Implementation Status

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Background

- IP (Internet Protocol) addresses are reqd. by devices for communicating with each other over the internet, such as sending mail, streaming video, or connecting to a website.
- **An IP address identifies a network or device on the internet.**
- There are two types of IP addresses: IPv4 and IPv6.
  - IPv4 addresses contain a series of four numbers, ranging from 0 to 255
  - IPv6 addresses are represented as eight groups of four hexadecimal digits, with the groups separated by colons. A typical IPv6 address might look like this: 2620:0ba2:0d01:2042:0100:8c4d:d370:72b4.

Background

- **IPv4** has a theoretical limit of **4.3 billion addresses**, which was more than enough in 1980. But as the internet grew and went global, we quickly ran out of addresses, especially in today's era of smartphones and IoT devices.

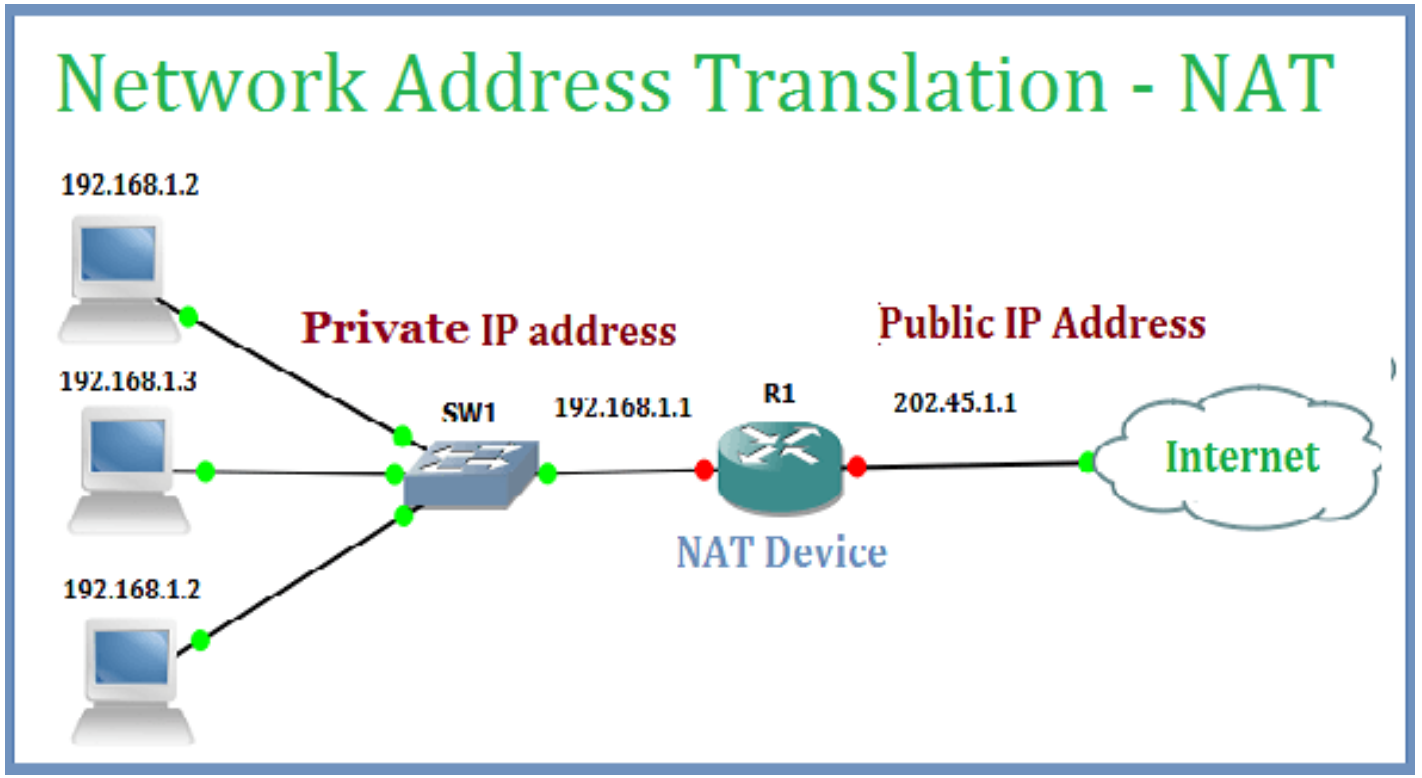
- At present, IPv4 coexists on the internet with its newer version, though eventually, everything will use IPv6. Replacing old IPv4 equipment would be very expensive and disruptive, and so IPv6 is being slowly rolled out as older IPv4 hardware gets retired.

