

REPORT ON
INTERNET, INTERNET RESOURCES IN VIET NAM

2023



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DIRECTING COMPILATION

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Preface

In the era of intelligent technology, Internet is shifting from the Consumer Internet to the Industrial Internet, not only connecting people but also expanding connections to myriad of things and IoT devices. The constant development of Internet present new opportunities and challenges for the ITC industry in particular and society in general. According to discussions from the Internet Governance Forum 2023 organized by the United Nations Secretariat, the most significant challenge to nations is the issue of narrowing the digital divide to ensure equal access to the Internet, leaving no one behind. The second major challenge is cybersecurity, ensuring the trust and online safety against the increasing sophistication of cybercrime technology. Other challenges include technology governance, data management, digital institution building, and multi-stakeholder engagement within the framework of global Internet governance and so on.

In Viet Nam, Viet Nam Internet Network Information Center (VNNIC), serving the function of the National Internet Registry, has been devoting to ensure the trust and security of critical Internet infrastructure and Internet resources, including ".vn" domain name – Viet Nam's country code top level domain name, Internet address (IP), autonomous system number (ASN), the national domain name system (DNS), Viet Nam

national Internet eXchange (VNIX), and new services on Internet resources.

To achieve the sustainable and secure future of the Internet, it's essential to address issues from their core. Through the perspective and researches of whom manages national Internet resources, operates and manages Internet core infrastructures in Viet Nam, VNNIC developed the Report on Internet, Internet Resources in 2023 with the theme "Internet in the Intelligent Era". This report focuses on analyzing the development trends of Internet resources, critical internet infrastructures, and safety issues at the core of the Internet. VNNIC hopes that this report will help experts, organizations, and businesses in their information needs, researches, as well as in their strategies and actions plans towards the inclusive, secure, sustainable, and intelligent development of the Internet.

The analysis and data presented in this report are updated to November 30th, 2023, reflecting indicative statistics and the development trend of Internet resources and critical Internet infrastructure in Viet Nam in the year 2023. Readers could access to gain further updated information and statistics related to the operation and development of Internet, Internet resources on VNNIC Internet Atlas at the link <https://internetatlas.vnnic.vn>.



**PROMOTING INTERNET
CONNECTIVITY,
INTERNET RESOURCES**



**ENHANCING THE TRUST
AND SAFETY OF INTERNET
RESOURCES**



**ENHANCING THE TRUST
AND SAFETY OF CORE
INFRASTRUCTURE**



**ENSURING NETWORK
REUNDANCY AN
ROUTING SECURITY**



**DEVELOPING NEUTRAL DIGITAL
INFRASTRUCTURE, CONNECTING
DIGITAL PLATFORMS**



**PROMOTING AND ORIENTING
THE DEVELOPMENT OF INTERNET
IN VIET NAM, BUILDING THE INTERNET
EXPERT COMMUNITY**



PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES



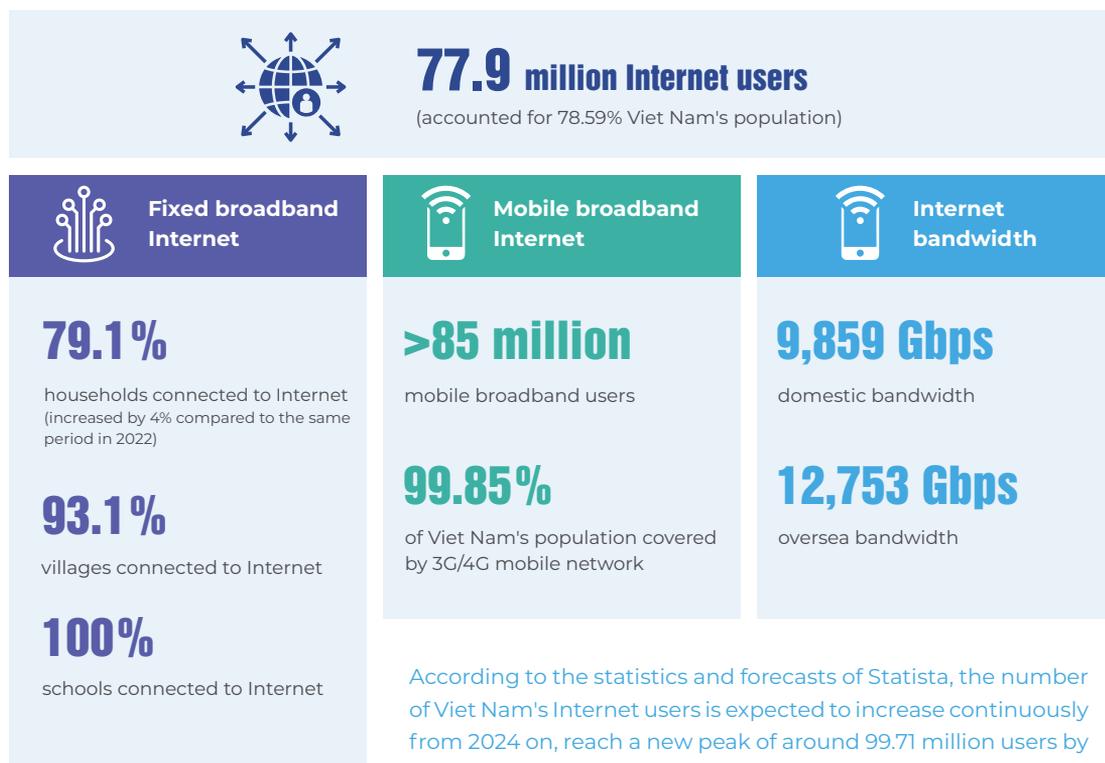
1. BRIDGING DIGITAL DIVIDE AND PROMOTING INTERNET CONNECTIVITY

In 1997, Viet Nam officially connected to the global Internet, paving the way for a new era of integration. Until now, Internet has become an essential part of our lives, helping to promote the success of Viet Nam's industrialization and modernization process, and playing an important role in national digitalization.

In the acceleration phase of Viet Nam's digital transformation process, bridging the digital divide and promoting Internet connectivity is considered a critical mission.

INTERNET GROWTH IN VIET NAM

Source: Monitoring and Evaluating Performance Indicators System of the Ministry of Information and Communications



I. PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES

Along with the development of the Internet in Viet Nam, national Internet resources also achieved a steady growth. By the end of November 2023, the number of “.vn” domain names reached **607,758 domains, an increase of 5,84% compared to the same period in 2022** and achieved a **growth rate of 5% on average in the last 5 years**.

“.VN” DOMAIN NAME REGISTRATION AND USAGE

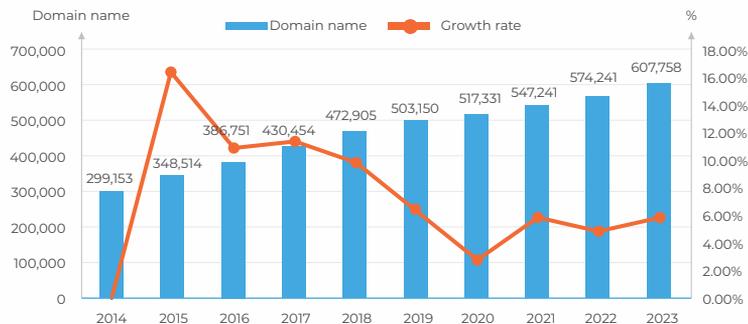


Figure 1. “.vn” domain name usage and growth rate (updated to November 30th, 2023)

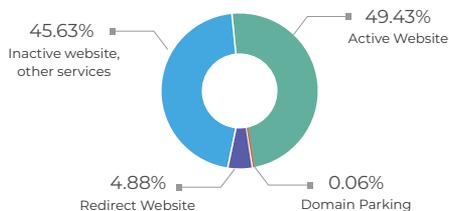


Figure 2. “.vn” domain name usage in 2023 (updated to November 30th, 2023)

“.VN” DOMAIN NAME USAGE RECORDED ON NATIONAL DNS SYSTEM IN 2023

(updated to November 30th, 2023)

- **344.4 billion queries** (an increase of 13% compared to the same period in 2022)
- **37.3 billion IPv6 queries**
- **307.1 billion IPv4 queries**
- Average response time: **12.9 ms**

The expansion of domain name space, as well as the increase in the number of the national DNS queries somewhat reflects the vibrancy of online services and activities associated with “.vn” domain name. It also indicates the scalability and adaptability of the national

DNS system and Viet Nam Internet, ensuring the fast, smooth, safe, and stable operation for e-commerce services, e-government, and digital transformation in Viet Nam.

