VNNIC INTERNET CONFERENCE 2026

FPT University Can Tho Campus

Essay

IPv6-Only Transition in Vietnam

The 2026–2030 Program, the Role of IPv6 in National Digital Infrastructure, and Youth Actions

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Table of Contents

1 Introduction **1**
1.1 How I first learned about IPv6 1

2 The 2026–2030 IPv6-Only Transition Program **2**
2.1 Background and Context 2
2.2 What is IPv6 Only? 2
2.3 National policy basis 2
2.4 Goals 3
2.5 Deployment Roadmap 3

3 The Strategic Role of IPv6 in Vietnam's IPv6-only Transition **4**
3.1 IPv4 Limitations and the Need for IPv6 5
3.2 IPv6 as an Enabler of End-to-End Communication and NAT Reduction 5
3.3 IPv6 as the Foundation for Scalable National Connectivity 6
3.4 IPv6 as the Core Protocol of IPv6-only Network Design 6
3.5 IPv6: Catalyst for the Modernization of Digital Infrastructure 6
3.6 IPv6 Enabling Layer for Digital Government, Cloud, IoT and 5G Services 7
3.7 IPv6 as a Tool of International Integration and Global Internet Governance 7

4 Personal View: IPv6, Cybersecurity and Digital Transformation in Can Tho and the Mekong Delta **8**
4.1 IPv6 from a Cybersecurity Student's Point of View 8
4.2 Importance of IPv6 for Can Tho and the Mekong Delta 8
4.3 Practical Applications of IPv6 in Can Tho and the Mekong Delta 9
4.4 Cybersecurity Issues of IPv6 Deployment 10

5 Ways to Achieve 90–100% IPv6 Adoption by 2030 . . . . . **11**
5.1 Lessons from Global IPv6 Deployments 11
5.2 Improving Coordination at the National and International Levels 12
5.3 Policy and Regulatory Solutions 13
5.4 Technical Implementation Roadmap 13
5.5 Awareness and Human Capital Development 14
5.6 Building an IPv6-only Ecosystem toward 2030 15

6 Youth Engagement in Safe IPv6 Adoption and Digital Transformation **15**
6.1 Why IPv6 Is Important to Young People and Students 15
6.2 Joining IPv6 Training, Labs and Technical Communities 16
6.3 Student Contributions in the Mekong Delta and Can Tho 17
6.4 Raise Awareness of IPv6 Among Peers and Communities 18
6.5 Towards a Safer and More Connected Digital Future 18
6.6 Student Action Plan Toward 2030 19

7 Conclusion: My Commitment to the Future of IPv6 in Vietnam **21**

1 Introduction

In Vietnam's new era of national advancement, science, technology, innovation, and digital transformation have become key drivers of national development. In this spirit, Politburo Resolution No. 57-NQ/TW states that "the development of science, technology, innovation, and national digital transformation constitutes a foremost important breakthrough and serves as the primary driving force for the rapid development of modern productive forces" [1]. In order to achieve this goal, a contemporary, safe, and expandable Internet infrastructure is essential for guaranteeing connectivity, facilitating the use of digital services, and promoting the growth of the country's digital infrastructure.

However, IPv4's shortcomings in address space, scalability, and network management have become more apparent as the need for contemporary Internet infrastructure grows. Therefore, in order to increase address capacity, enhance connectivity, and guarantee the steady and long-term growth of the Internet in Vietnam, the switch to IPv6 has become essential. On this basis, Decision No. 3369/QD-BKHCN on the "Program to Promote, Deploy, and Transition to IPv6 Only in Vietnam for the 2026–2030 Period" was issued as a concrete step toward implementing the national policy on digital infrastructure development.

This essay focuses on analyzing the role of IPv6 in the development of Vietnam's Internet infrastructure. It also proposes practical solutions and youth and student actions to help promote the IPv6 transition in connection with national digital transformation.

Paper Focus

Core message: IPv6 is not only a network protocol upgrade. It is a foundation for Vietnam's digital transformation, regional connectivity, cybersecurity readiness, and youth participation toward 2030.

As a student in the Mekong Delta, I see IPv6 as more than a technical upgrade. In a region where digital connectivity is increasingly important for education, business, public services, and regional development, IPv6 represents a foundation for more scalable and inclusive Internet access. From this perspective, I am interested not only in the technical side of IPv6 transition, but also in how it can support communities outside major urban centers. That is why I see this fellowship as an opportunity to connect policy, technology, and local engagement, and to help make the value of IPv6 more understandable to students and communities in the Mekong Delta.

1.1 How I first learned about IPv6

My first interest in IPv6 was from the course in FutureLearn by SOI Asia and youtube channel Jeremy's IT lab in CCNA course. My understanding was cleared up when I attended the webinar of VNNIC on 6 May 2026. These experiences made me realize that IPv6 is not just a technical protocol, but also a real and urgent issue for the development of Internet in Vietnam. They gave me a more concrete and visual sense of how IPv6 transition is happening in Vietnam's digital landscape.

2 The 2026–2030 IPv6-Only Transition Program

2.1 Background and Context

IPv6 is the essential infrastructure for the national digital transformation, provides the foundation for the development of digital government, digital economy, and digital society. Since 2021, Vietnam has recorded strong growth in IPv6 adoption and by October 2025, "Vietnam's IPv6 adoption rate reached 65%, ranking 2nd in ASEAN and 7th in the world" [2]. On October 27, 2025, Vietnam's Ministry of Science and Technology issued Decision No. 3369/QD-BKHCN approving the "Program to Promote, Deploy and Transition to IPv6 Only in Vietnam for the 2026–2030 Period" [3]. The program aims to transition the Internet in Vietnam to IPv6 only with IPv6 adoption reaching 90–100% by 2030 and IPv4 being phased out gradually [3]. According to Vietnam Internet Network Information Center (VNNIC), the program was developed in line with Resolution No. 57-NQ/TW and Resolution No. 71/NQ-CP, and it targets Vietnam's entry into the world's top 10–20 countries for IPv6 transition [3].

2.2 What is IPv6 Only?

IPv6-only as an operational model: IPv6-only should be understood as an operational model rather than just a protocol label. It describes how a network is organized in practice, not only what protocol it supports.

