Network Working Group
Internet-Draft
Intended status: Informational
Expires: 6 May 2026

P. L. Ursini
Paducah Internet Exchange (Paducah IX)

2 November 2025

Reservation of IPv6 Address Block 44::/16 for Amateur Radio Digital Communications (44Net)

draft-ursini-44net-ipv6-allocation-01

Abstract

This document proposes the reservation of the IPv6 address block 44::/16 for use by the global amateur radio community. The allocation would serve as the IPv6 successor to the legacy IPv4 network 44.0.0.0/8, historically known as AMPRNet or 44Net, which has provided a unified, non-commercial address space for amateur radio digital communications for more than four decades.

The goal of this proposal is to maintain global cohesion and routing consistency for amateur radio networks as they transition to IPv6, while preserving the service’s unique social and regulatory context. Amateur networks operate under national licensing frameworks and are limited to educational, experimental, and public-service purposes, distinguishing them from commercial Internet use. The proposed prefix would remain part of the global unicast routing table, enabling interoperability, research, and gateway connectivity between amateur systems and the wider Internet.

This document outlines the historical rationale for an amateur radio IPv6 allocation, describes the technical and governance considerations for maintaining a contiguous and hierarchically managed address space, and specifies the IANA action required to reserve 44::/16 as a special-purpose global IPv6 prefix for amateur radio use.

Note

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Copyright Notice

Table of Contents

1. Introduction

In 1981, the IPv4 network block 44.0.0.0/8 was assigned for use by licensed amateur radio operators worldwide. This allocation known as the Amateur Packet Radio Network (AMPRNet or 44Net) provided over sixteen million IPv4 addresses dedicated to experimentation, education, and digital communications within the amateur service. The foresight of early amateur radio pioneers such as Hank Magnuski (KA6M) and others ensured that amateur networks could participate in the emerging Internet ecosystem, applying packet networking principles to radio-based communications.

For more than four decades, this globally coordinated allocation has enabled licensed operators and organizations to conduct research and experimentation using Internet protocols over radio links, microwave backbones, and mesh networks. Amateur stations have developed and refined technologies such as AX.25, TCP/IP over radio, and wireless routing protocols, all while adhering to national amateur radio regulations that prohibit commercial activity and require operator identification and transparency. These policies distinguish amateur networks from the commercial Internet while maintaining open interconnection 44Net has always been a public, routable, and cooperative part of the Internet infrastructure.

As IPv4 addresses have become scarce and IPv6 adoption continues to expand, the need for a unified IPv6 successor to 44Net has become increasingly clear. Portions of the legacy 44/8 block have been returned or repurposed, and the remaining space continues to support active experimental networks. However, no equivalent IPv6 allocation exists for amateur radio today. Under current Regional Internet Registry (RIR) policies, there is no straightforward mechanism for a globally distributed, non-commercial service such as amateur radio to obtain a single, coherent IPv6 prefix that can be used consistently across all regions.

This document therefore proposes the reservation of 44::/16 in the global IPv6 address space for use by the amateur radio community. This allocation would serve as the IPv6 counterpart to the legacy 44/8, preserving both operational continuity and symbolic identity while enabling modern addressing, routing, and security practices. The 44::/16 prefix would provide sufficient space for global expansion and could be hierarchically delegated through existing RIRs and local Internet registries (LIRs) to ensure distributed governance consistent with Internet best practices.

The following sections describe the rationale for this proposal, its historical significance, and the technical and policy considerations associated with maintaining a unified, non-commercial IPv6 address

space for amateur radio experimentation and public service. This reservation would allow amateur digital networks to continue contributing to Internet research, education, and emergency communications in the IPv6 era, maintaining the community's legacy as an integral part of Internet history.

2. Problem Statement

Despite widespread deployment of IPv6, the global amateur radio community lacks an equivalent IPv6 address space to the long-standing IPv4 44/8 AMPRNet allocation. Individual operators and amateur organizations currently depend on commercial Internet providers or Regional Internet Registries (RIRs) for IPv6 connectivity processes that are often misaligned with the amateur service's non-commercial and volunteer nature. Many operators do not qualify for direct RIR allocations, and provider-assigned prefixes are transient, not portable, and frequently filtered, making them unsuitable for long-term experimental networks.

The absence of a unified IPv6 allocation fragments the amateur community's experimental and emergency communications networks. Without a single globally recognized prefix, operators cannot reliably coordinate routing, DNS, or dual-stack interoperability with the existing 44/8 IPv4 infrastructure. This lack of cohesion inhibits research collaboration and complicates the ongoing transition to IPv6 within a service that has historically relied on globally routable, stable addressing.