IMPROVED INTERNET CONNECTION SPEED

According to the statistics of the i-Speed by VNNIC, the Internet connection speed has gradually been improved to meet the need of high-quality Internet connection of Internet users.

FIXED BROADBAND		MOBILE BROADBAND	
 Download (Mbps)	 Upload (Mbps)	 Download (Mbps)	 Upload (Mbps)
90.34	89.25	38.01	16.57

Table 1: Fixed Broadband and Mobile broadband median speed in 2023
(updated to November 30th, 2023)

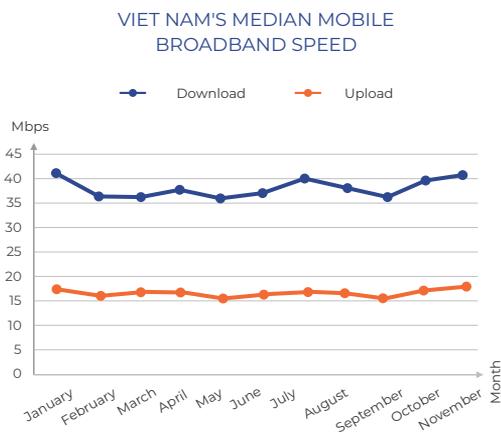
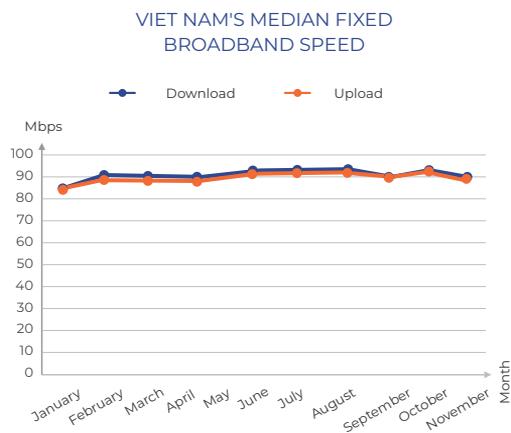


Figure 3: Fixed broadband and Mobile broadband median speed in 2023
(updated to November 30th, 2023)

I. PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES

No.	Province	Fixed Broadband		Mobile Broadband		IPv6 usage (%)
		Download (Mbps)	Upload (Mbps)	Download (Mbps)	Upload (Mbps)	
1	An Giang	90.50	87.08	45.69	22.45	41.30
2	Ba Ria - Vung Tau	89.60	82.44	44.07	20.75	47.10
3	Binh Duong	95.08	94.54	39.21	19.21	41.29
4	Binh Phuoc	85.76	84.56	42.05	18.14	56.40
5	Binh Thuan	90.54	85.22	43.96	19.20	48.68
6	Binh Dinh	82.44	74.93	41.05	16.86	50.65
7	Bac Lieu	96.47	92.77	46.93	21.55	57.36
8	Bac Giang	86.44	86.64	37.40	14.04	51.59
9	Bac Kan	69.37	64.33	38.13	14.55	44.06
10	Bac Ninh	89.32	90.76	35.45	12.98	47.06
11	Ben Tre	98.86	100.03	46.79	19.59	58.80
12	Cao Bang	69.43	57.27	35.16	16.02	52.65
13	Ca Mau	89.40	84.40	51.95	20.61	56.49
14	Can Tho	95.00	92.70	44.14	23.04	43.14
15	Gia Lai	93.62	92.47	41.56	17.60	53.05
16	Ha Giang	90.11	90.51	45.76	15.73	57.75
17	Ha Nam	66.00	66.49	39.66	13.92	51.66
18	Ha Noi	90.58	91.97	33.21	14.22	29.95
19	Ha Tinh	70.83	68.79	42.52	15.31	64.65
20	Hoa Binh	89.46	93.13	39.29	13.33	59.70
21	Hung Yen	85.63	86.55	36.64	12.47	52.81
22	Hai Duong	78.18	78.43	35.41	12.24	49.45
23	Hai Phong	79.65	78.78	40.23	15.02	54.31
24	Hau Giang	96.07	94.00	48.88	19.69	54.01
25	Khanh Hoa	90.74	85.80	41.08	20.69	45.81
26	Kien Giang	87.46	81.07	46.61	19.93	53.30
27	Kon Tum	72.94	64.39	47.89	18.55	49.53
28	Lai Chau	131.32	102.75	35.15	15.14	58.66
29	Long An	89.19	86.31	44.69	17.33	55.70
30	Lao Cai	83.66	82.47	41.44	15.14	42.96
31	Lam Dong	85.88	78.06	44.03	19.81	50.36
32	Lang Son	74.04	68.61	32.79	13.91	69.62
33	Nam Dinh	91.06	91.02	41.43	16.84	59.23
34	Nghe An	62.88	61.42	39.11	13.70	50.36
35	Ninh Binh	90.00	91.45	43.38	15.68	48.08
36	Ninh Thuan	100.09	101.73	46.87	8.04	17.95

I. PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES

37	Phu Tho	79.89	79.35	45.59	14.06	50.95
38	Phu Yen	68.73	64.65	42.65	19.89	52.76
39	Quang Binh	95.48	90.21	43.86	17.71	64.33
40	Quang Nam	79.32	76.19	41.44	19.16	53.31
41	Quang Ngai	98.31	98.86	42.25	16.15	58.97
42	Quang Ninh	75.61	71.62	32.56	10.71	46.38
43	Quang Tri	69.19	63.46	44.31	18.91	59.26
44	Soc Trang	98.14	96.52	46.28	19.10	59.88
45	Son La	93.69	97.19	35.11	12.65	58.73
46	Tp. Ho Chi Minh	95.91	95.27	39.48	20.63	36.87
47	Thanh Hoa	84.95	85.66	39.98	15.72	47.06
48	Thai Binh	88.91	91.18	41.84	13.44	58.29
49	Thai Nguyen	85.02	85.72	35.01	13.51	49.72
50	Thua Thien Hue	80.57	73.22	38.58	18.67	54.63
51	Tien Giang	95.19	93.46	43.43	18.91	58.46
52	Tra Vinh	79.95	78.43	48.43	18.38	53.38
53	Tuyen Quang	91.29	98.63	42.76	14.56	53.11
54	Tay Ninh	98.14	96.90	47.27	22.92	56.94
55	Vinh Long	82.40	77.94	45.79	19.98	58.50
56	Vinh Phuc	74.19	74.66	38.22	13.90	54.38
57	Yen Bai	70.30	70.42	40.11	14.77	39.15
58	Dien Bien	94.69	97.61	38.75	13.88	67.01
59	Da Nang	91.64	88.33	36.92	20.16	45.22
60	Dak Lak	77.26	69.63	40.88	19.68	45.54
61	Dak Nong	74.60	64.01	38.93	16.18	55.36
62	Dong Nai	96.20	95.12	45.42	19.55	49.61
63	Dong Thap	84.31	76.69	46.93	20.02	47.30

Table 2: Fixed broadband, mobile broadband median speed and IPv6 usage in provinces and municipality cities in 2023 (updated to November 30th, 2023)

The statistics showed that IPv6 services had been provided to a wide range of agencies, organizations, businesses, and individuals across the nation, ensuring the readiness of new services, emerging technologies on the next generation of Internet to users.

Application

52 domestic host servers

04 overseas host servers (Hongkong, Singapore, Australia, and Japan)

i-Speed by VNNIC (<https://i-speed.vn>) is a neutral system designed and developed by VNNIC in collaboration with the Telecommunication Authority, Ministry of Information and Communications in 2020. The system allows users to test their Internet speed for free.