Changes in network design: This model changes how a network is built, how addresses are assigned, and how services are delivered. In other words, IPv6 becomes the default basis for daily network operation.

IPv4 during transition: Under this approach, IPv4 is no longer part of the native network design, but support for older services can still be maintained through transition tools. This allows the network to move toward IPv6 without breaking compatibility too quickly.

Real-world deployments show that IPv6-only is already practical in enterprise environments. ARIN's case studies note that Microsoft decided to move to an IPv6-only internal network, showing that large organizations can operate successfully without relying on IPv4 as the native protocol [18].

2.3 National policy basis

Vietnam's IPv6-only transition is supported by a clear policy chain that connects national strategic direction, government implementation, and sector-specific action.

- **Resolution No. 57-NQ/TW:** This resolution establishes the national direction for science, technology, innovation, and digital transformation. It provides the broad policy foundation for Vietnam's long-term digital development.[1]

- **Resolution No. 71/NQ-CP:** This resolution helps translate that strategic direction into government action. It serves as an intermediate step between national policy goals and concrete implementation.[17]
- **Decision No. 3369/QD-BKHCN:** This decision formally approves the Program to Promote, Deploy and Transition to IPv6 Only in Vietnam for the 2026–2030 period. It marks the official institutionalization of the IPv6-only transition.[16]

2.4 Goals

National IPv6-Only Target

- **Adoption by 2030:** Vietnam aims to reach 90–100% IPv6 usage by 2030, enter the world's top 10–20 countries for IPv6 transition, and gradually phase out IPv4 [3].
- **Whole-ecosystem transition:** telecommunications operators, data centers, digital content providers, government agencies, core networks, mobile networks, Wi-Fi, fixed broadband, and public systems must move together toward IPv6-only operation [3].

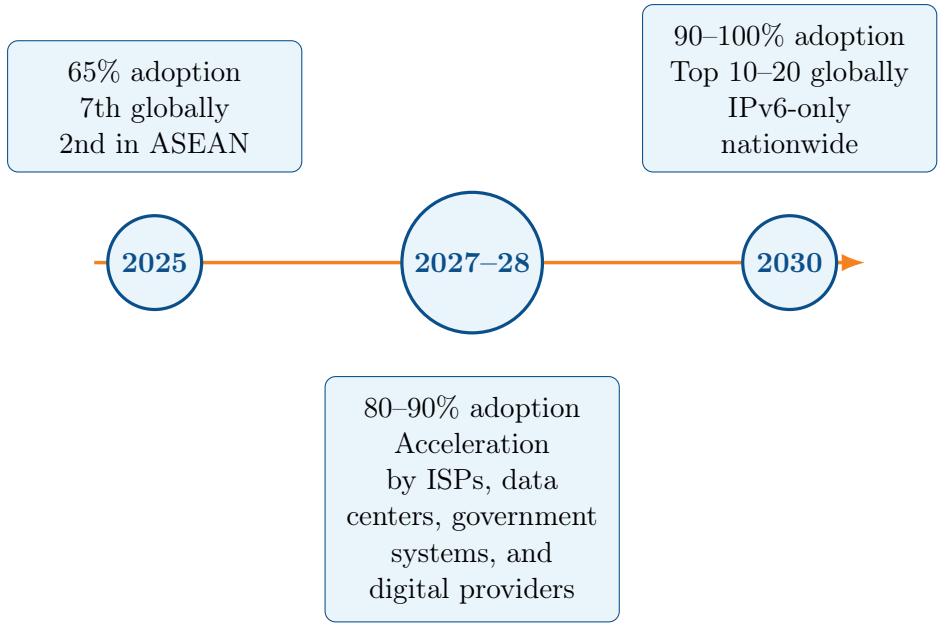


Figure 1: Key IPv6 adoption targets and transition milestones for Vietnam.

2.5 Deployment Roadmap

Vietnam will transition to IPv6-only in three phases to facilitate a smooth, safe, and scalable migration:

Phase 1 (2026–2027) will involve preparation, technical assessment, pilot deployment, and testing

in constrained environments [3].

Phase 2 (2027–2028) will accelerate adoption by major players such as ISPs, data centers, government systems, and digital service providers, with the adoption rate estimated to reach around 80–90% [3].

Phase 3 (2029–2030) will complete the statewide transition, expand IPv6-only deployment across the full ecosystem, and gradually retire IPv4 [3].

Realizing a Managed Transition: IPv6 deployment requires careful planning, multiple migration models, and operational expertise, which supports a staged transition that reduces risks and keeps the migration under control [4].

Shaping a Future-Ready Internet: IPv6 is widely regarded as the long-term solution for the continued expansion of the Internet. Its larger address space and support for modern network design make it a foundation for a more scalable and efficient Internet ecosystem [5].

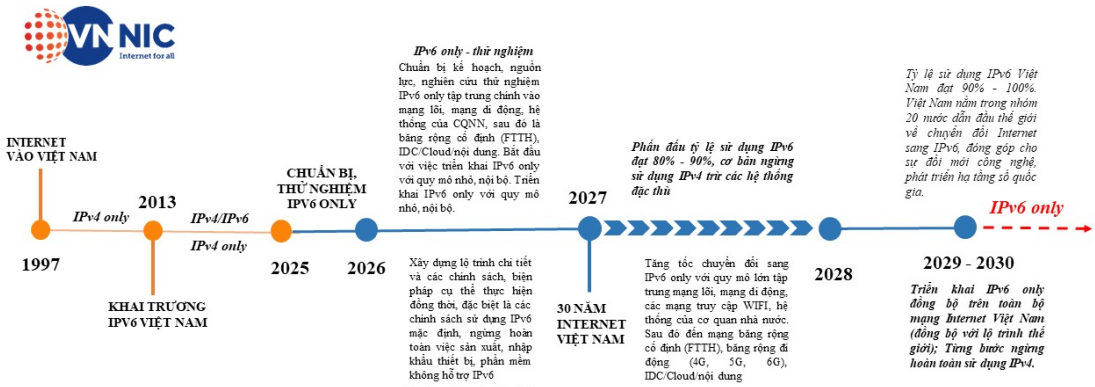


Figure 2: Vietnam's 2026–2030 Program to Promote, Deploy, and Transition to IPv6 Only, source from VNNIC [3].