What is IPv6?

- Internet Protocol version 6, or IPv6, was first introduced in the late 1990s as a replacement for IPv4. It uses 128-bit addresses formatted as eight groups of four hexadecimal numbers separated by colons. IPv6 uses 128-bit (2^{128}) addresses, allowing **3.4×10^{38}** unique IP addresses. This is equal to 340 trillion trillion trillion IP addresses
- IPv6 is the **solution that addresses the relatively limited number of IP addresses possible under IPv4.**
- Under IPv6, there will no longer be a shortage of the total number of possible addresses.
- In addition to increasing the supply of IP addresses, IPv6 also addresses IPv4's many shortcomings — chief among them being security.

Workaround - Network Address Translation (NATing)

- ✓ Because of limited Ipv4 addresses, NAT is used that enables hosts on private networks to communicate with hosts on the Internet
- ✓ It is run on routers that connect private networks to the public Internet
- ✓ NAT conserves IP addresses by enabling private IP networks to communicate with internet via translating the private internal network addresses into public IP address



Source: https://avinetworks.com/glossary/network-address-translation/

Disadvantages of NAT

- **Resource consumption** - Network address translation is a technology that **consumes memory resources and processor space**, because it must translate IPv4 addresses for all outgoing and incoming IPv4 packets and retain the details from translation in memory.
- **Delays -** Caused by translation resulting in **switching path delays**
- **Troubleshooting Issues -** With NATing, the **end-to-end traceability will be reduced**. Also, the IP address will be constantly changed multiple times. This in turn will make troubleshooting more difficult.

Benefits of transition to IPv6

- **Larger pool of addresses:** IPv6 provides an exponentially larger address space compared to IPv4 (3.4 × 10^38 compared to 4.3 billion addresses).
- **Enhanced security due to Built-in Security feature of IPSec protocol**
  - In IPv6, IP security (IPsec) is part of the protocol suite. It is mandatory.
  - IPsec provides secure communication, authentication, and data integrity, helping to protect IPv6 traffic by default.
  - IPsec was also adapted for IPv4. However, support for IPsec in IPv4 is optional, on the other hand, **IPSec in IPv6 provides end-to-end security**, i.e. data is secured from the originating workstation/host (through the various routers, etc. of the Internet) to the destination workstation/host.
  - In IPv4, IPsec typically provides security between border routers of separate networks.

Benefits of transition to IPv6

- **Quality of Service (QoS) Support:** IPv6 includes support for QoS functionality, allowing for better prioritization and mgmt. of n/w traffic ensuring critical applications and services receive necessary bandwidth and n/w resources, leading to **improved perf. and user exp. due to faster routing and switching**.
- **Simplified Network Configuration:** IPv6 reduces the complexity of network configuration and administration. With features like neighbor discovery, devices can dynamically learn about other devices on the network without relying on external services. This simplifies network setup and mtce. tasks.
- **Improved addressing and Auto configuration:** IPv6 simplifies address allocation and management incorporating features like stateless autoconfiguration, which enables devices to configure their IPv6 addresses automatically without the **need for manual configuration or DHCP servers**.
- **Improved streaming** for several applications such as VoIP, interactive gaming, e-commerce, videos etc.

Benefits of transition to IPv6

- **IoT and Device Connectivity:** Developing innovative applications which are not easily possible in the current IPv4 protocol e.g. Smart Metering, Centralized Building Management System, Intelligent Transport Systems, Rural Emergency Health Care, Tele-education / Distance Education, Smart Grids etc. Improvement in the scalability and speed of the websites apart from supporting the M2M/IoT infrastructure.
- **Mobility and Seamless Roaming:** IPv6 incorporates features like Mobile IPv6, enabling seamless connectivity and mobility for devices as they move between different networks. This facilitates efficient handovers and roaming for mobile devices without interrupting network connections.
- **Future-Proofing:** IPv6 is the **future of internet addressing**. As the availability of IPv4 addresses diminishes, adopting IPv6 becomes increasingly necessary for the long-term sustainability of the internet.