VNNIC also implemented the i-Speed Portal and granted accesses to relevant government agencies, ISPs, mobile service providers and enterprises for their overseeing and improving Internet speed for users.

2. PROMOTING NATIONAL “.VN” DOMAIN NAME

Viet Nam's Internet resources are identifying parameters, including “.vn” domain name, IP address and autonomous network number (ASN), plays a crucial role in the operation of the Internet, connecting all entities to participate in cyberspace. The first “.vn” domain name was registered in 1994, marking Viet Nam's image and sovereignty on the global Internet.

With the Identity - Trust - Safety value of national Internet resources, “.vn” domain name, associated with websites, emails, online services, etc., has assisted agencies, organizations, businesses, and individuals in building digital brands, increase the value of online presence and competitiveness capacity. “.vn” domain name also helps businesses and customers access information and conduct online transactions safely and securely.

Following the National Digital Transformation Program to 2025, with a vision to 2030, the Ministry of Information and Communications issued Decision No. 922/QĐ-BTTTT dated May 20, 2022, approving the scheme "Identifying the set of indicators for digital transformation of ministries, ministerial-level agencies, and state-owned agencies, provinces and centrally run cities, and the country". In particular, “.vn” domain name is one of the component indicators for evaluating the level of digital transformation of provinces and municipality cities.

VNNIC sets the target to reach at least 1 million “.vn” domain names by 2025, ranking 20th - 30th place in the world.

“.VN” DOMAIN NAME REGISTRATION AND USAGE GROWTH



607,758

“.vn” domain names



2nd

place in ASEAN



5%

Average annual growth in the last 5 years

145,147 domain names

newly registered in 2023

10th

place in the Asia-Pacific region

43rd

worldwide

increased by **16.7%** compared to the same period of 2022

Statistics updated to November 30th, 2023

According to statistics, “.vn” domain names are registered and used mainly by individuals and businesses in Viet Nam (accounting for about 96% of total “.vn” domain registrations). By November 30th, 2023, there were 10 provinces/ municipality cities having more than 5,000 “.vn” domain names. Ha Noi, Da Nang, Ho Chi Minh City, Binh Duong and Dong Nai have the

highest number of accumulated “.vn” domain names in the country.

The US, Korea, China, France and Germany are 5 countries having the highest number of accumulated “.vn” domain name outside of Viet Nam.

“VN” DOMAIN NAME REGISTRATION AND USAGE

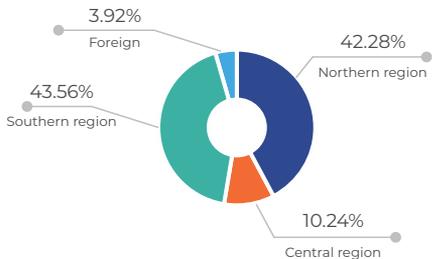


Figure 4: “.vn” domain name registrations by geographical distribution

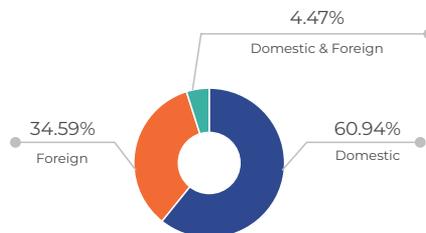


Figure 7: “.vn” domain name registrations by domestic and overseas DNS hosting



Figure 5: “.vn” domain name registrations by registrant type

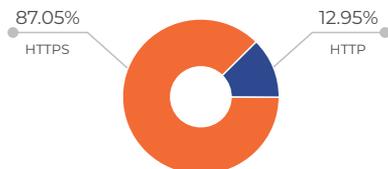


Figure 6: Websites associated with “.vn” domain name by HTTP/HTTPS

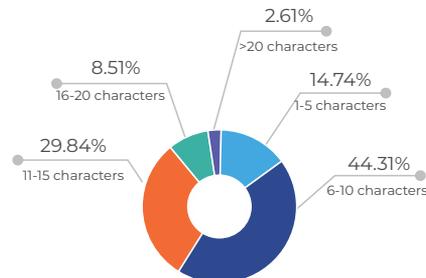


Figure 8: “.vn” domain name registrations by the length of domain name

(* updated to November 30th, 2023)

“.vn” domain name growth is a successful result of comprehensive promotion activities conducted by Viet Nam Internet Network Information Center (VNNIC), including: the reduction on domain registration fees and charges; the expansion of “.vn” domain name space; the improvement of service quality; targeted audiences support programs, etc.

These efforts aim to facilitate agencies, organizations, businesses, and individuals to access and exploit the value of national Internet resources effectively, contributing to the development of the digital economy and digital society.

I. PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES

The reduction on “.vn” domain registration fees and charges has brought a positive impact in the registration of “.vn” second-level domain name extension::



ai.vn and io.vn for artificial intelligence and digital technology field saw new registration of nearly **10,000 domain names**.



id.vn domain name for personal brand recorded new registrations up to **16,000 domain names**.



the registrations of info.vn and pro.vn saw a spectacular growth, particularly an increase of **543% in registrations of pro.vn domain** and **396% in registrations of info.vn** compared to the same period in 2022. Their new registrations were higher than **4.5 times** compared to the average amount in the period from 2019 to 2022.

In 2023, there were 02 more accredited “.vn” Registrars (TINO Group Joint Stock Company, Bach Kim Network Solutions Joint Stock Company), expanding “.vn” Registrar system providing “.vn” domain name services to users.

On the other hand, VNNIC continues to review and evaluate the operation quality of “.vn” Registrars to ensure their service quality.



iNET - iNET Software Company Limited

The best “.vn” Registrar of 2022

“.vn” Registrar providing the best customer services of 2022.



P.A Vietnam Company Limited

Top3 “.vn” Registrar of 2022

“.vn” Registrar achieving the highest “.vn” domain re-registration rate of 2022.



GMO-Z.com RUNSYSTEM Joint Stock Company

Top3 “.vn” Registrar of 2022

3. DEVELOPING MULTI-HOMED NETWORKS USING INDEPENDENT IP ADDRESS AND ASN

IP address is a unique identifier for a device or a server. There are two versions of the Internet Protocol (IP) currently available, which are IPv4 (Internet Protocol Version 4) and IPv6 (Internet Protocol Version 6). An Autonomous System Number (ASN) is a unique number assigned to network nodes in computer networking which allows its autonomous system to exchange routing information on the Internet.

By November 30th, 2023, Viet Nam had 944 IP members having independent IP addresses and ASNs allocated by VNNIC. It saw an increase of 16,54% in the number of IP members compared to the same period of 2022, mainly in the sector of IDC, Cloud and Hosting Providers.

The average increase in IP members in Viet Nam is 109 members per year.

16.3 million IPv4 addresses

Growth rate: 0.44%

28.364 octillion IPv6 addresses

Growth rate: 46.12%

944 IP address members

Growth rate: 16.54%

663 ASN

Growth rate: 20.55%

(updated to November 30th,2023)

By promoting the registration of IP addresses and ASNs simultaneously, the number of ASNs in Viet Nam saw a considerable growth in 2023, reaching 663 ASNs with the new registrations 1,5 times higher than in 2022.

Registering simultaneously independent IP addresses and ASNs allows organizations and businesses to develop a multi-home network and proactively connect with various ISPs, as well as connect to Viet Nam National Internet eXchange (VNIX), therefore contributing to developing Viet Nam's Internet infrastructure bigger, faster, safer and flatter.