While some Regional Internet Registries do allow individuals or organizations to receive IPv6 allocations, others reserve that capability for ISPs or large institutions. Even where permitted, such assignments are drawn from ordinary unicast space and lack the cohesion, recognizability, and global identity that have defined 44Net for decades. If each amateur society or operator received an unrelated prefix within its regional RIR pool, those addresses would appear as ordinary commercial space with no shared heritage or policy context. The result would be a patchwork of independent allocations rather than a cohesive, globally identifiable address family representing the amateur radio service.

This proposal does not replace the RIR system but builds on it. The goal is for IANA to reserve 44::/16 as a unified global allocation and then work with the RIRs to subdivide it under a coordinated global policy framework. Within each RIR, national amateur radio societies and local Internet registries (LIRs) could administer sub-allocations just as they do today. This approach operates entirely within existing policy mechanisms while preserving a single, globally aggregated address family that remains easily recognizable in routing, research, and coordination.

Amateur radio is internationally regulated under the International Telecommunication Union (ITU) Radio Regulations, with licensed operators active in nearly every country. Because RIR charters limit allocations to their respective territories Section 2.2 of [RFC7020], a coordinated IANA reservation ensures that all regions can participate under harmonized policy terms rather than through isolated, region-specific efforts. Implemented through the existing IANA-RIR framework, a single global prefix is the most practical and policy-consistent means of maintaining global routing cohesion and operational consistency for amateur radio digital communications.

3. Rationale for an Amateur Radio IPv6 Allocation

3.1. Historical Significance and Community Needs

The amateur radio community has a long history of using dedicated IP address space to advance education, research, and technical experimentation. The IPv4 allocation of 44.0.0.0/8 approved in the early 1980s under the stewardship of Jon Postel and established through the efforts of Brian Kantor (WB6CYT) and collaborators at the University of California, San Diego ([Kantor44net]) became the foundation for a worldwide amateur digital network known as the Amateur Packet Radio Network (AMPRNet or 44Net). Over the subsequent four decades, thousands of licensed operators, clubs, and research institutions have used this space to interconnect packet radio systems, implement TCP/IP over RF, develop mesh routing technologies, and explore interoperability between amateur and academic networks. These efforts demonstrated the enduring value of maintaining a unified, globally routable address range that identifies and connects the amateur service as a cohesive and technically innovative community.

Allocating 44::/16 for amateur radio continues this legacy in the IPv6 era. It ensures that the next generation of digital experimentation, emergency communications, and educational outreach can transition to IPv6 without fragmentation or loss of identity. A single, contiguous prefix allows amateur radio networks to remain globally coherent, easily recognized in routing, and operationally distinct from commercial or private networks while still interoperating with the Internet at large.

Without a common allocation, amateur operators would need to request IPv6 resources individually or through national organizations from their respective RIRs. This would produce multiple unrelated prefixes, differing policies, and inconsistent address management across regions. Such fragmentation undermines the efficiency goals of IPv6 routing and makes global coordination difficult. A unified /16 space, subdivided by the RIRs for local administration, preserves hierarchical aggregation and maintains a clean, scalable routing model. This approach avoids unnecessary route-table growth and supports policy uniformity without granting control to any single organization.

The alternative of using non-routable IPv6 space, such as Unique Local Addresses (ULAs), was considered but rejected. Amateur networks often serve public functions including research, remote control of equipment, and emergency communications that require bidirectional Internet reachability. ULA space would isolate these networks from the global Internet, eliminating one of the greatest benefits of the original 44Net: its ability to interoperate with external systems for experimentation, coordination, and public service.

Finally, while national RIR policies allow organizations to obtain IPv6 space, the process is often impractical for individual amateur operators. The global amateur service consists largely of volunteers and hobbyists who do not operate commercial networks or meet RIR criteria for membership or large-scale deployment. A community allocation ensures equitable access to globally routable IPv6 space for all licensed amateurs, lowering barriers to participation and preserving the educational and experimental spirit that has defined amateur networking for over forty years.

4. Technical and Social Distinction from Commercial Internet Use

As with the historical 44/8 allocation, this space is intended solely for lawful activities within the amateur radio service as defined by national administrations and the International Telecommunication Union (ITU). These include technical experimentation, education, public-service and emergency communications, community resilience projects, and the advancement of radio science and digital communications techniques. The 44::/16 address space provides a framework for these activities to operate openly on the Internet while remaining governed by the non-commercial, self-identified, and cooperative principles that distinguish the amateur service from commercial or governmental networks.