Transition Mechanisms between IPV4 and IPV6

- **Dual Stack -** A common and core system of transition techniques between IPV4 and IPV6 network. In order to implement dual stack, **all the devices need to support both the IP versions** and extra processing power and simultaneously handle both the protocols.
- **Tunneling** – The header of the packet is changed when it moves from one protocol to another. Applicable when one IPv6 site has to be connected with another IPv6 site through an IPv4 infrastructure by creating a tunnel interface between two IPv6 networks. It provides a cost effective solution for connecting IPv6 networks. Only the gateway routers need to be upgraded to support both IPv4 and IPv6 protocols.
- **Translation** - It changes the header format from IPv4 to IPv6 format and vice versa. By using this translation, IPv6only hosts can communicate with IPv4only hosts.

Regional Internet Registries (RIRs) for allocation of IP addresses

- Total 5 RIRs in the world at present, with APNIC for ASIA Pacific region

IRINN: Indian Registry for Internet number and names

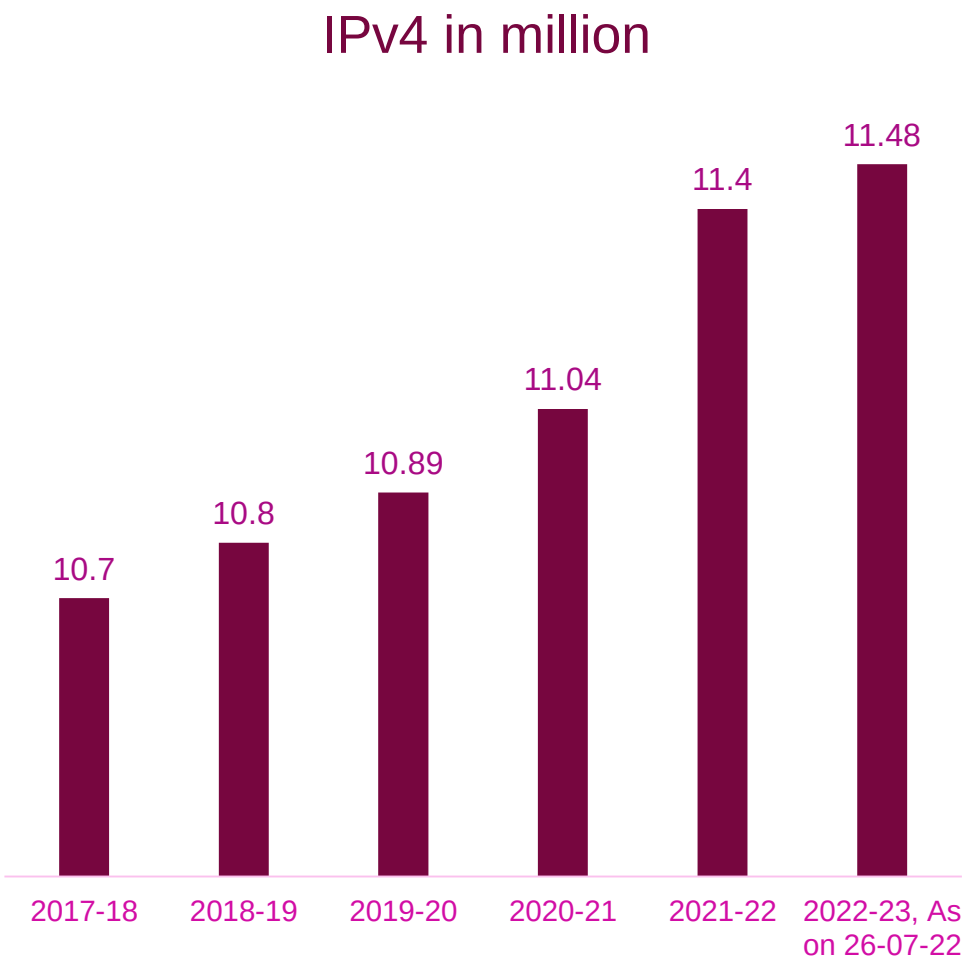
- On 3rd March, 2012 Asia Pacific Network Information Centre (APNIC) accorded recognition to NIXI as the National Internet Registry (NIR) for India.
- IRINN provides allocation and registration services of IP addresses (IPv4 & IPv6) and Autonomous System numbers to Indian Internet community.
- Since IPv4 addresses are almost exhausted, IRINN is encouraging its affiliates to make their network dual stack and move to IPv6 Technologies.
- **IPV6 adoption in India is appx 79% (As per APNIC report dated 11th June 23), which is the highest in the world. However IPV6 traffic flow is lower (67.19% as per Google). This low traffic may by due to non-conversion of existing networks from IPV4 to IPV6, non-use of dual stacking, Websites non-IPV6 compliant etc. It is required to improve in this area as we are growing in IPV6 adoption.**