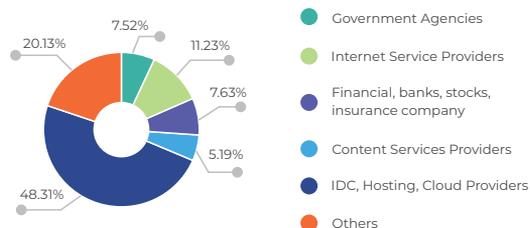


Figure 9: IP address members by categories in Viet Nam (updated to November 30th, 2023)

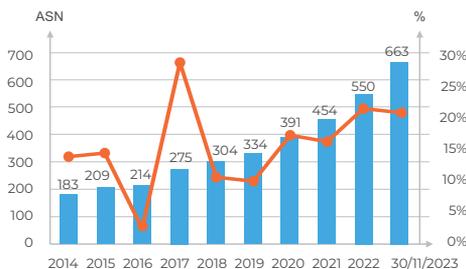


Figure 10: ASNs growth over years (updated to November 30th, 2023)



Figure 11: IP members growth over years (updated to November 30th, 2023)

4. PROMOTING THE NEXT GENERATION INTERNET PROTOCOL – IPv6

In 2011, IPv4 address space was exhausted globally. Following the Internet number policy in the Asia-Pacific region, each Vietnamese organization and enterprise is now allowed to register a maximum of one /23 IPv4 allocation (512 addresses). This address range helps organizations and businesses maintain their service and prepare the transition plan to the next generation of Internet protocol - IPv6.

Viet Nam IPv6 usage rate: 59%

- Ranked 2nd in ASEAN (higher 2.3 times than ASEAN's average IPv6 usage rate)
- Ranked 9th in the world (increased by 1 rank compared to 2022) (higher 1.6 times than the global average IPv6 usage rate) (behind India, Malaysia, France, Belgium, German, Saudi Arabic, Uruguay and Israel)

100% critical Internet infrastructure transitioned to IPv6

(the national DNS and VNIX)

IPv6 Services:

- **16.8 million** FTTH IPv6 subscribers
- **55.6 million** IPv6 mobile subscribers
- **32.535 “.vn”** websites enabled IPv6

IPv6 transition in Ministries, branches, and localities:

- **82/85** organizations issued IPv6 plan
- **75/85** organizations supported their portals and electronic public services with IPv6

IPv6 training:

10 workshops with the participation of **767 students** in 2023

(* updated to November 30th, 2023)

IPv6 address is the next generation Internet address which is 128 bits in length and an almost infinite address space. IPv6 transition is an inevitable process to ensure adequate Internet resources for developing the next generation Internet, Internet of things, and Industrial Internet and the adoption of new technology services such as IoT, Cloud Computing, 5G/6G, etc.

With the right direction and early promotion plan by the Ministry of Information and Communications (assigned to VNNIC to be the program chair), Viet Nam has achieved remarkable results in IPv6 adoption.

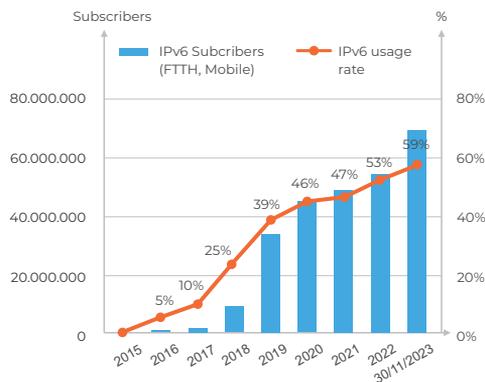


Figure 12: IPv6 usage growth (updated to November 30th, 2023)

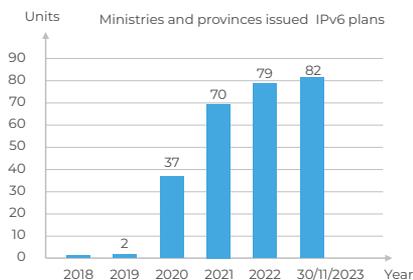
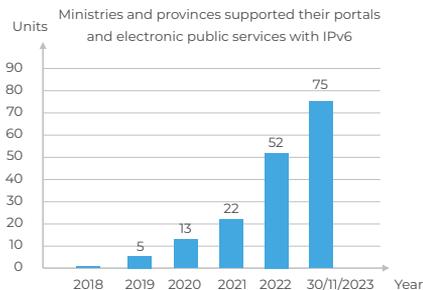


Figure 13: IPv6 usage growth among government agencies



I. PROMOTING INTERNET CONNECTIVITY, INTERNET RESOURCES

No.	Organization/Enterprise	IPv6 usage rate
1	Viet Nam Mobile Telecom Services One Member LLC (MobiFone)	75.76%
2	Viettel Group	63.40%
3	FPT Online Service Joint Stock Company	61.93%
4	Viet Nam Post and Telecommunications Group (VNPT Group)	54.47%
5	FPT Online Services Joint Stock Company	51.67%
6	Viet Digital Technology Liability Company	48.64%
7	Bach Kim Network Solutions Joint Stock Company	41.82%
8	Megacore Technology Company Limited	19.25%
9	Da Nang Department of Information and Communications	12.57%
10	Vietserver Services Technology Company Limited	8.60%

Table 3: Organizations leading in IPv6 transition in Viet Nam (source: APNIC Labs, November 2023)

Viet Nam completed the National Action Plan on IPv6 (for the period of 2011 - 2019). Following the missions in the National Digital Transformation Program (Decision No. 749/QĐ-TTg of the Prime Minister), the Ministry of Information and Communications initiated the IPv6 for

Gov Program (for the period of 2021 - 2025) to promote and support IPv6 transition amongst government agencies, setting the goal of transiting the entire Viet Nam's Internet to IPv6 and being ready for IPv6-only network.



To complete transition of Viet Nam's Internet to the next generation Internet protocol address (IPv6)



100% of users accessing broadband Internet via IPv6



To be ready for IPv6-only network, IPv6 application in 5G and IoT networks



VNNIC'S ROLE IN THE COORDINATION, PROMOTION AND SUPPORT OF IPv6 TRANSITION IN VIET NAM

- ✓ Orient and develop policies to promote and support IPv6 deployment.
- ✓ Assign and allocate IP addresses and ASN.
- ✓ Support of registration, planning and using Internet resources effectively. Consult in IPv6 deployment.
- ✓ Support IPv6 training.

II.

ENHANCING THE TRUST AND SAFETY OF INTERNET RESOURCES, NATIONAL CRITICAL INTERNET INFRASTRUCTURE



Trust, safety, and security are crucial factors in shaping the usage and utilization of the Internet to be a force for good. With the role of operating and managing Internet resources and critical Internet infrastructure, VNNIC has made efforts to implement activities ensuring the trust and safety of Internet across layers, including the core infrastructure, routing layer and services/activities associated with Internet resources.

1. ENSURING THE SECURITY OF CRITICAL INTERNET INFRASTRUCTURE

The DNS function is translating domain names into IP addresses and vice versa. It is like the phonebook of Internet, facilitating connections among devices and Internet services, enabling users to access Internet

services. In Viet Nam, the DNS is regarded to be one of critical Internet infrastructures, often referred to the "heart" of the Internet as its centralization of connections between applications, data, and users.

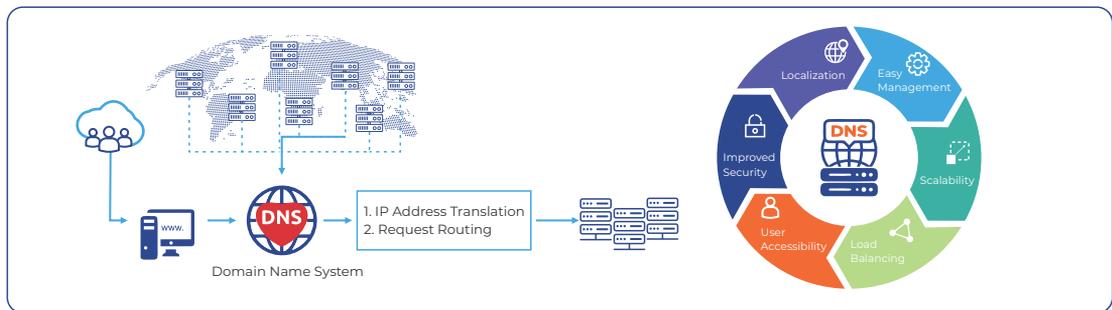


Diagram 2: The role of National DNS - the heart of Internet

The rapid development of the Internet and new technology services, which resulted to a huge number of DNS queries, has expanded DNS capabilities and increased the complexity of the Internet infrastructure. Ensuring a reliable and secure DNS is an important task to maintain the integrity, continuous operation, and stability of the Internet.