3 The Strategic Role of IPv6 in Vietnam's IPv6-only Transition

"Strong national strategies, infrastructure investment, and active community engagement" [6] establish the circumstances for long-term digital development, which is why IPv6 serves as a foundational component of Vietnam's national digital infrastructure, with the country's robust IPv6 progress being a testament to these efforts. As connectivity demands keep growing, IPv6 is critical for enabling next-generation Internet infrastructure and large-scale digital services, including cloud platforms,

data centers, CDN deployment and an IPv6-only future.

Why This Matters

IPv6 strengthens Vietnam's Internet foundation in four connected ways: **address scalability**, **end-to-end connectivity**, **modern digital services**, and **international integration**.

Capability	IPv4	IPv6
Address space	32-bit; limited address pool.	128-bit; vastly larger address pool.
Scalability	Depends heavily on NAT.	Supports IoT, 5G, cloud, and large-scale networks.
Configuration	Manual configuration or DHCP.	SLAAC and DHCPv6 auto-configuration.
Local discovery	Broadcast and ARP.	Multicast/anycast and Neighbor Discovery.
Connectivity	Often constrained by NAT.	More direct end-to-end connectivity.
Header design	Variable-length header.	Fixed 40-byte base header.
Security	Mature but legacy/NAT-based.	Requires IPv6-aware security and management.
Long-term role	Legacy protocol still widely used.	Foundation for future Internet and IPv6-only networks.

Figure 3: Capability comparison between IPv4 and IPv6 across key technical dimensions.

3.1 IPv4 Limitations and the Need for IPv6

Internet Protocol version 4 (IPv4) was deployed since early 1980's. It uses 32-bit addresses that provides a limited number of Internet addresses (2^{32} or about 4.3 billion). As the Internet grows, IPv4 addresses will be exhausted eventually [7].

IPv4 has reached its structural limits, because "the global free pool of available IPv4 addresses has been fully depleted" [7] which creates a huge obstacle for the Internet's ongoing expansion. The increasing number of connected devices, online services and digital applications, coupled with the paucity of IPv4 addresses, is making it increasingly difficult to serve new customers and build Internet-based businesses in a sustainable manner.

3.2 IPv6 as an Enabler of End-to-End Communication and NAT Reduction

NAT and the End-to-End Model: This shortage has led many networks to deploy NAT, which fixes short-term address shortages but breaks the fundamental end-to-end communication concept of the Internet and makes the network management more complex [8]. IPv6 is therefore not merely a technical upgrade but a vital basis for regaining direct connectivity, extending address capacity and supporting the long-term evolution of digital infrastructure [9].

3.3 IPv6 as the Foundation for Scalable National Connectivity

National digital connectivity requires an addressing system capable of supporting millions of users, devices, platforms, and public services. IPv6 offers this foundation with a much larger address space than IPv4, making it suitable for long-term Internet growth and national digital transformation [19], [20].

Consider what Vietnam needs to connect at a national scale:

- **Citizens and households:** broadband Internet users, mobile subscribers, and users of public digital services.
- **Business networks and platforms:** enterprise networks, cloud services, e-commerce systems, and digital platforms.
- **Public infrastructure:** schools, hospitals, government agencies, and smart urban systems.

IPv6 therefore forms the addressing basis for a scalable national Internet, enabling Vietnam to expand connectivity without being limited by IPv4 address depletion [3], [19].

3.4 IPv6 as the Core Protocol of IPv6-only Network Design

Future IPv6-only network architecture is based on the core protocol, IPv6. Networks and services in this model operate natively over IPv6, while dependence on IPv4 is progressively reduced through transition mechanisms and careful deployment planning [4], [12].

Such an architecture allows:

- **Native IPv6 operation:** services run natively over IPv6 as the main network protocol.
- **Reduced dependence on IPv4:** networks rely less on the old addressing system and gradually move away from IPv4-based operation.
- **Infrastructure for the future:** network design becomes better prepared for long-term digital transformation.

Thus, IPv6-only architecture is the next step after IPv4-only and dual-stack deployment, helping networks move from compatibility-based transition toward native IPv6 operation [4], [12].

3.5 IPv6: Catalyst for the Modernization of Digital Infrastructure

IPv6 updates digital infrastructure with a scalable, future-oriented addressing model. With the development of digital services, IPv6 lays the foundation for broadband networks, data centers, cloud platforms, and national Internet infrastructure [19], [20].

The modernization is visible in:

- **Broadband networks:** support for more users, households, and connected devices.
- **Cloud and data centers:** an enabler of scalable service deployment and digital service expansion.
- **Digital platforms:** infrastructure for future Internet services and long-term digital transformation.

Thus, IPv6 is not only a technical upgrade, but also an important driver of national digital infrastructure modernization [3], [20].

3.6 IPv6 Enabling Layer for Digital Government, Cloud, IoT and 5G Services

Digital government, cloud computing, IoT, and 5G need large-scale and reliable connectivity. IPv6 can support these services by allowing its huge address space to be used for a large number of users, devices, sensors, and applications [19], [20].

Consider the services that depend on IPv6:

- **Digital government:** interconnected government systems and online public services.
- **Cloud computing:** scalable platforms, data centers, and applications.
- **IoT and 5G:** sensors, smart devices, industrial systems, and real-time services.

In this role, IPv6 serves as a support layer for next-generation digital services and smart infrastructure [3], [19].

3.7 IPv6 as a Tool of International Integration and Global Internet Governance

Vietnam is entering the global Internet ecosystem more deeply with the adoption of IPv6. IPv6, as an internationally standardized Internet protocol, helps national networks become compatible with international Internet standards and technical norms [19], [21].

This helps Vietnam to:

- **Global interoperability:** connect more seamlessly with global IPv6 networks.
- **Participation in Asia-Pacific Internet development:** strengthen regional cooperation and technical alignment.
- **Internet governance:** support global coordination of Internet number resources.

Thus, IPv6 is not only a network protocol but also a tool for Vietnam to internationalize and participate in global Internet governance [21], [22].