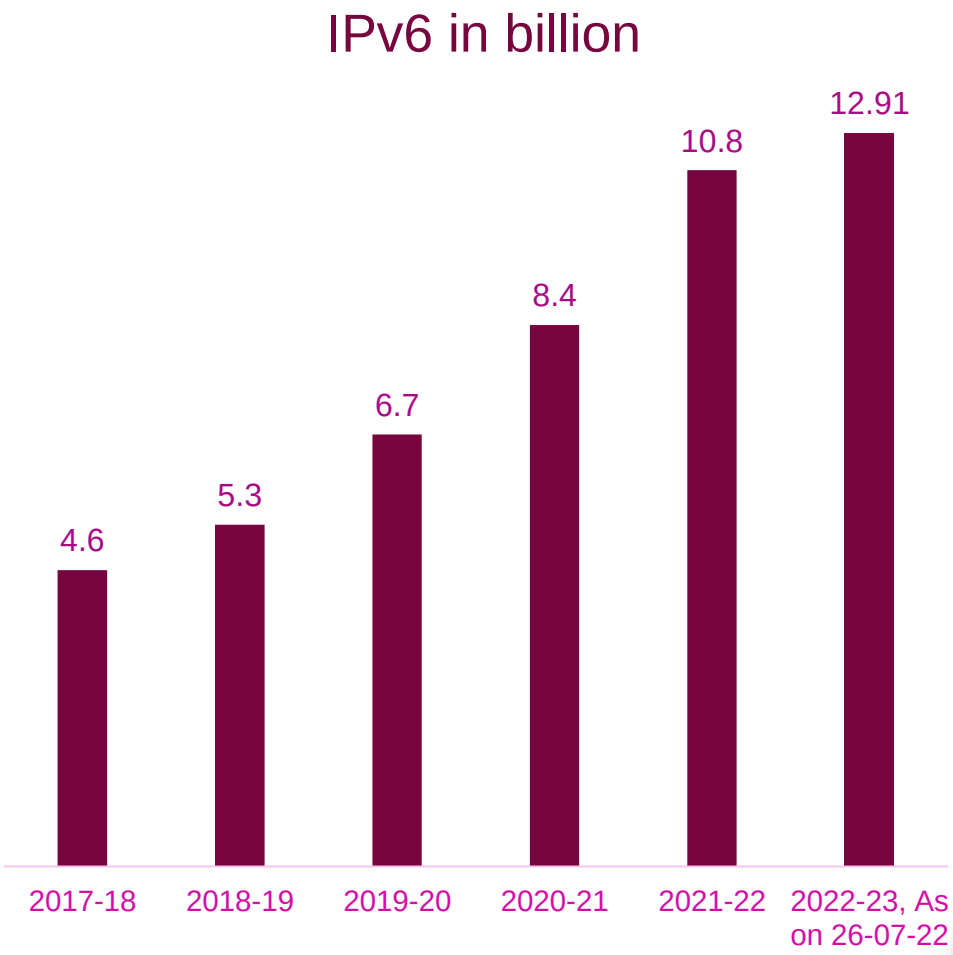
High IPV6 adoption but low IPV6 traffic?