These restrictions differentiate amateur radio networking from general commercial Internet use. Much like spectrum allocations, this IP address space represents a community resource governed by eligibility and conduct rules. Operators identify themselves by call sign, observe national content restrictions, and maintain transparency in network operation. The result is a global, self-regulated community network within the broader Internet openly connected, but socially and technically distinct in purpose. The 44::/16 space will be fully routable and capable of interconnection with the public Internet, yet its use will remain guided by the cooperative norms of the amateur service rather than by market or commercial motives.

A major motivation for maintaining this distinction is the proven public-service role of amateur radio digital networks. Amateur operators have provided emergency communications during disasters when conventional systems were unavailable, using packet radio, microwave links, and mesh networks to carry email, voice, and telemetry. Recognizing this, allocating a well-defined and stable IPv6 prefix allows emergency networks to integrate seamlessly with Internet-connected systems such as municipal servers or disaster-response applications without confusion or inconsistent routing treatment. Network operators can easily identify traffic from 44::/16 as originating from volunteer-operated, non-commercial infrastructure that often supports public safety functions.

Beyond emergency use, a globally coordinated amateur IPv6 space also supports research and innovation. The amateur community has a long record of pioneering techniques later adopted by the wider Internet, including early TCP/IP over radio, packet switching, and wireless mesh networking. Providing a contiguous IPv6 block for experimentation allows such work to continue in a structured, globally consistent environment. Projects in fields such as delay-tolerant networking, telemetry, and novel routing can be deployed

across 44::/16 with clear attribution and accountability. In this way, the amateur service continues its historical role as a proving ground for technical innovation, bridging hobbyist experimentation with the evolution of the global Internet.

Beyond its community and governance value, the reservation of 44::/16 also serves as a catalyst for broader IPv6 adoption. Many amateur operators, educational programs, and technical volunteers continue to rely on IPv4-based infrastructure simply because an organized path to IPv6 deployment has not existed within the amateur domain. Establishing a globally recognized IPv6 prefix gives these users a tangible reason to learn, deploy, and experiment with IPv6 technologies from address planning and router configuration to DNS, BGP, and security. This will help cultivate the next generation of network engineers and innovators by linking practical IPv6 skills with real-world, public-benefit experimentation. In this way, the 44::/16 allocation not only preserves a legacy, but also strengthens the overall IPv6 ecosystem through education and participation.

5. Technical Considerations for 44::/16 Usage

5.1. Routing and Registry Model for 44::/16

This document proposes that 44::/16 be reserved by IANA and subdivided among the five Regional Internet Registries (RIRs), each receiving a contiguous allocation (for example, a /19). Each RIR would then issue sub-allocations to eligible amateur radio organizations and licensed operators under a unified global policy framework. This approach maintains historical continuity with earlier amateur digital communication networks that operated under IPv4 network 44/8 (commonly referred to as AMPRNet or 44Net) while integrating fully with the existing IPv6 number resource governance model.

Under this model, 44::/16 remains under IANA oversight, with operational administration distributed through the established RIR system. This ensures transparency, policy consistency, and accountability while preserving alignment with standard Internet number resource management practices. The RIRs would continue to act as the authoritative stewards and policy regulators, while individual amateur organizations would function as downstream members analogous to Local Internet Registries (LIRs), ISPs, or end-user organizations. This structure prevents any single entity from exercising unilateral control over the address space and maintains decentralized governance consistent with global Internet principles.

This arrangement would parallel existing global number resource policies described in the RIR frameworks (for example, ARIN NRPM Section 10), in which IANA maintains the root allocation and delegates to the RIRs under a globally coordinated policy approved by all regions. The intent of this document is to establish the technical reservation through the IETF process, with subsequent policy coordination to occur through the RIR global policy mechanisms.

Regional amateur radio organizations may apply to their respective RIRs for address space allocations under harmonized policy terms that restrict usage to non-commercial, licensed amateur service purposes. This allows each RIR to implement regionally appropriate procedures while maintaining global cohesion through consistent eligibility and operational guidelines.

From a technical perspective, 44::/16 would be listed in the [IANA-IPV6-SP] registry [IANA-IPV6-SP]. The registry entry should include the following attribute values:

Source True

Destination True

Forwardable True

Globally Reachable True

Reserved-by-Protocol False

These parameters indicate that the prefix is globally routable and should be treated as standard unicast space, consistent with other globally reachable allocations.