4 Personal View: IPv6, Cybersecurity and Digital Transformation in Can Tho and the Mekong Delta

4.1 IPv6 from a Cybersecurity Student's Point of View

I am a cybersecurity student in the Mekong Delta, and I see IPv6 as an enabler of both digital transformation and network security. Students need to understand IPv6 because future networks will increasingly use IPv6 and IPv6-only architecture. Therefore, cybersecurity students should understand IPv6 addressing, firewall policies, access control, tunneling risks, and traffic monitoring to secure modern digital systems [19], [22], [23], [24].

This is especially important for the Mekong Delta, which needs many connected devices and sensors for agriculture, aquaculture, climate monitoring, and digital government services. Such systems can be supported by IPv6 because it provides scalable addressing for smart farming, water-level monitoring, salinity warning, and public service platforms [20], [25], [26]. However, if these systems are not deployed securely, they may introduce new cybersecurity risks. I believe that learning about IPv6 is a practical way for cybersecurity students to contribute to safer and smarter digital development in the Mekong Delta.

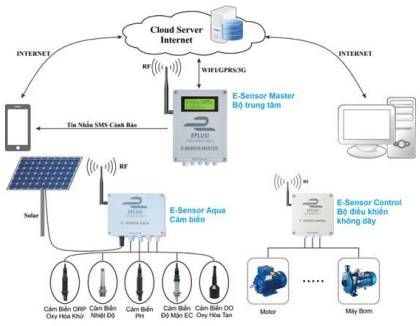
Mekong Delta Relevance

IPv6 can connect local needs with national infrastructure: smart agriculture, aquaculture monitoring, climate adaptation, digital public services, and cybersecurity education.

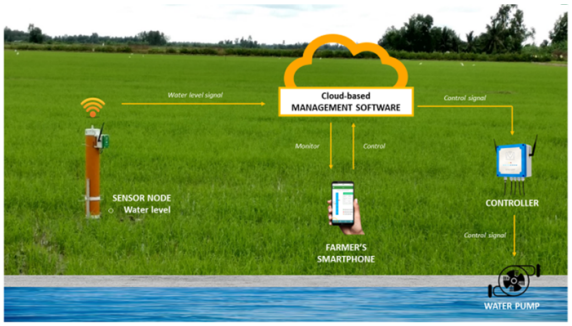
4.2 Importance of IPv6 for Can Tho and the Mekong Delta

Can Tho is considered the heart of the Mekong Delta and plays an important role in regional digital transformation, agriculture, education, healthcare, and public services. In this context, IPv6 can facilitate the development of scalable digital infrastructure for both Can Tho and the surrounding provinces.

The Mekong Delta also faces major challenges related to climate change, flooding, salinity intrusion, agriculture, aquaculture, and environmental monitoring. These challenges require large-scale digital systems, sensor networks, and real-time data platforms. IPv6 can provide the addressing foundation for connecting these devices and services at a regional scale [25], [26].



(a) IoT-based water quality monitoring system for aquaculture.



(b) Cloud-based IoT system for smart rice irrigation in the Mekong Delta.

Figure 4: IPv6-enabled IoT applications in agriculture and aquaculture in the Mekong Delta. Sources: Eplusi Technology [27] and World Bank [28].

4.3 Practical Applications of IPv6 in Can Tho and the Mekong Delta

IPv6 opens up many practical applications in Can Tho and the Mekong Delta:

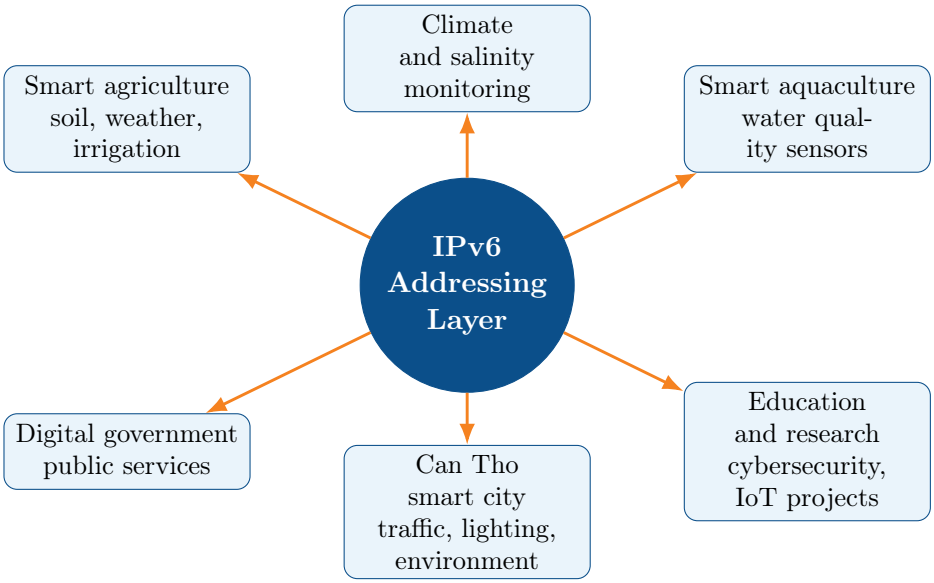


Figure 5: IPv6 as the addressing layer connecting practical digital applications in Can Tho and the Mekong Delta.

- **Smart agriculture:** connecting soil sensors, weather stations, irrigation systems, and farm management platforms.
- **Climate and salinity monitoring:** supporting sensor networks for rainfall, river water levels, flooding, and saltwater intrusion.
- **Smart aquaculture:** monitoring water quality, dissolved oxygen, temperature, and feeding systems for fish and shrimp farms.

- **Digital government:** improving online public services and data sharing between local agencies.
- **Can Tho smart city services:** supporting traffic management, environmental monitoring, public lighting, and city digital platforms.
- **Education and research:** supporting universities and students in cybersecurity, IoT, networking, and digital infrastructure projects.

These applications show that IPv6 can serve as a technical basis for regional modernization, especially where agriculture, environment, and public services depend on large-scale connectivity [20], [25], [26].

4.4 Cybersecurity Issues of IPv6 Deployment

IPv6 has many benefits, but it also brings new challenges for cybersecurity. If there is no proper security plan when deploying IPv6, misconfigured services, weak firewall rules, unmanaged IPv6 traffic, and tunneling mechanisms may become potential attack surfaces [23], [24].