Several factors that can contribute to this phenomenon-

- **Dual-Stack Deployment**: While IPv6 adoption may be high in terms of infrastructure readiness and support, the actual traffic flow might still be predominantly IPv4 because many services and content providers have not yet fully adopted IPv6.
- **Content Availability**: While IPv6 adoption has been increasing, the pace of content providers and internet services adopting IPv6 has been relatively slower. If the majority of popular websites, services, and content are still primarily accessible over IPv4, it can limit the volume of IPv6 traffic.
- **Network Configuration**: Some orgns. or ISPs might have deployed IPv6 but have not yet fully configured their networks to **prioritize IPv6 traffic over IPv4**.
- **NAT and Transition Technologies**: While these technologies allow devices to communicate over IPv6, the traffic may still flow through IPv4 tunnels. Consequently, it may not be counted as native IPv6 traffic.
- **Legacy Systems and Devices having limited support for IPV6**: This can hinder the full adoption of IPv6 and limit the traffic flow over IPv6.

IPv4 and IPv6 address allocation





IRINN Billing Procedure

Annual Affiliation fee is calculated based on the total address resources held by the affiliate. The annual Affiliation fee shall not be refunded during the Affiliation period of one year, even if the affiliate withdraws its Affiliation or IRINN terminates the Affiliation. Annual fee for IPv4 and IPv6 components are calculated separately, based on the total address holdings of the affiliate

IRINN Fee Structure is changed from 1 January 2021

For new IRINN account holders: A new Affiliate has to pay a one-time sign-up fee of Rs. 27,500/- plus the Annual Resource fee which is calculated based on the size of the approved IP address space. The annual Affiliation fee is then charged as the higher of these two components :

a) IPv4 Component	b) IPv6 Component
Affiliation Fee :- 27500 + tax (for 1st year only) **Resource fees for /24 :- 27500 + tax** **Resource fees for /23 :- 37125 + tax**	**Affiliation Fee :- 27500 + tax (for 1st year only)** **Resource fees for /48 :- 24199 + tax** **Resource fees for /32 :- 44103 + tax**

For Example:-

1) /23 + /48 = 37125 + tax (Fee will be charged for higher one, here price of IPv4 is > than price of IPv6)
2) /24 + /48 = 27500 + tax
3) /23 + /32 = 44103 + tax (Here price of IPv6 is greater than price of IPv4)

For 1st year, Affiliation-ship fees is also payable. Example:-

1) /23 + /48 = (37125 + 27500) + Applicable tax
2) /23 + /32 = (44103 + 27500) + Applicable tax

IPv6 Capable Rate by country (%)

Sl.	Country	IPv6 Capable	IPv6 Preferred	Samples
1	India, Southern Asia, Asia	78.92%	78.51%	14,04,21,535
2	Belgium, Western Europe, Europe	66.75%	66.35%	16,07,601
3	Malaysia, South-Eastern Asia, Asia	66.05%	64.63%	69,78,122
4	France, Western Europe, Europe	65.01%	64.66%	1,05,39,999
5	Saint Barthelemy, Caribbean, Americas	61.88%	57.46%	181
6	Germany, Western Europe, Europe	61.79%	61.17%	77,28,511
7	Uruguay, South America, Americas	59.40%	59.25%	10,98,392
8	Saudi Arabia, Western Asia, Asia	58.82%	58.01%	63,40,425
9	Greece, Southern Europe, Europe	57.74%	57.49%	25,26,420
10	Israel, Western Asia, Asia	57.52%	53.83%	20,41,275
11	Vietnam, South-Eastern Asia, Asia	57.33%	56.09%	1,02,98,502
12	United States of America, Northern America, Americas	55.36%	53.45%	3,70,91,405
13	Sri Lanka, Southern Asia, Asia	54.00%	53.17%	11,61,408
14	Montserrat, Caribbean, Americas	53.96%	51.31%	2,865
15	Taiwan, Eastern Asia, Asia	52.56%	49.06%	56,50,942

Source – APNIC Labs 11th June 23

IPv6 Capable Rate by country (%)