VNNIC has continually upgrade the national DNS system as well as enhanced the quality and security of DNS.

IMPROVED RESPONSE TIME OF “.VN” DNS

From 2020, VNNIC deploys DNS Root server clusters in Vietnam, connecting to the Viet Nam National Internet eXchange (VNIIX), reduces dependence on international connections, increases the access speed to services using local domain names in Viet Nam.

- **IPv4 average response time: 13.9ms**
- **IPv6 average response time: 12.3ms**

UPGRADED AND EXPANDED “.VN” DNS

“.vn” DNS has been expanded to 08 clusters of 100 servers in Viet Nam and around the world, ensuring fast, stable, and secure “.vn” DNS services for users globally.

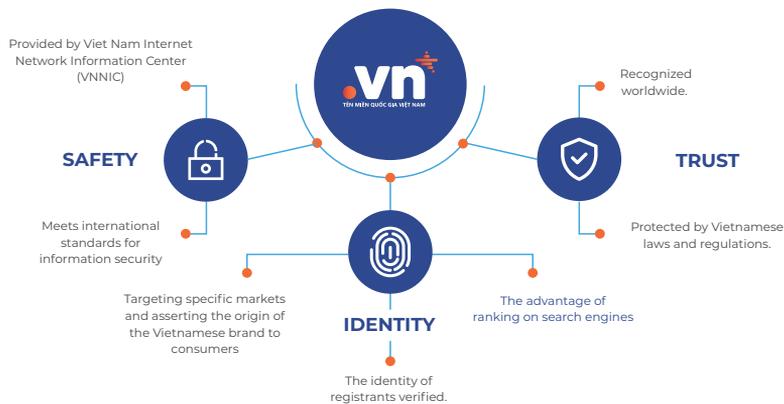


Diagram 3: Allocation of national DNS servers

DEPLOYING EMERGING TECHNOLOGIES AND INTERNATIONAL SECURITY STANDARDS

- The national DNS system adheres to the ISO/IEC 27001:2013 standard and other international security standards. The system has not encountered any significant incidents causing service disruptions over 23 consecutive years, maintaining a committed Service Level Agreement (SLA) of 99.999% (practically achieving 100%). This significantly contributes to the secure operation of Viet Nam's Internet. VNNIC is preparing for a transition to the updated ISO/IEC 27001:2022 certification in 2024.
- Implemented DNSSEC to enhance the trust and security for the national DNS and online services associated with “.vn” domain name.
- Implemented Anycast and IPv6 technology with the aim to help improve the DNS resolution process for users and ensure DNS reliability and performance.

2. “.VN” DOMAIN NAME IDENTITY - TRUST - SAFETY



2.1. ENSURING “.VN” DOMAIN NAME SERIVES SAFELY AND SECURELY



REGISTRY LOCK

The Registry Lock service helps protect “.vn” domain name from potential attacks, unauthorized changes of contact information, or any major change in DNS servers.

More than 3,000 “.vn” domain names used the Registry Lock service.



DOMAIN NAME SYSTEM SECURITY EXTENSIONS

DNSSEC is a set of specifications that extend the DNS protocol to strengthen the authentication and integrity in DNS, thereby enhance accuracy and reliability in “.vn” domain name.

Almost 10,000 “.vn” domain names signed DNSSEC.

VNNIC conducted re-signing of DNSSEC (DNSSEC Key Rollover) for the entire “.vn” domain zones in 2023 to ensure the highest level of security for “.vn” domain operations.

2.2. CONVENIENT AND SECURE REGISTRATION WITH EKYC

“.vn” domain registration process was verified through eKYC solution which enables domain registrants to provide required information and documents from their mobile devices/personal computers and integrated into payment and other add-on services. eKYC helps strengthen the registration and management of “.vn” domain name more secure and convenient.

2.3. “.VN” DOMAIN INFORMATION LOOKUP

With the aim to assist citizens, organizations, and businesses in proactively identifying and authenticating the official sources of information associated with domains and websites in Viet Nam, VNNIC provides a domain information lookup tools, through the hotline 156 or WHOIS.VN, or the website <https://tracuutenmien.gov.vn>.

Look up at: WHOIS.VN.

Syntax: TCTM <domain name or website's link>
send to hotline 156

Look up at: <https://tracuutenmien.gov.vn>

2.4 DNS ABUSE MITIGATION PROGRAM

In recent years, DNS Abuse has become a rising concern for Internet security. DNS Abuse refers to the exploitation of DNS infrastructure or the domain registration to carry out fraudulent, harmful, or illegal activities in cyberspace. Some typical forms of DNS abuse are Malware, Phishing, Botnets, Spam, Pharming, among others.

Learning from global best practices, VNNIC has launched the DNS Abuse Mitigation Program in Viet Nam with the aim to contribute to cleaning up cyberspace and safeguarding Internet users from risks of information insecurity through DNS.

THE DNS ABUSE MITIGATION PROGRAM AIMS TO ACHIEVE THE FOLLOWING TARGETS:

- Monitoring, tracking, and early warning of domains at risk.
- Preventing and mitigating DNS abuse from the domain registration stage through identity recognition and authentication solutions.
- Implementing policies, coordinating mechanisms among involved parties to report, receive, and address cases of DNS abuse.
- Deploying security standards for the DNS system (such as Anycast, DNSSEC, etc.) to strengthen the DNS capabilities to defend against attacks.
- Promoting awareness of DNS abuse and training skills in detecting and addressing DNS abuse.

3. ENSURING NETWORK REDUNDANCY AND ROUTING SECURITY

With the aim to improve domestic Internet connectivity, ensure backup connections and security for Viet Nam's Internet, the National Digital Transformation Program by 2025 with the vision towards 2030 (outlined in Decision No. 749/QĐ-TTg dated June 3, 2020, by the Prime Minister) emphasizes tasks “expanding domestic internet connectivity via direct peer-to-peer connections, connecting to Internet Exchange Points (IXPs), and to Viet Nam National Internet eXchange-VNIX. Expanding regional and global Internet connections, developing submarine optical cable routes...”



Diagram 4: The architecture model of Viet Nam's Internet connectivity

Organizations and enterprises need to register independent IP addresses and ASN allocated by VNNIC to build a secure and reliable multi-homed network (using BGP multi-home). This helps to establish direct peer-to-peer connections, distribute load, and ensure network redundancy through multiple paths, enabling connections to IXPs and VNIX.

STEP 1

REGISTER AND USE INDEPENDENT IP ADDRESSES AND ASN



- Register directly with VNNIC, independent from an ISP
- Register online at: <https://dichvucong.gov.vn>
- Proactively plan and use IP address and ASN for network systems and services. Be ready for an independent multi-homed network.
- Be proactive and flexible in connecting to other ISPs (using BGP multi-home).
- Connect to VNIX which enable connections to many ISPs, networks, the national DNS through a physical connection, reducing latency, ensuring redundancy, security, and service quality.

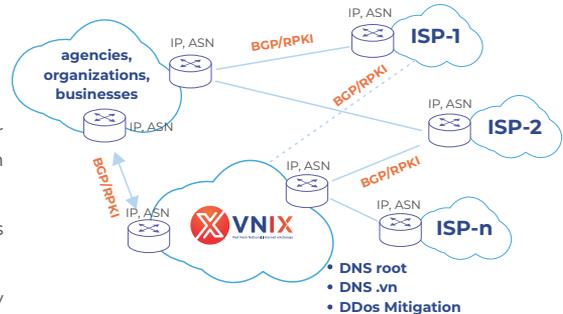


Diagram 5: A multi-homed network model (using BGP multi-home, RPKI)

II. ENHANCING THE TRUST AND SAFETY OF INTERNET RESOURCES, NATIONAL CRITICAL INTERNET INFRASTRUCTURE

Securing routing is also one of the fundamental aspects of Internet security. According to the Internet Society (ISOC) report, there was up to 14,000 routing incidents and nearly 30,000 DoS attacks occurring globally every day. Common routing security problems includes BGP

attacks (BGP Hijacking), fat finger error caused by the administrator entering wrong information, routing policy violation such as leaking routing information, configuring block routing rules, intentional malicious attacks and so on.

