. This research combined financial data of transactions for IPv4 sales, current prices from different platforms, and in-depth interviews with ISPs, mobile operators, IPv4 transfer brokers, government representatives, and network consultants.

Available Options

🚀 I want to launch a new network

V6 Deployment

Option A: Request an IPv6 Allocation from the RIPE NCC

Option B: Rent IPv6 from a RIPE NCC Member

Option C: Receive an IPv6 PI Assignment Through a Sponsoring Member

V4 Deployment

Option D: Request an IPv4 Allocation from the RIPE NCC's Waiting List

Option E: Rent IPv4 Addresses from a RIPE NCC Member

Option F: Receive a Transfer of IPv4 Space

⬆ I want to grow my existing network

V6 Deployment

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Option D: Request an IPv4 Allocation from the RIPE NCC's Waiting List

Option E: Rent IPv4 Addresses from a RIPE NCC Member

Option F: Receive a Transfer of IPv4 Space

Option G: Optimise IPv4 Address Management

Option H: Deploy CGNAT

Legend

slow: 1y+

medium: 1-12 months

fast: up to 1 month

EUR 100 - 1,000

EUR 1,000 - 10,000

EUR 10,000+

Deploy "IPv6-mostly" Network

Deploying an IPv6-mostly network is the modern-day solution available to everyone, including new entrants. An IPv6-mostly network implements IPv6-only for customers and provides gateways to translate IPv6 into IPv4, using a mechanism called NAT64. It relies on a number of components such as a NAT64 translator and a DNS64 server that are available as both commercial and open source implementations. IPv6-mostly networks also have the ability to support IPv4-only hosts.

An IPv6-mostly network can pose some challenges, such as interoperability issues with legacy systems and uncertainties regarding customer readiness and market acceptance. However, in other ways it can also be more simple and cost-effective, reducing the amount of IPv4 needed to run your network, and providing the flexibility and unlimited growth potential of IPv6.

There are multiple ways to receive IPv6 address space in order to start the deployment process.

Option A: Request an IPv6 Allocation from the RIPE NCC

If you plan to run a complex network, for example providing network solutions to customers or using a hierarchical internal network topology, an IPv6 allocation is the best solution. You can receive an initial allocation of /32 up to /29. You may also qualify for an initial allocation greater than /29 if you can submit documentation that reasonably justifies your request. You need to become a RIPE NCC member to request an allocation.

Who is this for?

→ If you have larger deployment plans or want to provide network solutions to your customers.

→ If you want to scale your network to reach more customers but do not have many IPv4 addresses.

→ If you would like to avoid the cost and complexity of implementing CGNAT, and prefer to invest in a more future-proof solution.

How to?

1. Become a member of the RIPE NCC.
   Once you have completed the basic steps to get set up as a RIPE NCC member, you can submit a resource request.
2. Prepare an addressing plan for IPv6.
3. Train your employees.

4. Test the setup. This is fundamental in understanding if all the components work together, and if the routers, CPEs and end user "terminals" accept the new configuration.

Cost

Membership Fee in 2025	€1,800
One-time sign-up fee for new members	€1,000

You don't have to pay an extra fee to request IPv6. Find up-to-date membership fees on this page.

Useful resources

- You can check out IPv6-related courses in the RIPE NCC Academy.

- IPv6 Address Allocation and Assignment Policy.

- Best Current Operational Practice for Operators: IPv6 prefix assignment for End Users - persistent vs non-persistent, and what size to choose.

- An article about deploying an IPv6-mostly network.

Brief overview

⊕ High availability: plenty of IPv6 addresses are available.

⊕ Control: once you have been allocated this space, you will remain the official holder of the address space for as long as you wish (provided you comply with RIPE policies and RIPE NCC procedures).

⊕ Low cost: getting IPv6 addresses from the RIPE NCC is cheaper than sourcing IPv4 on a secondary market.

⊖ Knowledge of IPv6 is required.

⊖ Compatibility issues: there might be some old devices that do not support IPv6-only networks.

Option B: Rent IPv6 from a RIPE NCC Member

For a simple network configuration, you can consider getting an IPv6 assignment from a RIPE NCC member. This approach means that you will be using the IPv6 address space of another organisation, and so will have to renumber your network if you ever decide to move to another provider.

Who is this for?

→ If you have a simple network configuration.
→ If you are a new entrant, enterprise or have an expanding network and don't want to make a capital investment to purchase IP addresses.
→ If you are looking for smaller IP address blocks.