Security Takeaway

IPv6 adoption must be treated as both an infrastructure project and a cybersecurity responsibility. Secure configuration, monitoring, access control, and student training should be included from the beginning.

Thus, IPv6 deployment in Can Tho and the Mekong Delta should be combined with:

- **Network design security:** planning IPv6 networks with security requirements from the beginning.
- **IPv6 access control and firewall policies:** ensuring that IPv6 traffic is filtered and protected properly.
- **Continuous monitoring and logging:** detecting abnormal IPv6 traffic, misconfigurations, and possible attacks.
- **Training for administrators and students:** improving practical IPv6 deployment and troubleshooting skills.
- **IPv6-specific threat awareness:** learning about tunneling risks, rogue services, and common IPv6 misconfigurations.

This means that the adoption of IPv6 is not only a technical transition, but also a cybersecurity responsibility.

5 Ways to Achieve 90–100% IPv6 Adoption by 2030

Path to 2030

Reaching 90–100% IPv6 adoption requires coordinated progress in policy, technical deployment, public services, cloud and data centers, universities, security practice, and user awareness.

5.1 Lessons from Global IPv6 Deployments

To achieve 90–100% IPv6 adoption by 2030, Vietnam should continue to learn from countries and large organizations that have successfully deployed IPv6 at scale. International experience shows that IPv6 adoption requires not only technical upgrades, but also clear policy direction, long-term investment, user awareness, and coordination among Internet service providers, enterprises, government agencies, and technical communities [4], [12], [18].

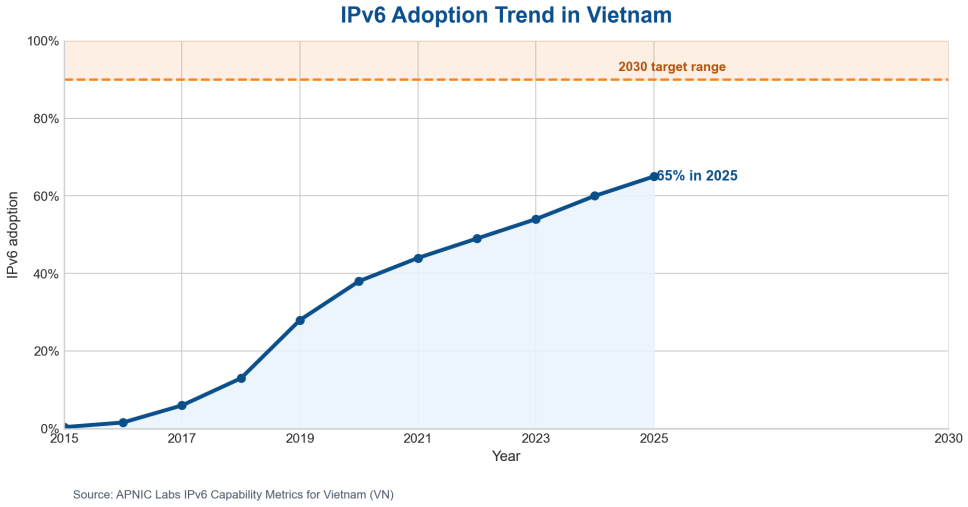


Figure 6: IPv6 adoption trend in Vietnam. Source: APNIC Labs [33].

One key lesson is that IPv6 should be built into default infrastructure planning. New networks, cloud platforms, data centers, public services, and enterprise systems should be IPv6-ready from the start, rather than adding IPv6 later as an extra feature [3], [16].

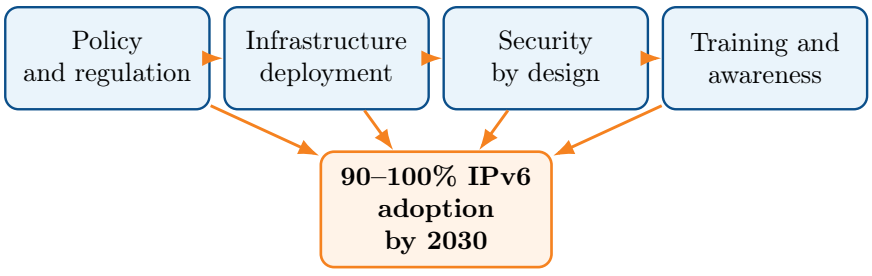


Figure 7: Integrated path for achieving 90–100% IPv6 adoption in Vietnam by 2030. Source: Author's synthesis based on VNNIC [3] and MST [16].

5.2 Improving Coordination at the National and International Levels

National agencies and international Internet organizations need to work together to promote IPv6 adoption. At the global level, IETF develops technical documents and RFCs to define how Internet technologies work at scale, ICANN coordinates unique Internet identifiers, IANA manages global number resources, and APNIC supports IPv6 deployment and regional Internet resource management [19], [21], [22], [29], [30], [31], [32].

At the national level, VNNIC should continue to be the coordinating center for IPv6 deployment, IPv6-only transition, technical training, and awareness programs in Vietnam [3], [13], [16].

The coordination should focus on:

- **Technical standards:** conforming to IETF IPv6 specifications and deployment guidelines.
- **IPv6 address management:** ensuring addressing that is efficient, scalable, and suitable for long-term growth.
- **Regional cooperation:** using APNIC resources, training, and deployment support.
- **National guidance:** strengthening VNNIC's role in Vietnam's IPv6-only transition.