In an effort to promote global routing security and reduce routing incidents, ISOC developed the Mutually Agreed Norms for Routing Security (MANRS), which has garnered significant participation, commitment, and promotion from the global community. MANRS comprises four primary action recommendations:

- Filtering: preventing propagation of incorrect routing information
- Anti-Spoofing
- Coordination: facilitating global operational communication and coordination
- Global Validation: facilitating routing information on a global scale through the Internet Routing Registry (IRR)

Source: <https://manrs.org/hetops/network-operator-actions>

RPKI (Resources Public Key Infrastructure) is one of the routing security technologies widely adopted globally. RPKI helps authenticate routing information and mitigate various routing security issues, including prefix hijacking or route leaks.

STEP
2

DEPLOY RPKI FOR
ROUTING SECURITY



RPKI helps:

- Ensure Internet number resource holders are certifiably linked to those resources.
- Mitigate the risks of route hijacking, IP address spoofing and other routing related attacks.
- Ensure routing security and improve network quality.

How to deploy RPKI:

- Actively deploy RPKI in the network system.
- Collaborate with partners, peering and transit service providers to ensure routing paths.

RPKI consists of two processes ROA/RPKI and ROV/RPKI

- **Route Origin Authorization (ROA):** Organizations and enterprises create a cryptographically object to verify the authenticity of the authorization, embedding information as to which ASN is authorized to announce particular IP prefixes. Regional Internet Registries (RIRs) and National Internet Registries (NIRs) manage and issue digital certificates for resources, validating routing rights for the IP address ranges they oversee.
- **Route Origin Validation (ROV):** Organizations and enterprises deploy RPKI Route Origin Validation (ROV) to verify the authenticity and accuracy of BGP announcements, thereby ensuring routing security, and preventing IP address spoofing and other routing related attacks.

Viet Nam Internet Network Information Center (VNNIC), as the National Internet Registry (NIR), is responsible for managing national Internet resources, including domain names, IP addresses and ASNs. VNNIC oversees the allocation and distribution of Internet resources, implements technical solutions and initiates programs to promote the efficient use of Internet resources in Viet Nam.

RPKI DEPLOYMENT IN VIET NAM:



88.6%

ROA/RPKI signing rate



651 IP members

signed ROA/RPKI



06 courses, 710 officials

were trained in RPKI deployment

(*) updated to November 30th, 2023

III.

DEVELOPING NEUTRAL DIGITAL INFRASTRUCTURE, CONNECTING DIGITAL PLATFORMS



III. DEVELOPING NEUTRAL DIGITAL INFRASTRUCTURE, CONNECTING DIGITAL PLATFORMS

A customer of a non-carrier-neutral data center only has one or a few options for connectivity and colocation. As in that case, the customer can easily be a victim of lack of competition, outrageous prices, limited bandwidth, and high latency due to the transit through several third-party networks. This model is no longer efficient as it is at the mercy of the non-carrier-neutral data service providers.

In recent trends, when an organization looking to outsource your data center or seeking interconnection services, this is where the term carrier neutrality or a carrier-neutral data center comes to the forefront. A carrier neutral data center or a network-neutral data center is a data center that allows interconnection between multiple colocations, interconnection providers and other data centers, providing flexibility and diversity for clients looking forward to using interconnection hub or outsource their data center.

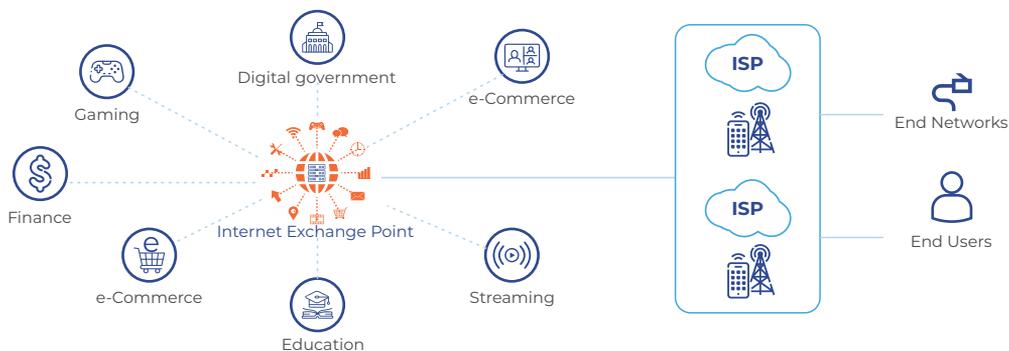


Diagram 6: Data Center connecting to IXP model

In addition to carrier-neutral data centers, Internet Exchange Points (IXPs) also play a crucial role in upgrading Internet infrastructure to new levels of connectivity and speed, providing numerous benefits for agencies, organizations, businesses, and users.

Through peering at an IXP, networks can exchange traffic with other networks, helping to reduce dependency on transit providers and allows flexible routing adjustments, overall optimizing traffic exchange.

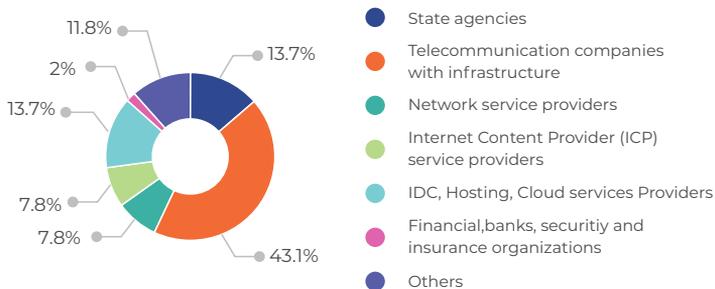
By allowing networks to interconnect directly, IXP helps improve data transfer efficiency, reduce latency, reduce costs, and enhance overall Internet performance.

With the aim to improve domestic Internet connectivity, ensure backup connections and security for Viet Nam's Internet, the National Digital Transformation Program by 2025 with the vision towards 2030 (outlined in Decision No. 749/QĐ-TTg dated June 3, 2020, by the Prime Minister) emphasizes the tasks of developing digital infrastructure: "expanding domestic internet connectivity via direct peer-to-peer connections, connecting to Internet Exchange Points (IXPs), and to Viet Nam national Internet eXchange-VNIX. Expanding regional and global Internet connections, developing submarine optical cable routes to make Viet Nam become one of the regional hubs. Transitioning the entire Viet Nam's Internet to the next-generation Internet Protocol addresses (IPv6)."

III. DEVELOPING NEUTRAL DIGITAL INFRASTRUCTURE, CONNECTING DIGITAL PLATFORMS

From 2019, all agencies, organizations, and enterprises having independent IP addresses and ASN allocated by VNNIC are allowed to connect to VNIX. This effort aims to meet the growing demand for connectivity and high-quality Internet in Viet Nam.

VNIX'S MEMBERSHIP BY SECTORS



As of November 30th, 2023, there were **54 VNIX members**. The bandwidth reached **446 Gbps**, showing a 12% increase compared to the same period in 2022.

Figure 14: VNIX members by categories (updated to November 30th, 2023)

To facilitate the connection between digital platforms, VNNIC leverages VNIX by placing Points of Presence (POPs) located at neutral IDCs (Internet Data Centers) and provides remote peering solutions. With this approach, networks can peer with VNIX through connectivity infrastructure provided by Telcos instead of deploying additional physical transmission lines.