How to?

1. Find a RIPE NCC member willing to provide their space. You can find a list of members that operate in your country on this page.
2. Negotiate agreement terms.
3. That member will need to update the RIPE Database with your details.

Cost

Average yearly price for a /48	around €300*

Based on an average fee of €25 per month.

Useful resources

Find out about the different types of IPv6 address space.

Despite the technological readiness of IPv6, its adoption continues to lag behind IPv4 due to a range of operational, financial, and logistical challenges. Although IPv6's primary advantage is its vast address space, those interviewed in the research noted that its deployment still poses challenges, requiring investments in infrastructure upgrades, software compatibility improvements, and workforce training.

*All costs are indicative and based on research conducted by NEXOP in spring 2024

Brief overview

⊕ Fast: organisations can start renting space in as little as 24 hours. Several entities either rent IPv6 addresses directly or serve as brokers to find suitable space for you.

⊕ Low costs relative to other options.

⊕ Reduced administrative burden: you don't have to become a member of the RIPE NCC.

⊖ Less control: you're relying on the organisation that you rent from. If they alter their business approach, you'll need to react, often requiring renumbering.

⊖ You will also have to renumber your network if you change providers.

⊖ Potential geolocation issues: the addresses might have previously been used by other entities in different regions and so could be associated with outdated geolocation data.

Option C: Receive an IPv6 PI Assignment Through a Sponsoring Member

For smaller IPv6 deployment plans, such as rolling out IPv6 in your office network, you can request an IPv6 Provider Independent (PI) assignment from the RIPE NCC via a sponsoring member ("Sponsoring LIR"). Unlike getting resources from a provider (Option B), the PI assignment is held by you, which means you will not have to renumber your network if you ever decide to change providers.

The minimum PI assignment size is a /48, with larger sizes available if justified. To receive a PI assignment, you will need to enter into a contractual relationship with a RIPE NCC member willing to sponsor your request. IPv6 PI can only be used for your own network and cannot be provided to your customers.

Who is this for?

→ If you want to implement IPv6 quickly on smaller, simpler networks for an indefinite period, without the need for a large allocation.

→ If you want to run your own network but don't want to renumber it if you ever decide to change providers.

How to?

1. Find a sponsoring RIPE NCC member. You can find a list of members that operate in your country on this page.
2. The sponsoring member submits a request on your behalf to the RIPE NCC.
3. The registry is updated with your details.

Cost

Sponsoring member fee to the RIPE NCC	€75

Sponsoring members typically charge their own fee on top of this, and the costs vary.

Useful resources

How to Request an IPv6 PI Assignment.

Brief overview

⊕ Control: you have control over your own resources and so renumbering is not required if you ever decide to change providers.

⊕ High availability: a number of organisations are willing to become a sponsoring member for a fee, and there's plenty of IPv6 space available.

⊕ Scalable: /48 has space for 65,000 different networks, and you can always request more addresses as you expand.

⊖ You can only use PI resources for your own network and cannot further assign addresses to your customers.

IPv4-only or Dual-stack Network

As IPv4 is scarce, organisations that already have IPv4 addresses can also explore technologies to optimise their address usage, or run a dual-stacked network on both IPv4 and IPv6 at the same time, and thus provide connectivity to their customers over both protocols.

Some alternative solutions are implementing Carrier Grade Network Address Translation (CGNAT) technologies, or optimising address space utilisation with IP Address Management (IPAM) tools.

You can also receive an IPv4 transfer from, or enter into a rental agreement with, another organisation with unused addresses, or join the RIPE NCC's waiting list, if time is not a huge constraint and a /24 is enough.

Option D: Request an IPv4 Allocation from the RIPE NCC's Waiting List

New or existing RIPE NCC members who have never received any IPv4 space from the RIPE NCC can request a single /24 IPv4 block from our waiting list. You cannot request more than a /24 per LIR. You will then be eligible to receive an allocation once any addresses become available in the future, according to your place in the queue. This can take quite some time. As of 1 October 2024, the first LIR in the queue had been waiting for over 500 days. This can be slower or faster depending on the rate at which resources are returned to the RIPE NCC.

Who is this for?

→ If you are looking to hold your own IPv4 addresses.
→ If you are not in a rush to acquire IPv4 addresses.
→ If you intend to hold the IPv4 addresses for an indefinite period.

How to?