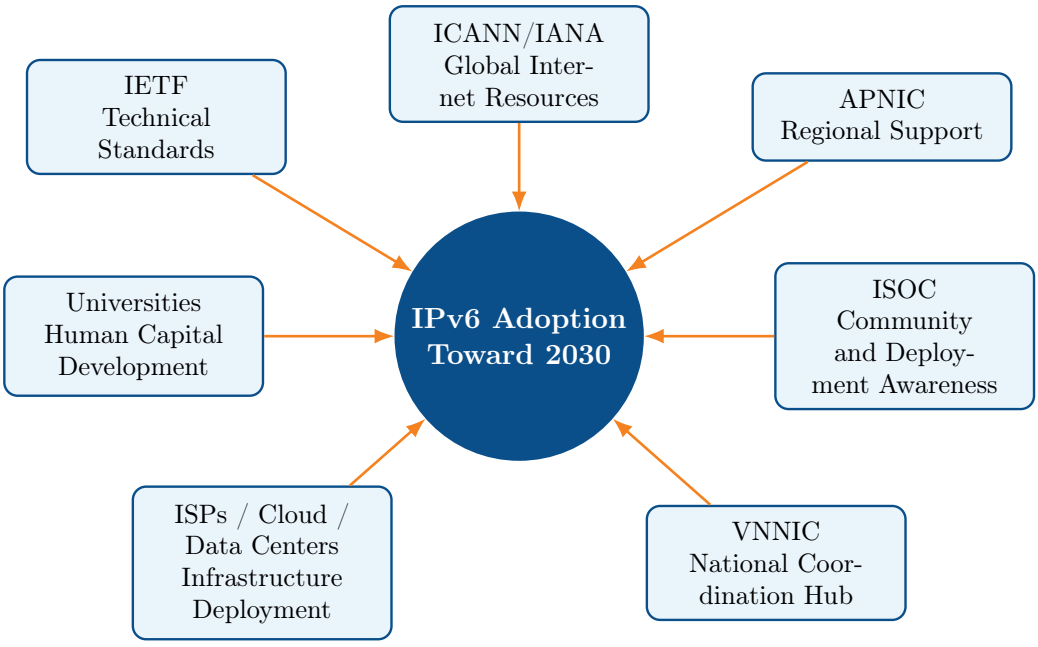


Figure 8: Proposed coordination ecosystem for achieving 90–100% IPv6 adoption in Vietnam by 2030. Source: Author's synthesis based on ICANN [30], Internet Society [31], APNIC [32], VNNIC [3], and MST [16].

5.3 Policy and Regulatory Solutions

Policy support is crucial to accelerate IPv6 adoption. Vietnam has already issued national directions on science, technology, innovation, digital transformation, and transition to IPv6-only. These guidelines need to be translated into explicit implementation requirements for government agencies, enterprises, universities, and service providers [1], [2], [16], [17].

Policy actions can include:

- Require government websites, public service portals, and digital platforms to support IPv6.
- Require Internet service providers to enable IPv6 by default for new users and services.
- Make IPv6 readiness part of public procurement, cloud infrastructure, and data center requirements.
- Promote IPv6-only pilot projects in selected government, education, and enterprise networks.
- Establish a periodic reporting mechanism for tracking IPv6 deployment progress.

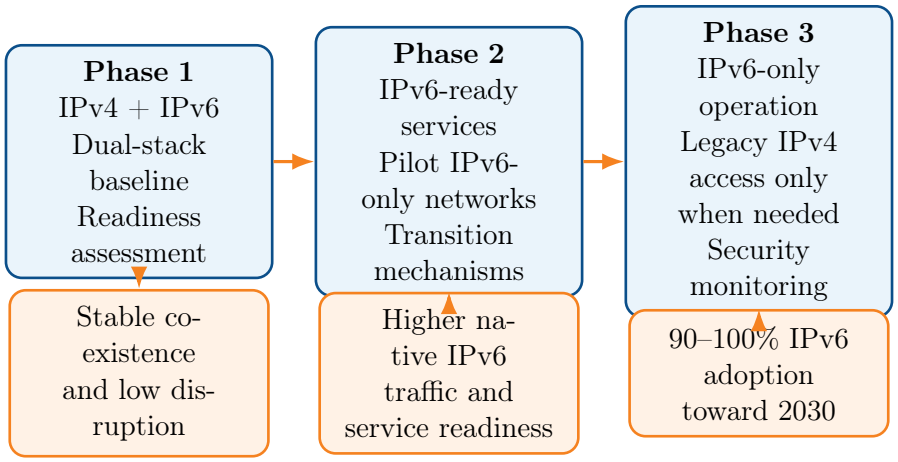
These measures can help move IPv6 from a technical recommendation to a practical national requirement.

5.4 Technical Implementation Roadmap

Vietnam needs a clear transition path from IPv4-only networks to dual-stack deployment and then to IPv6-only architecture. Transition technologies may be used to provide legacy IPv4 service access while incrementally increasing native IPv6 traffic [4], [5].

The technical roadmap should include:

- **Dual-stack deployment:** supporting IPv4 and IPv6 during the transition period.
- **IPv6-only pilots:** testing IPv6-only operation in selected networks, universities, data centers, and public systems.
- **Transition mechanisms:** maintaining IPv4 service compatibility where needed.
- **IPv6-ready infrastructure:** upgrading routers, firewalls, DNS, monitoring systems, and cloud platforms.
- **Security-by-design:** embedding IPv6 security controls in all stages of deployment [23], [24].



Technical implementation roadmap from dual-stack deployment to IPv6-only operation. Source: Author's synthesis based on ITU [4], IETF [5], VNNIC [3], and MST [16].

This path allows Vietnam to continue increasing IPv6 adoption while minimizing technical disruption and preparing for IPv6-only operation.

5.5 Awareness and Human Capital Development

Human resources are one of the most important factors for IPv6 adoption. Network administrators, engineers, cybersecurity students, public sector IT staff, and university lecturers need practical IPv6 training, not only theoretical knowledge [13], [14].

Training should emphasize:

- IPv6 addressing and subnetting.
- IPv6 routing and deployment models.
- Design of IPv6-only networks.
- IPv6 firewall and access control settings.
- IPv6 monitoring and troubleshooting.
- IPv6 security risks and countermeasures.

Students and young professionals can also contribute by attending IPv6 training courses, workshops, university labs, cybersecurity clubs, and community awareness events. This helps build a new technical workforce that is ready for IPv6 and IPv6-only networks.

5.6 Building an IPv6-only Ecosystem toward 2030

To reach 90–100% IPv6 adoption by 2030, Vietnam should increase the percentage of IPv6 users and build a complete IPv6-ready and IPv6-only ecosystem. This means that IPv6 should become the default standard for public services, Internet service providers, cloud platforms, data centers, universities, enterprises, and digital transformation projects [3], [16].