2021

The deployment of a Point of Presence (PoP) at VNPT Tan Thuan Data Center

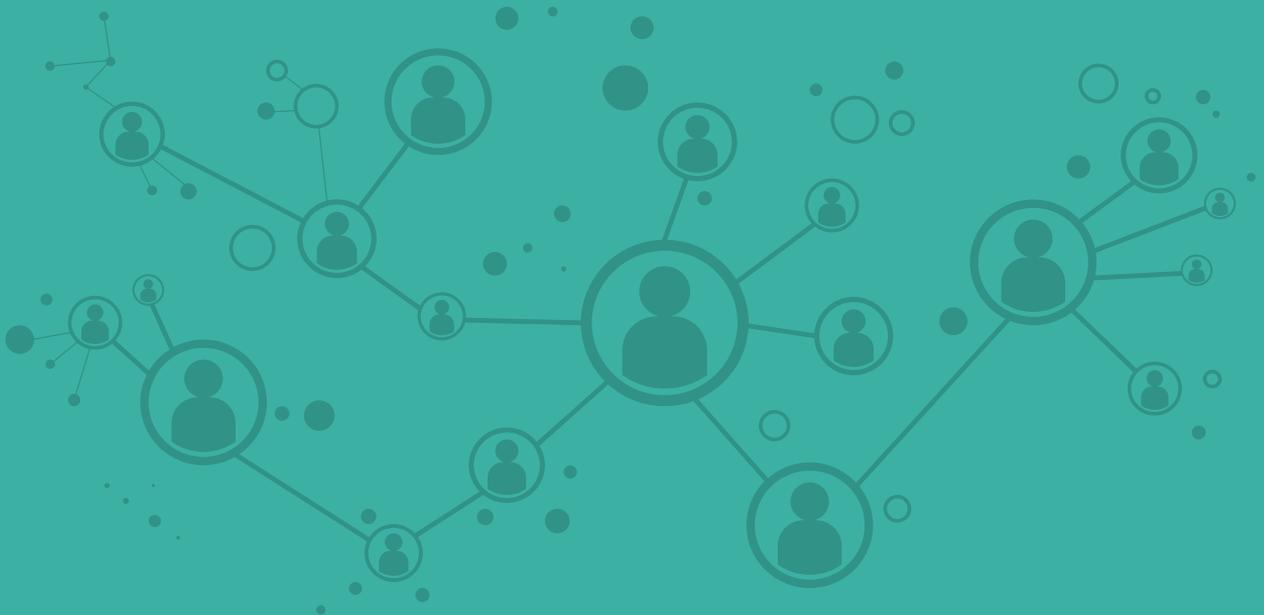
11/2023

MoU signing and the PoP launching at CMC Telecom Tan Thuan Data Center

In the upcoming development phase, VNIX will continue to perform its neutral, nonprofit role for the community. As a central hub connecting networks, it aims to innovate into a digital infrastructure connecting various digital platforms, fostering digital transformation, and contributing to positioning Viet Nam as a regional hub.

IV.

PROMOTING AND ORIENTING THE DEVELOPMENT OF INTERNET IN VIET NAM, BUILDING THE INTERNET EXPERT COMMUNITY



IV. PROMOTING AND ORIENTING THE DEVELOPMENT OF INTERNET IN VIET NAM, BUILDING THE INTERNET EXPERT COMMUNITY

With the aim of promoting and orienting the stable and secured Internet development in Viet Nam, meeting the next-generation Internet requirements, and building the Internet expert community, VNNIC organizes annual conferences, seminars, workshops and free online learning courses specializing in the Internet, Internet resources and emerging technologies.

INTERNATIONAL CONFERENCES AND WORKSHOPS SPECIALIZED IN INTERNET TECHNOLOGY



VNNIC INTERNET CONFERENCE

⇒ To initiate discussion amongst community towards the vision of an intelligent, safe, and sustainable Internet in Viet Nam.

June 28th-30th, 2023 in Ho Chi Minh city

Number of attendees: 300 people

Events:

- Workshop on "Advanced Routing Security"
- Workshop on "Youth and Internet Governance in Intelligent Era"
- The theme of main conference: "Internet in Intelligent era" The conference was supported by the local host - Ho Chi Minh Department of Information and Communications and the keynote speaker - Mr. Vinton G. Cerf, "Father of the Internet"/Co-inventor of the TCP/IP Internet protocol.



VNIX-NOG CONFERENCE

⇒ To share in-depth experience in operating, peering, and developing Viet Nam National Internet eXchange (VNIX) and critical Internet infrastructures. October 05th-06th, 2023 in Da Lat city Number of attendees: 150 people

Events:

- Workshop on IPv6 deployment: Guidelines for managing and operating IPv6 network infrastructure
- VNIX-NOG 2023 Conference: celebrating the twentieth anniversary of VNIX, with the support of local host – Lam Dong Department of Information



ICANN DNS SYMPOSIUM 2023 & DNS – OARC 41

Besides the annual conferences, VNNIC hosts international events on Internet technologies, creating opportunities for local community to participate and cooperate with the international one.

In 2023, VNNIC was appointed to be the local host of ICANN DNS Symposium 2023 and DNS-OARC 41. This is the first international event specializing in DNS held in Viet Nam.

- July 04th-07th, 2023 in Da Nang city
- Number of attendees: 200 DNS leading experts
- **Theme of conference: The Integration of DNS with Emerging Technologies**



INTERNET TRAINING AND HUMAN RESOURCE DEVELOPMENT PROGRAMS

Since 2020, VNNIC built a free learning platform called VNNIC Internet Academy (<https://academy.vnnic.vn>), providing free workshops, webinars, etc., on basic and advanced knowledge on Internet to local community.

30 Programs (workshops, webinars) | **56** Courses | **21** Articles | **2912** students in 2023, increased by 24% compared to 2022 | **13** experts participate in course preparation and teaching

April 20th, 2023 & May 09th, 2023

Training course on the next generation of Internet addresses - IPv6 for students from Universities in Da Nang city (Da Nang University of Science and Technology, Duy Tan University, Vietnam-Korea University of Information and Communication Technology, Dong A University, etc.).



June 24th, 2023

"Building online identity with ".vn" domain" program series kick-off.



June 29th, 2023

Workshop on "Advanced Routing Security" in Ho Chi Minh city with the participation of 60 Vietnamese engineers, having ISOC, NTT experts as lecturers.



August - November, 2023

Collaborated with the Viet Nam E-Commerce Association (VECOM) in the E-Unitour 2023, including 20 events at 15 universities across the country.



Cooperated with experts to enhance young generation's digital skills through instructions on how to use the WHOIS.vn domain information lookup portal and the 156 portal.



May 30th, 2023

Webinar on "Core Internet technologies and Safe use of Internet" for 120 students from ICT universities in Ha Noi, Da Nang, and Ho Chi Minh city.



Granted 02 fellowships for students in Da Nang and Ha Noi to participate in VNNIC Internet Conference 2023 in Ho Chi Minh City.



June 28th, 2023

Workshop on "Youth and Internet Governance in Intelligent Era" with the participation 40 students in Ho Chi Minh City, having APNIC experts as lecturers.



August - November, 2023

Collaborated with NextJobs and P.A Vietnam in **Personal Branding 4.0 contest - creating personal branding with the national domain name ID.VN.**



September - December, 2023

Digital business competition 2023 participated by students from more than 40 universities and colleges.



COOPERATED WITH GOVERNMENT AGENCIES IN DEVELOPING THE NEXT GENERATION INTERNET IN VIET NAM

In order to promote the development of the next generation Internet and modern network infrastructure for government agencies and localities, VNNIC cooperated with the Departments of Information and Communications to organize training programs, consult on IPv6 deployment, networking, etc. Some outstanding results in 2023:

March 28th, 2023
Finalizing Phase 1 of the IPv6 for Gov Program, implementing IPv6 deployment tasks in 2023 and 2023 - 2025 period.

May 25th-26th, 2023
IPv6 deployment technology training program and discussion for Ministries, Branches and central agencies.

June 30th, 2023
The Ministry of Information and Communications awarded the Minister's Certificate of Merit to 15 units for successfully completed the tasks in Phase 1 of the IPv6 For Gov Program (09 Departments of Information and Communications, 04 IT units of Ministries and Branches, 02 enterprises (VNPT group, Viettel group)).

July 27th-28th
IPv6 deployment technology training program and discussion for IT units of state agencies in Ha Giang province.