1. Become a member of the RIPE NCC. Once you have completed the basic steps to get set up, you can request a /24 IPv4 allocation.
2. When your position arises on the waiting list, the RIPE NCC will review your application. Upon approval, you will be granted a /24 IPv4 allocation.
3. You will then be able to use the space on your network.

Cost

Membership Fee in 2025	€1,800
One-time sign-up fee for new members	€1,000

Find up-to-date membership fees on this page.

Useful resources

📄 IPv4 Address Allocation and Assignment Policies.
📄 IPv4 Waiting List.

Brief overview

⊕ Legitimacy: the main advantage of approaching the RIPE NCC for a /24 of IPv4 addresses is that you are assured that you are receiving authorised address space directly from a Regional Internet Registry.

⊕ Control: once you have been allocated this space you will remain the official holder of the address space for as long as you wish (provided you comply with RIPE policies and RIPE NCC procedures).

⊖ Long wait time.

⊖ Uncertainty regarding if/when you will receive the allocation. You will have to pay your yearly membership fee while on the waiting list. This also creates difficulties if you plan to scale up your network.

Option E: Rent IPv4 Addresses from a RIPE NCC Member

If you require IPv4 address space urgently, or on a temporary basis, you can effectively rent addresses from a RIPE NCC member. Without the need to become a member of the RIPE NCC, you can start this quite quickly once you have found a member willing to rent their IPv4 addresses.

Who is this for?

→ If you are a new entrant, enterprise or have a network that is expanding.

→ If you prefer not to make a capital investment or do not have the means to purchase IP addresses.

→ If you are looking for smaller IP address blocks.

→ If you are mainly interested in obtaining IPv4 addresses quickly and prefer not to maintain information in the RIPE Database yourself.

→ If you do not want to become a member of the RIPE NCC.

How to?

1. Understand your needs.
2. Source a RIPE NCC member.
3. Compare their service offerings.
4. Enter into a contractual service agreement with a member.

Cost

Price per IP address per month	€0.5-20*
Price for a /24 per year	€1,500 - €5,000

The price depends on a few factors. For example, the amount of addresses you plan to rent (*a single IP can cost up to 20 EUR, with the price per IP decreasing when renting a larger range*), or whether you want to buy a connectivity package together with the addresses from your provider.

Useful resources

IPv4 Address Allocation and Assignment Policies.

All costs are indicative and based on research conducted by NEXOP in spring 2024

Brief overview

⊕ Fast: organisations can start renting space from willing entities in as little as 24 hours. Several entities either directly rent IPv4 addresses or serve as brokers to find suitable space.

⊕ Scalable and flexible: renting space enables the swift acquisition of additional space for short durations, or conversely, the reduction of rented space based on specific events or business decisions.

⊖ Reduced control: you're relying on the organisation that you rent from. If they alter their business approach, you'll need to react, often requiring renumbering.

⊖ Long-term costs: while this option in the short-term can be an attractive financial alternative, if one is looking to make use of the space for more than five years, it may make more financial sense to buy the space outright.

⊖ Potential geolocation issues: the addresses might have previously been used by other entities in different regions and so could be associated with outdated geolocation data.

Option F: Receive a Transfer of IPv4 Space

If you need IPv4 for a larger network and customers, you can consider finding an organisation willing to transfer some of their addresses to you. This involves transferring the rights to use specific IPv4 address blocks between organisations, which is facilitated by the RIPE NCC.

Typically, a transfer involves financial compensation to the transferring party. Transfers can be done on a permanent or temporary basis. Organisations will often use IPv4 transfer brokers to find a member looking to transfer their addresses and facilitate the process. Once terms are settled between the two parties and the transfer has been approved by the RIPE NCC, you will have full holdership rights and can use the addresses for your own network purposes and can assign address space to your customers. In order to receive transferred addresses from another organisation, you will need to first become a member of the RIPE NCC.

There are also other types of address space that are available to acquire via transfers such as **Provider independent (PI)** resources and **Legacy** address space. These options are suitable for organisations that need IPv4 addresses for their own network and don't want to renumber. PI assignments cannot be further assigned to other parties.

Who is this for?

→ If you intend to hold the space for an indefinite period of time.
→ If you need stability and control over your addresses.
→ If you need more than a /24 of IPv4 addresses.
→ If you are willing to make a capital investment in acquiring IPv4 addresses
→ (For PI only) if you don't need to assign addresses to your customers.

How to?