This ecosystem can evolve around several priorities:

- **IPv6-ready public services:** government websites, public service portals, and administrative systems should be IPv6-enabled by default.
- **IPv6-ready cloud and data centers:** national cloud platforms, hosting providers, and data centers should offer native IPv6 services.
- **IPv6-only pilot networks:** selected universities, public agencies, and enterprises can trial IPv6-only networks before broader deployment.
- **IPv6 for digital transformation:** new systems in smart cities, IoT, 5G, education, healthcare, and public administration should be designed with IPv6 from the beginning.
- **IPv6 security integration:** IPv6 deployment should include firewall policies, monitoring systems, access control, and security training.

This will allow Vietnam to progress from basic IPv6 adoption to a more sustainable IPv6-only environment. By 2030, IPv6 should not be an optional network feature but basic infrastructure for national digital transformation.

6 Youth Engagement in Safe IPv6 Adoption and Digital Transformation

Youth Engagement Focus

Students can support IPv6 adoption by learning the technology, joining technical communities, applying IPv6 in local projects, raising awareness, and passing knowledge to the next generation.

6.1 Why IPv6 Is Important to Young People and Students

IPv6 matters to young people and students because it is the future of Internet infrastructure. As Vietnam is moving to IPv6 and IPv6-only networks, students from different backgrounds need to understand the importance of IPv6 for digital transformation, online public services, cloud computing, IoT, 5G, smart cities, and the future development of the Internet [13], [14].

This knowledge should not be restricted to students in technical majors. Students from business, communication, public administration, agriculture, tourism, education, and other fields can also contribute to the explanation, implementation, and promotion of IPv6 in their areas. Understanding the value of IPv6 can help young people bring technical knowledge closer to society.

Youth participation is important for Vietnam because IPv6 adoption is not just a network engineering problem. It is also linked to national digital transformation, innovation, education, public services, and the development of a modern digital economy.

6.2 Joining IPv6 Training, Labs and Technical Communities

Young people and students can contribute to IPv6 adoption through their involvement in training programs, online courses, university workshops, technical labs, and Internet community activities. These activities help students move from awareness to practical understanding of IPv6 deployment and its role in digital infrastructure [13], [14].

Students can, for example, take the IPv6 Fundamentals course on VNNIC Academy, join IPv6 workshops at universities, and participate in online learning groups. Students can also broaden their knowledge of Internet infrastructure, IPv6 deployment, Internet governance, and digital policy through regional and international programs such as APIE Camp, APNIC Fellowship, VNNIC workshops, VNNIC Internet Conference, and the VISY platform [15], [34], [36].

Through these activities, students are able to:

- Learn IPv6 from trusted sources.
- Learn the basics of networking and Internet infrastructure.
- Meet young people interested in Internet development, engineers, and experts.
- Gain global perspectives on IPv6 and digital transformation.
- Bring knowledge back to their universities and local communities.

This helps create a generation of students who understand the value of IPv6 both technically and socially.

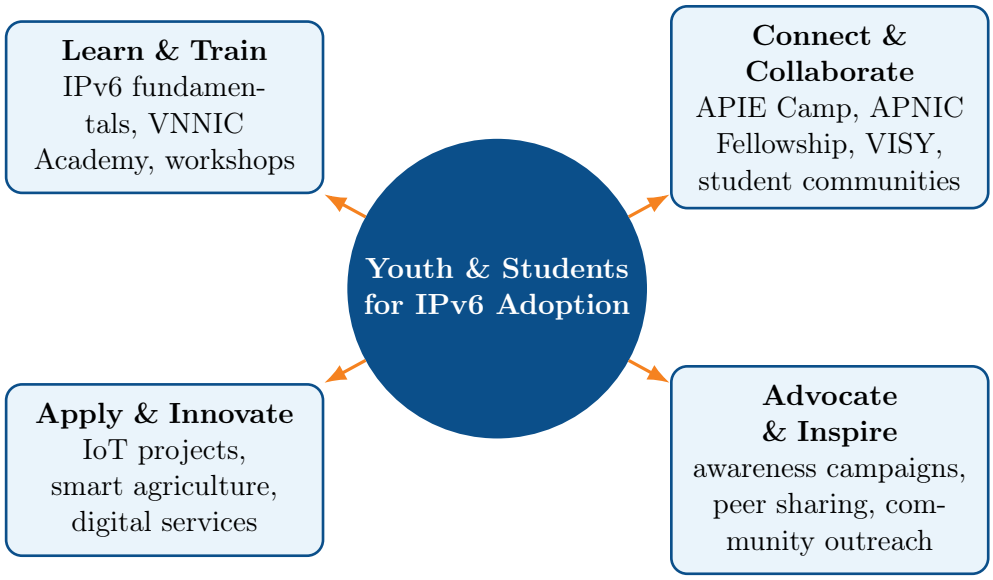


Figure 9: Youth and student engagement framework for secure IPv6 adoption and digital transformation. Source: Author's synthesis based on VNNIC Academy [13], VietnamNet [14], APIE Camp [15], APNIC Fellowship [34], and VISY [36].

6.3 Student Contributions in the Mekong Delta and Can Tho

Students in Can Tho and the Mekong Delta can help establish a regional student network for IPv6, Internet development, and digital transformation. This network can link universities in the Mekong Delta, such as Can Tho University, FPT University, An Giang University, and other local institutions, while also connecting with universities in other areas of Vietnam.

The idea is reminiscent of the early spirit of the Internet, which developed from universities and research communities sharing knowledge, experiments, and technical ideas. Similarly, today's students can build a collaborative learning network to share opinions, discuss IPv6 adoption, and propose ideas for Vietnam's digital future [35].

Possible contributions from students include:

- Building an IPv6 student community in universities in the Mekong Delta.
- Holding inter-university seminars on IPv6, Internet development, and digital transformation.
- Sharing learning materials, lab exercises, and useful resources.
- Formulating student research topics on IoT, smart cities, digital government, Internet governance, and IPv6 adoption.
- Bringing together students from technical and non-technical majors to discuss how IPv6 can help different sectors.

- Building small local projects in smart agriculture, aquaculture, environmental monitoring, and digital public services.

Through these activities, students can become active contributors to regional digital transformation, rather than just passive learners.

6.4 Raise Awareness of IPv6 Among Peers and Communities

IPv6 needs more than policy and infrastructure; it needs public awareness. Many people use the Internet every day without knowing what IPv6 is or why it is important. Students can help explain IPv6 in simple, practical, and accessible ways.