Sl.	Country	IPv6 Capable	IPv6 Preferred	Samples
16	Aland Islands, Northern Europe, Europe	52.45%	52.29%	5,165
17	United Arab Emirates, Western Asia, Asia	52.25%	50.31%	30,99,935
18	Japan, Eastern Asia, Asia	51.49%	49.26%	1,39,60,116
19	Mexico, Central America, Americas	50.90%	49.47%	1,53,84,766
20	Hungary, Eastern Europe, Europe	49.41%	49.09%	18,60,400
21	Finland, Northern Europe, Europe	48.79%	48.26%	7,42,674
22	Thailand, South-Eastern Asia, Asia	48.00%	47.46%	59,51,763
23	Luxembourg, Western Europe, Europe	47.96%	47.53%	1,33,914
24	Brazil, South America, Americas	45.92%	45.54%	3,86,38,371
25	Netherlands, Western Europe, Europe	44.73%	44.42%	32,12,581
26	United Kingdom of Great Britain and Northern Ireland, Northern Europe, Europe	44.44%	44.07%	1,40,92,895
27	Portugal, Southern Europe, Europe	43.86%	43.30%	18,74,596
28	Switzerland, Western Europe, Europe	42.19%	41.86%	7,34,869
29	Puerto Rico, Caribbean, Americas	41.43%	38.96%	4,98,301
30	Norway, Northern Europe, Europe	40.06%	37.68%	10,73,238

Source – APNIC Labs 11th June 23

IPv6 Capable Rate by country (%)

Sl.	Country	IPv6 Capable	IPv6 Preferred	Samples
31	Australia, Australia and New Zealand, Oceania	38.86%	37.53%	36,30,908
32	Canada, Northern America, Americas	37.69%	36.13%	79,94,905
33	Nepal, Southern Asia, Asia	37.45%	37.26%	17,47,969
34	Estonia, Northern Europe, Europe	36.29%	36.12%	1,85,754
35	Austria, Western Europe, Europe	35.00%	34.67%	8,75,839
36	Guatemala, Central America, Americas	34.60%	33.47%	11,82,434
37	Turks and Caicos Islands, Caribbean, Americas	34.05%	32.70%	18,088
38	Paraguay, South America, Americas	32.18%	31.99%	11,25,953
39	China, Eastern Asia, Asia	31.91%	29.89%	6,24,60,084
40	Macao Special Administrative Region of China, Eastern Asia, Asia	31.59%	31.29%	15,06,642
41	Saint Martin (French part), Caribbean, Americas	30.53%	29.55%	4,710
42	Romania, Eastern Europe, Europe	29.84%	29.76%	25,11,646
43	New Zealand, Australia and New Zealand, Oceania	28.70%	26.38%	8,16,187
44	Myanmar, South-Eastern Asia, Asia	27.98%	26.97%	9,69,347
45	Peru, South America, Americas	27.02%	26.78%	57,25,985

Source – APNIC Labs 11th June 23

Use of IPv6 for India

Sl.	AS Name	IPv6 Capable	IPv6 Preferred	Samples
1	RELIANCEJIO-IN Reliance Jio Infocomm Limited	97.74%	97.28%	6,57,92,142
2	BHARTI-MOBILITY-AS-AP Bharti Airtel Ltd. AS for GPRS Service	90.74%	90.39%	3,44,47,594
3	VIL-AS-AP Vodafone Idea Ltd	85.11%	84.68%	77,89,075
4	**AIRTELBROADBAND-AS-AP Bharti Airtel Ltd., Telemedia Services**	**52.29%**	**51.84%**	**55,92,227**
5	ICLNET-AS-AP Idea Cellular Limited	82.36%	81.60%	55,14,686
6	**BSNL-NIB National Internet Backbone**	**0.60%**	**0.50%**	**30,74,191**
7	**CABLELITE-AS-AP Atria Convergence Technologies Pvt. Ltd. Broadband Internet Service Provider INDIA**	**26.42%**	**26.10%**	**9,35,647**
8	**EXCITEL-AS-IN Excitel Broadband Private Limited**	**0.28%**	**0.10%**	**9,33,994**
9	**HATHWAY-NET-AP Hathway IP Over Cable Internet**	**0.33%**	**0.12%**	**7,94,943**
10	KVBPL-AS-IN Kerala Vision Broad Band Private Limited	9.44%	9.23%	7,68,698
11	**GTPL-AS-AP Gujarat Telelink Pvt Ltd**	**0.37%**	**0.11%**	**6,90,689**
12	**RAILTEL-AS-IN RailTel Corporation of India Ltd**	**0.98%**	**0.84%**	**5,71,569**
13	**ALLIANCE-GATEWAY-AS-AP Alliance Broadband Services Pvt. Ltd.**	**0.23%**	**0.12%**	**5,26,352**
14	**NETPLUS-AS Netplus Broadband Services Private Limited**	**0.44%**	**0.12%**	**4,97,752**
15	**BEAMTELE-AS-AP Atria Convergence Technologies pvt ltd**	**19.00%**	**18.68%**	**4,93,390**