IPv4 Allocation

1. Find a member willing to transfer IPv4 addresses or else find a broker to handle this for you. Find the list of members that cooperate in your country.
2. Become a member of the RIPE NCC.
3. The offering party will submit a transfer request to the RIPE NCC.
4. Await for verification and approval.
5. The Registry is updated.

PI

1. Find an organisation willing to transfer IPv4 addresses with the status **ASSIGNED PI** and submit a transfer request to the RIPE NCC.
2. PI resources can be transferred to either a RIPE NCC

member, or an entity that has a contractual relationship with a sponsoring member.

3. If you are not a member, your sponsoring member deals with the RIPE NCC on your behalf.
4. The registry is updated.

Legacy Space

1. Find an organisation willing to transfer IPv4 addresses with the status LEGACY and request a transfer from the RIPE NCC.
2. The Registry is updated.
3. The new holder of the legacy space then has the option to enter into a contractual relationship with the RIPE NCC for that address space.

€ Cost (for /24 of IPv4)

Average purchase price for /24	€7,800*
Membership Fee in 2025	€1,800
One-time sign-up fee for new members	€1,000
Sponsoring member fee to the RIPE NCC	€75

Sponsoring members typically charge their own fee on top of this, and the costs vary.
Find up-to-date membership fees on this page.

Useful resources

- Check out this document to understand the difference between Allocation, PI, and Legacy space.
- RIPE Resource Transfer Policies.
- Contractual Requirements for Provider Independent Resource Holders in the RIPE NCC Service Region.
- Learn more about transfers on this page.

Despite its importance to the future growth of the Internet, IPv6 deployment is often not seen as a priority. Compounding this issue is the widespread lack of understanding among C-level executives about the differences between IPv4 and IPv6, which poses a significant hurdle in advocating for its implementation. However, the global deployment of IPv6 has made tremendous advancements in recent years, which means organisations that do not invest in IPv6 may soon find themselves at a disadvantage relative to their peers.

*All costs are indicative and based on research conducted by NEXOP in spring 2024

Brief overview

⊕ Control: once the RIPE NCC has updated the registry to reflect that you are the official holder of the address space, you will remain the official holder of the address space for as long as you wish (provided you comply with RIPE policies and RIPE NCC procedures).

⊕ Scalable: as there is currently a supply of IPv4 address space on the transfer market, it is possible to scale a network if you have the funds needed to purchase the additional address space.

⊖ Capital investment: acquiring and maintaining IPv4 address space can be costly, especially if you require a large allocation.

⊖ Uncertainty: the IPv4 market is volatile and the prices are dependent on supply.

⊖ Potential geolocation issues: the addresses might have previously been used by other entities in different regions and so could be associated with outdated geolocation data.

Option G: Optimise IPv4 Address Management

You can optimise your IP address space for efficient subnet planning, minimising IPv4 wastage and allowing you to do more with fewer addresses.

IP Address Management (IPAM) tools, once used only by larger networks, are now widely available as cloud-based services. In the last five years, they've become mainstream, giving start-ups and small and medium-sized enterprises access to affordable tools similar to those used by larger networks.

Using IPAM will eventually require renumbering your network, though new entrants are exempt. It's advisable to implement IPAM early if your business requires significant public IP resources.

Who is this for?

→ If you already have IPv4 and are seeking to optimise the utilisation of your IP addresses into a smaller block so you can expand.

→ If you want to make the best use of your resources.

→ If you are less concerned about renumbering.

→ If you want to streamline your IPv4 address usage so you can sell the surplus addresses to fund other projects.

How to?

1. Source an IPAM software solution.
2. Carry out a full network audit.
3. Deploy required IPAM features.

Cost

Subscription-based IPAM software	€2000* p/a up to tens-of-thousands p/a

Open source IPAM Software: down to engineering resources costs

All costs are indicative and based on research conducted by NEXOP in spring 2024

Brief overview

⊕ Utilisation efficiency: this will allow you to identify the most efficient use of your IP space using automated IP address assignment and reduce the burden on human resources.

⊕ Scalability: the IPAM solutions are designed to scale with the growth of networks. They are designed to handle IPv4 and IPv6 based on the evolving business needs of a network.

⊕ High availability of different software solutions.

⊖ Maintenance/complexity: IPAM software can be complex and time-consuming to set-up, especially in larger networks with a patchwork of different solutions. Integration can be challenging with regards to network infrastructure and compatibility with other tools.