They can raise awareness about IPv6 through:

- Student seminars and workshops in universities.
- Short videos and infographics.
- Social media campaigns.
- Peer-to-peer learning groups.
- Community discussions on digital transformation.
- Basic guides for students, families, and small groups.

Students from different backgrounds can make IPv6 more understandable. Technical students can explain how IPv6 works, while communication, business, education, and public administration students can help translate technical concepts into language that ordinary users, small businesses, teachers, and local communities can understand.

In this way, students can become a bridge between the technical community and wider society.

6.5 Towards a Safer and More Connected Digital Future

Youth participation makes IPv6 adoption more practical, inclusive, and secure. As more devices, services, and platforms are connected, Vietnam will need stronger infrastructure as well as better awareness of safe and responsible digital use.

Students can help make a safer, more connected future by learning and sharing knowledge about:

- The fundamental role of IPv6 in modern Internet infrastructure.
- The relationship between IPv6, IoT, cloud services, and digital government.
- Safe use of connected devices and online services.

- Security and configuration vulnerabilities in IPv6.
- Community projects on smart agriculture, smart cities, education, and public services.
- Knowledge sharing with younger students and local communities.

This contribution is especially significant for Can Tho and the Mekong Delta. IPv6 can facilitate smart agriculture, aquaculture monitoring, climate adaptation, digital government, education, healthcare, and regional connectivity. Therefore, youth participation is not just about learning a new Internet protocol; it is about contributing to a more connected, more secure, and future-ready society.

6.6 Student Action Plan Toward 2030

To make student participation more practical, youth engagement in IPv6 adoption should be developed step by step from awareness, training, international exposure, community building, and long-term knowledge transfer.

Timeline	Student Actions	Expected Outcomes
2026	Organize IPv6 awareness workshops and basic training at universities in Can Tho and the Mekong Delta, such as Can Tho University, FPT University, An Giang University, and other local institutions. Students can also complete the IPv6 Fundamentals course on VNNIC Academy and other online learning platforms. At the same time, an online learning group, such as Discord or Facebook, can be created for students to share documents, lab exercises, and learning experiences [13], [14].	Students gain basic IPv6 awareness, understand the importance of IPv6 for Vietnam's digital transformation, and form the first online learning community.
2027	Introduce students to regional and international programs such as APIE Camp, APNIC Fellowship, VNNIC workshops, VNNIC Internet Conference, and the VISY platform. These programs can help students learn more about Internet infrastructure, IPv6 deployment, technical policy, and global Internet governance from both Vietnamese and international perspectives [15], [34], [36].	Students begin to connect with wider technical communities, gain international exposure, and understand IPv6 not only as a technical issue but also as part of Internet policy and digital development.

Timeline	Student Actions	Expected Outcomes
2028–2029	Expand the student network into a broader community connecting universities in Can Tho, the Mekong Delta, and other regions of Vietnam. This network can organize cross-university seminars, IPv6 labs, cybersecurity workshops, small research projects, and IoT-based local applications.	A stronger IPv6 student community is formed, allowing students from different universities to exchange knowledge, share perspectives, and contribute ideas for secure IPv6 adoption.
2030	Build a mature group of students and young professionals who experienced the IPv6 transition period and can transfer knowledge to the next generation. These students can mentor younger learners, promote IPv6 awareness, support IPv6-only readiness, and continue research on future Internet technologies beyond IPv6.	A sustainable youth-led IPv6 community is established, contributing human resources, inspiration, and long-term support for Vietnam's IPv6-only future.

Table 1: Student action plan for supporting safe IPv6 adoption and digital transformation toward 2030.

This action plan shows that student participation should not stop at learning IPv6 individually. It should gradually develop into a community-based movement where students learn, connect, share, research, and inspire others. By 2030, students who take part in this transition can become an important human resource for Vietnam's secure IPv6 and digital infrastructure development.

7 Conclusion: My Commitment to the Future of IPv6 in Vietnam

Vietnam's migration to IPv6 and IPv6-only networks is more than a technical upgrade. It is a long-term foundation for national digital transformation, cloud services, IoT, 5G, digital government, smart cities, and secure Internet infrastructure. To reach 90–100% IPv6 adoption by 2030, Vietnam will need more than policies and technologies; it will also need students, universities, communities, and young people to become active participants.

To me, IPv6 is important because it connects national Internet development with local digital needs. IPv6 in Can Tho and the Mekong Delta can support smart agriculture, aquaculture monitoring, flood and salinity warning systems, digital public services, and more secure regional connectivity. These applications show that IPv6 is not just about addresses and protocols, but about building better digital infrastructure for better real life.

If selected, I commit to

- **Learn in depth:** develop knowledge of IPv6, IPv6-only architecture, Internet infrastructure, and secure network deployment.
- **Participate in training and community programs:** attend VNNIC Academy courses, VNNIC workshops, VNNIC Internet Conference, VISY activities, APIE Camp, APNIC Fellowship opportunities, and other Internet community programs.
- **Build student communities:** assist in forming online learning groups and connecting students from Can Tho, the Mekong Delta, and other parts of Vietnam to share IPv6 knowledge and learning resources.
- **Create awareness of IPv6:** advocate IPv6 in simple and practical ways through student discussions, social media, workshops, and peer-to-peer learning activities.
- **Support local digital applications:** encourage student projects on smart agriculture, aquaculture monitoring, flood and salinity warning, digital government, and IoT systems in the Mekong Delta.
- **Connect technical knowledge with society:** contribute to making IPv6 more accessible to non-technical students, local communities, small organizations, and future users of digital services.
- **Pass knowledge down the chain:** encourage younger students to become interested in IPv6, Internet governance, cybersecurity, and future digital infrastructure.

Vietnam has a chance to become a more IPv6-ready and IPv6-native digital nation by 2030. This future will not be built only by engineers and policymakers, but also by students and young people who are willing to learn, connect, share, and contribute. I want to be part of that process and contribute to a safer, smarter, and more connected Internet future for Vietnam, Can Tho, and the Mekong Delta.

Vietnam 2030: A safe and inclusive IPv6-ready digital nation

Infrastructure, policy, and youth participation

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