August 29th-30th, 2023
IPv6 deployment technology training program and discussion for Departments of Information and Communications in the Southern region of Viet Nam

August, 2023
MoU Signing of VNNIC, Department of Information and Communications, Department of Agriculture and Rural Development, Department of Industry and Trade of Lam Dong province in supporting the implementation of digital transformation for agencies, organizations, businesses, individuals in the province.

September 28th-29th, 2023
IPv6 deployment training workshop and discussions for Departments of Information and Communications in the Northern and North Central eras.

October 05th, 2023
IPv6 deployment training workshop and discussions for Departments of Information and Communications in the Central and Central Highlands eras.

November 29th, 2023
IPv6 deployment technology training program and discussion for IT units of state agencies in Hai Phong city.

V.

EFFECTIVELY PARTICIPATING IN INTERNATIONAL COOPERATION ACTIVITIES



V. EFFECTIVELY PARTICIPATING IN INTERNATIONAL COOPERATION ACTIVITIES

The global Internet ecosystem consists of various Internet community players including governments, social organizations, technical community, and Internet users, participating in the work of governance of Internet and governance on Internet. In the intelligent era, nations across the world need to keep pace with global trends, from policies and management models to the application of new technology, while ensuring

synchronization with national policies and sovereignty interest.

To strengthen international integration in the field of Internet resources, VNNIC has participated actively and effectively in international cooperation activities, gaining great support from the community in both bilateral cooperation and multilateral cooperation.

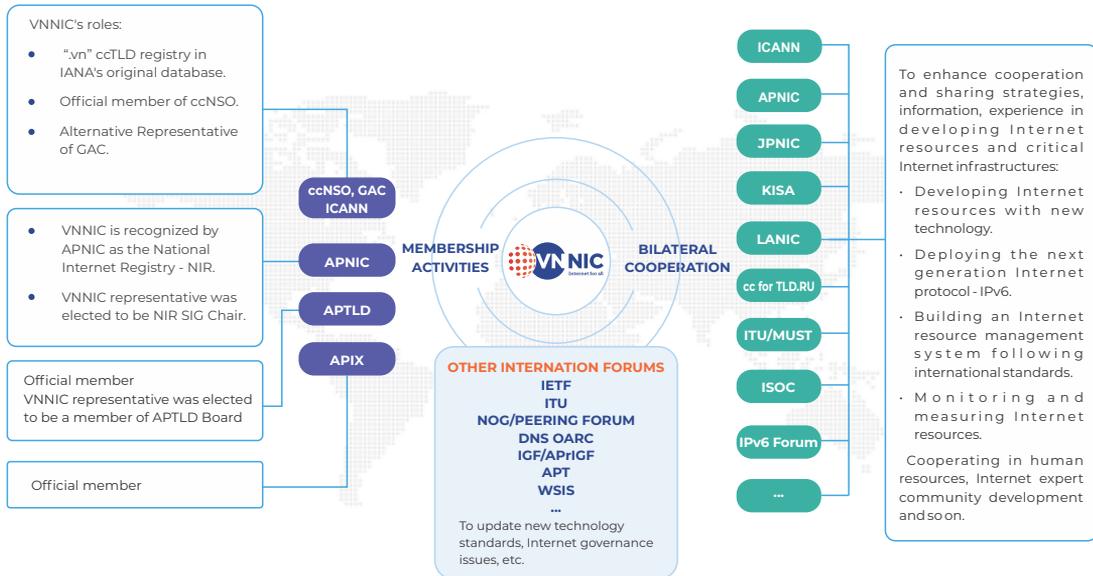


Diagram 7: VNNIC's international cooperation activities

OUTSTANDING RESULTS IN 2023

MEMBERSHIP ACTIVITIES IN INTERNATIONAL ORGANIZATIONS

VNNIC representative was successfully re-elected as NIR SIG Chair for the second term (2023-2025), completed the task of NIR SIG Chair.



VNNIC representative continued to be re-elected as APTLD Board Member for a second term, and Chair of Working Group on the Development of the APTLD Members Policy Statement (PSDWG).



VNNIC was chosen to be local host, supporting ICANN and DNS-OARC to successfully organize the ICANN DNS Symposium and DNS-OARC Conference in September 2023 in Da Nang.



BILATERAL COOPERATION

August 2023

Bilateral meeting with the Asia-Pacific Network Information Centre (APNIC) on cooperation strategies in building a new Internet resources management system, securing IP and ASN in Viet Nam.



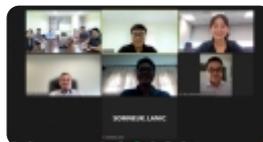
September 2023

Re-signed MoU with Korea Internet & Security Agency (KISA).



October 2023

Shared experience in deploying DNS Root with Lao National Internet Center (LANIC)



November 2023

Meeting with Internet resource management agencies in Japan, including Japan Network Information Center (JPNIC), Japan Registry Services (JPRS).



VI. VNNIC INTERNET ATLAS

PUBLIC INTERNET DATA, INTERNET RESOURCES ON VNNIC INTERNET ATLAS

The analysis and data presented in this Report are updated to November 30th, 2023, reflecting indicative statistics and the development trend of Internet resources and critical Internet infrastructure in Viet Nam in the year 2023.

Readers could access VNNIC Internet Atlas at the link <https://internetatlas.vnnic.vn> to gain further updated information and statistics related to the operation and development of Internet, Internet resources.



VII. ABOUT VIET NAM INTERNET NETWORK INFORMATION CENTER

ABOUT VIET NAM INTERNET NETWORK INFORMATION CENTER

Viet Nam Internet Network Information Center (VNNIC), in the management of Ministry of Information and Communications, carries out the functions of managing and promoting the use of Internet resources in Viet Nam; establishing, operating and managing critical Internet infrastructures in Viet Nam (national DNS, Viet Nam national Internet eXchange - VNIX).



VISION OF “INTERNET FOR ALL”

- Internet is the inclusive, secure, sustainable, and intelligent.
- The Internet is bigger, faster, safer and flatter.

MISSION

- Carrying out the role of NIC, providing essential services based on critical Internet infrastructures and Internet resources (ccTLD, NIR, DNS, Internet Exchange, WHOIS...) in line with the development trend of the next generation Internet.
- Orientating community to provide reliable information and new services using Internet resources.
- Promoting safe and sustainable Internet development.



VNNIC'S HIGHLIGHT EVENTS AND PROJECTS IN 2024

INTERNATIONAL CONFERENCES AND WORKSHOPS

June 2024

VNNIC INTERNET CONFERENCE 2024

September 2024

ASIA PACIFIC TOP LEVEL DOMAIN ASSOCIATION MEMBERS MEETING (APLTD 86)

VNNIC will support with the role of the local host

October 2024

VNIX-NOG 2024

KEY PROJECTS

- Completing regulations on the provisions on Internet resource synchronizing with the amended Telecommunications Law.
- Managing, developing, ensuring the security of DNS, VNIX SLA 99.999%, conducting transition to the updated ISO/IEC 27001:2022 certification in 2024.
- Launching VNNIC Internet data Lab; Digitally transforming the Internet resources management; DNS Abuse Mitigation Program.
- Developing VNIX, VNIX PoP by international models and standards, promoting peer-to-peer connections and domestic IPv6 traffic exchange.
- Promoting RPKI deployment in Viet Nam; monitoring the use of IPv4, IPv6, and ASN to ensure the safety and security of Viet Nam's Internet.
- Promoting i-Speed application to measure Internet speed and Internet network performance through users' experience.
- Promoting IPv6 deployment in Viet Nam; Supporting IPv6 deployment for state agencies (IPv6 For Gov Program for the period of 2021-2025); Promoting IPv6 deployment in 5G, IoT, Cloud and content services.
- Promoting ".vn" domain name associated with digital services for individuals, especially to students from the age of 18-23, agencies, organizations, enterprises, and household business.
- Researching emerging internet technologies, Internet protocols (VNNIC Internet Innovation Lab). Implementing development-oriented activities and events, building a Vietnamese Internet expert community.



MINISTRY OF INFORMATION AND COMMUNICATIONS
VIET NAM INTERNET NETWORK INFORMATION CENTER

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