Option H: Deploy CGNAT

You can explore technologies that allow you to share public IPv4 addresses between different customers or services. This is mostly achieved using Carrier-Grade Network Address Translation (CGNAT), which is the most widely used way to grow your customer base without acquiring more IPv4 addresses.

Who is this for?

→ If you have an established customer base and your own IPv4 addresses, but would like to grow your network.

→ If you are a new entrant and need to efficiently use the small amounts of IPv4 you have.

→ If you want to streamline your IPv4 address usage so you can sell the surplus addresses to fund other projects.

How to?

1. Find a vendor supporting CGNAT.
2. Be careful of any potential regulatory requirements.
3. Implement CGNAT on your network.

Cost

Cost varies depending on the equipment chosen to run CGNAT. Open source solutions are available, or vendors have specific devices/cards. You will need to invest resources to acquire suitable hardware and logging systems.

Useful resources

IPv6 Address Allocation and Assignment Policy.

According to the interviews conducted among various stakeholders, the widespread adoption of CGNAT has become an "industry standard" strategy for extending the lifespan of IPv4-based networks. However, NAT requires regulatory compliance and introduces operational complexities, including port mapping issues, protocol compatibility challenges, and difficulties in tracking and monitoring network traffic. As such, organisations must carefully evaluate the trade-offs between NAT deployment and the long-term viability of IPv6 adoption.

Brief overview

⊕ Reduced number of IPv4 addresses needed for the same amount of services/users.

⊕ Migration of users between addresses is simpler, and moving entire portions of the network to a new subnet is done centrally, without renumbering.

⊕ Widely used in the industry.

⊖ Scalability issues: as the density of usage increases this can lead to latency and performance issues for the customer.

⊖ Customers can experience problems using certain applications.

⊖ Helping law enforcement agencies is more complicated. Logs need to be kept and provided in case of investigations. This also requires extra OPEX and CAPEX as you'll need to keep the logs in a correlated way.

⊖ Abuse reports are harder to manage, as they involve investigating more than one customer at a time.

Glossary

Allocation - a block of IPv4/IPv6 addresses from which further sub-allocations or assignments can be made.

Assignment - delegated address space to an ISP or End User for use within their own Internet infrastructure. Assignments are only made for specific documented purposes and cannot be further sub-assigned to other parties.

Internet Number Resources - Internet identifiers such as IP addresses (IPv4, IPv6) and Autonomous System Numbers.

Legacy space - IPv4 address space that was distributed before the formation of the Regional Internet Registry (RIR) system and is therefore not subject to many of the policies that govern RIPE NCC-allocated IPv4 space. The RIPE NCC maintains and publishes registry data for resources held by members and legacy Internet resource holders in our service region. Legacy space makes up approximately 36% of today's IPv4 Internet. The RIPE NCC is responsible for close to 13% of that 36%, which amounts to around 12 /8 blocks (close to 200 million IPv4 addresses).

Local Internet Registry (LIR) - In order to receive and hold IP addresses and ASNs, a RIPE NCC member needs to open an LIR account. This happens as part of the membership application process. In the past, the term LIR was used interchangeably with "RIPE NCC Member". However, in recent years some members opened multiple LIR accounts and so the distinction is often relevant, especially as the policies that govern how we allocate resources typically focus on LIRs rather than members.

Provider Independent (PI) resources - A category of Internet number resources that are used to provide connectivity but cannot be further assigned to an organisation's customers. PI resources can be assigned by the RIPE NCC or received via a transfer from another resource holder. Organisations do not have to become RIPE NCC members/operate an LIR to hold PI resources, though they do need to find a RIPE NCC member to handle the administration for these resources with the RIPE NCC on their behalf (called a "sponsoring LIR").

RIPE NCC member - An organisation or person that has entered into a Service Agreement with the RIPE NCC. Once they have become a member, they can request IPv6 address space and AS Numbers, and/or make assignments to End Users or customers. New RIPE NCC members can request a single /24 allocation via our IPv4 Waiting List. RIPE NCC members are typically Internet Service Providers, Telcos and other large enterprises that run their own networks.

Renumbering - The exercise of renumbering a network consists of changing the IP host addresses, and perhaps the network mask, of each device within the network that has an address associated with it (RFC 2071).

About the RIPE NCC
We are the Regional Internet Registry (RIR) for Europe, the Middle East, and Central Asia. As such, we allocate and register Internet number resources to Internet service providers and other organisations. We are a not-for-profit organisation that works to support the RIPE community and the development of the Internet in general.

If you need help, get in touch with us via the contact form.

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