Operators who maintain bogon or unallocated-prefix filters will need to update them once 44::/16 is entered into the IANA IPv6 Special-Purpose Address Registry. Until that update occurs, prefixes derived from 44::/16 may be inadvertently filtered as unallocated space. This is a normal operational transition that has accompanied previous IANA allocations, and it can be mitigated through coordination with bogon-list maintainers and routing security communities. No protocol changes or router software updates are required; only filter data sources will need to reflect the new allocation status.

This structure preserves a contiguous and globally recognizable address family while distributing administrative authority through existing RIR mechanisms. It maintains continuity with the historical amateur coordination model, avoids centralization, and leverages the stability and neutrality of the RIR framework to ensure long-term sustainability of non-commercial amateur IPv6 networks.

5.2. Addressing Plan and Prefix Utilization

While the specific addressing plan for 44::/16 will be developed within the amateur radio community and coordinated through the Regional Internet Registries (RIRs), several technical guidelines and considerations are anticipated.

Size of End-User Assignments: It is expected that individual amateur operators or organizations (such as clubs or repeater groups) will receive at least a /48, consistent with IPv6 subnetting requirements for SLAAC autoconfiguration. In practice, a /48 per licensee or entity may be the standard assignment size, providing up to 65,536 internal subnets sufficient for any foreseeable amateur station, research, or emergency communications deployment. Even if every amateur worldwide were assigned a /48, the 44::/16 block would provide several orders of magnitude more capacity than needed, ensuring long-term scalability and avoiding renumbering pressure.

Hierarchical Structure: The 44::/16 prefix may be subdivided hierarchically for coordination purposes. For example, each RIR could manage a defined regional prefix (e.g., 44:0000::/24 for one region, 44:0100::/24 for another) according to their existing geographical boundaries. Within each region, national amateur societies or community registries could administer sub-allocations to licensed operators. This structure parallels how IPv4 44Net allocations were historically coordinated, while aligning with the modern RIR model for accountability, data accuracy, and policy consistency.

Interoperability with Legacy 44Net: During transition, many systems will operate in dual-stack mode, utilizing both IPv4 44.0.0.0/8 and IPv6 44::/16. Gateways may employ NAT64, SIIT, or other translation techniques to interconnect IPv4-only and IPv6-only amateur systems. Because 44::/16 preserves conceptual continuity with the original "44" addressing identity, operators can define clear and predictable mapping schemes for protocol translation or symbolic references. This continuity simplifies network documentation, community education, and legacy system adaptation during the IPv6 transition period.

Overall, the allocation of a large contiguous block ensures technical flexibility, equitable distribution, and operational simplicity. It provides a cohesive global foundation for experimentation, research, and emergency communication while remaining compatible with existing Internet routing and address management practices.

6. Security Considerations

Reservation of 44::/16 does not introduce any new security vulnerabilities to the Internet architecture or its protocols. The block functions as ordinary global unicast space from a technical perspective; it merely identifies a coordinated set of users with a shared non-commercial purpose. Network operators should treat this prefix as they would any other globally routable allocation when applying filtering, validation, and monitoring practices.

Authorized vs. Unrestricted Use: Only licensed amateur operators and recognized amateur organizations will be authorized to use address space derived from 44::/16. However, there is no technical mechanism in the IPv6 protocol to enforce that limitation. As with any other allocated prefix, unauthorized or spoofed use is possible. Standard operational practices such as ingress filtering ([BCP38]), route-origin validation, and coordination through RIR abuse contacts provide the best mitigations against such misuse.

Operational Security and Transparency: Amateur radio systems are generally operated by volunteers and may host experimental or lightly secured services. Some amateur applications also transmit identifying information, such as call signs, in cleartext due to regulatory requirements. These characteristics could make nodes using this prefix more observable to adversaries. Operators are encouraged to follow general network security practices timely patching, access controls, and minimal exposure of unnecessary services even within the constraints of amateur regulations.

Emergency and Public Service Use: Amateur networks are sometimes employed during emergency or disaster scenarios to carry non-commercial traffic that may contain sensitive personal or situational data. Because amateur regulations often restrict encryption, users should remain aware that transmissions over the public Internet or via shared gateways may be visible to third parties. The reservation of 44::/16 neither creates nor amplifies this risk; it simply extends existing practices into IPv6.

Overall, the security profile of 44::/16 will depend on the diligence of its participants and the cooperative monitoring framework maintained through the RIRs and amateur organizations that administer sub-allocations. By assigning this space through well-defined

registry channels, potential abuse can be traced and resolved through established operational contacts, improving accountability compared to fragmented, unregistered use.

7. IANA Considerations

IANA is requested to reserve the IPv6 address block 44::/16 and record it in the IPv6 Special-Purpose Address Space [IANA-IPV6-SP] registry.

This document uses the terminology and conventions defined in [RFC2119], [RFC8174], and [RFC5156].

* *Address Block:* 44::/16

* *Name/Description:* Amateur Radio IPv6 Address Space

* *Reservation Purpose:* Globally unique IPv6 address block for amateur radio digital communications networks. This allocation serves as the IPv6 successor to the historical 44.0.0.0/8 (AMPRNet) space, preserving a contiguous address family for worldwide amateur experimentation and non-commercial operation.

* *Administrative Model:* The 44::/16 block SHOULD be subdivided and issued to each Regional Internet Registry (RIR), which will in turn make sub-allocations to qualified amateur radio organizations and licensed operators in their regions. This maintains RIR oversight, policy accountability, and decentralization, ensuring that no single organization has exclusive administrative control while enabling coordinated global usage under consistent eligibility criteria.

* *Routability:* This prefix is intended to be globally routable. It is not private or local-use; network operators SHOULD treat it as they would any other allocated unicast space.

* *Reverse DNS:* IANA SHOULD delegate the corresponding .ip6.arpa zone (e.g., 4.4.ip6.arpa) to RIR-managed name servers or to designated sub-delegates under coordination with IANA.

The following attributes are to be registered in the IPv6 Special-Purpose Address Space registry:

Field	Value
Source	True
Destination	True
Forwardable	True
Globally Reachable	True
Reserved-by-Protocol	False

Table 1: IPv6 Special-Purpose Attributes for 44::/16

Upon reservation, IANA SHOULD notify all RIRs to prevent accidental overlap with future unicast allocations. The reservation of 44::/16 does not create any additional protocol parameters or code points beyond the address block and its reverse DNS delegation.

8. Conclusion

The reservation of 44::/16 provides a practical and historically consistent framework for enabling continued amateur radio innovation in the IPv6 era. It preserves the collaborative and experimental spirit that characterized the legacy 44.0.0.0/8 network, while modernizing its governance under the established Regional Internet Registry (RIR) system. This ensures that amateur networks remain globally coordinated, non-commercial, and technically aligned with current Internet addressing practices.

By distributing the address space among the RIRs, this approach maintains policy accountability and regional fairness while keeping the global prefix contiguous and recognizable. It prevents administrative centralization, supports transparency through existing RIR oversight mechanisms, and allows organizations such as national amateur associations to operate as Local Internet Registries (LIRs) within a harmonized global framework. This balance between heritage and modern governance enables the amateur community to participate fully in IPv6 while remaining distinct in purpose.

The allocation of 44::/16 represents a proportionally small request within the vast IPv6 address space but offers significant educational and public benefit. It affirms that the Internet continues to support experimentation, learning, and innovation by volunteer-driven

communities. By bridging the legacy of 44Net with the infrastructure of IPv6, this proposal helps ensure that amateur radio's long tradition of advancing communications technology will continue to contribute meaningfully to the broader Internet ecosystem.

9. Acknowledgments

The author wishes to acknowledge the pioneering work of Brian Kantor (WB6CYT), whose vision and stewardship of the 44/8 AMPRNet allocation made global amateur Internet experimentation possible. His contributions established the foundation upon which this IPv6 proposal is built.

The author also acknowledges his father, Louis F. Ursini, whose early involvement in Internet routing and coordination helped inspire this work. His technical curiosity and commitment to open networking continue to influence the author's approach to collaborative Internet development.

10. Normative References

[RFC7020] Housley, R., Conrad, D., and E. Kuerbis, "The Internet Numbers Registry System", RFC 7020, August 2013, <https://www.rfc-editor.org/info/rfc7020>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", RFC 2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", RFC 8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC5156] Hinden, B. and S. Deering, "Special-Purpose IPv6 Addresses", RFC 5156, April 2008, <https://www.rfc-editor.org/info/rfc5156>.

11. Informative References

[Kantor44net] Kantor, B., "The AMPRNet (44Net) Project", 1981, <https://www.ampr.org/>.

[BCP38] P., F. and S. D., "Ingress Filtering for Multihomed Networks", BCP 84, RFC 3704, May 2000, <https://datatracker.ietf.org/doc/html/bcp38>.

[IANA-IPV6-SP]
IANA, "IANA IPv6 Special-Purpose Address Registry", 2024, <https://www.iana.org/assignments/iana-ipv6-special-registry/>.

Author's Address

Preston Louis Ursini
Paducah Internet Exchange (Paducah IX)
1212 Helen Street
Paducah, KY 42001
United States
Phone: +1 833-701-7823
Email: preston@paducahix.net