Source – APNIC Labs 11th June 23

Use of IPv6 for India

Sl.	AS Name	IPv6 Capable	IPv6 Preferred	Samples
16	BEAMTELE-AS-AP Atria Convergence Technologies pvt ltd	25.19%	24.93%	4,34,279
17	ONEBROADBAND ONEOTT INTERTAINMENT LIMITED	1.83%	1.64%	3,96,433
18	ASIANET Cable ISP in India	2.87%	2.65%	3,41,350
19	APSFL-AS Andhra Pradesh State FiberNet Limited	0.15%	0.10%	2,97,102
20	TATAPLAYBROADBAND-AS-AP TATA PLAY BROADBAND PRIVATE	68.56%	68.19%	2,73,873
21	SITINETWORS-IN-AP SITI NETWORKS LIMITED	0.26%	0.10%	2,49,036
22	CTRLS-AS-IN CtrlS	0.24%	0.09%	2,37,233
23	QTLTELECOM-AS-AP Quadrant Televentures Limited	0.52%	0.13%	2,34,615
24	ANINETWORK-IN Ani Network Pvt Ltd	0.23%	0.09%	1,94,497
25	BEAMTELE-AS-AP ACTFIBERNET Pvt Ltd	20.19%	19.97%	1,93,421
26	DVOIS-IN D-Vois Broadband Pvt Ltd	1.32%	1.07%	1,83,909
27	FASTWAY-AS Fastway Transmission Private Limited	0.52%	0.12%	1,72,204
28	MCPL-IN Microscan Computers Private Limited	0.48%	0.26%	1,60,772
29	EXCELL-AS Excellmedia	0.56%	0.41%	1,51,107
30	YOU-INDIA-AP YOU Broadband & Cable India Ltd.	0.65%	0.35%	1,42,772

Source – APNIC Labs 11th June 23

Use of IPv6 for India

Sl.	AS Name	IPv6 Capable	IPv6 Preferred	Samples
31	VNPL-AS Vortex Netsol Private Limited	0.34%	0.10%	1,29,822
32	GTPLKCBPL-AS GTPL KCBPL BROADBAND PVT LTD	0.14%	0.07%	1,21,773
33	INTECHONLINE-IN Intech Online Private Limited	2.22%	1.95%	1,16,667
34	-Private Use AS-	85.06%	84.87%	1,16,350
35	WISHNET-AS-AP WISH NET PRIVATE LIMITED	0.16%	0.09%	1,15,469
36	STARNET7-AS Juweriyah Networks Private Limited	0.33%	0.11%	1,09,240
37	-Private Use AS-	79.38%	79.23%	1,07,993
38	ULTRANET-AS Ultranet services private limited	0.25%	0.10%	1,04,862
39	ZESSNPL-AS-IN Zess Networks Private Limited	0.29%	0.11%	1,00,424
40	SATNECOM-AS Satellite Netcom Private Limited	0.22%	0.09%	94,849
41	BBIL-AP BHARTI Airtel Ltd.	0.67%	0.26%	93,400
42	MEGHBELA-IN MEGHBELA BROADBAND	0.13%	0.07%	92,580
43	DWANIRINN-AS DWANIRINN	1.83%	1.60%	91,933
44	FIVE-NET-AS-IN Fivenetwork Solution India Pvt Ltd Internet	0.28%	0.08%	90,172
45	NKN-CORE-NW NKN Core Network	0.34%	0.27%	82,226

Source – APNIC Labs 11th June 23

Use of IPv6 for India

Sl.	AS Name	IPv6 Capable	IPv6 Preferred	Samples
1	AKAMAI-AS	99.90%	99.44%	7,088
2	GOOGLE-IT	99.48%	98.88%	1,340
3	FASTLY	99.17%	98.33%	120
4	CLOUDFLARENET	99.00%	97.43%	47,858
5	MAHATAA-AS-AP Mahataa Information India Private Limited	93.52%	93.16%	1,651
6	YAHOO-BANGALORE-AS-AP Yahoo Bangalore Network Monitoring	85.29%	85.29%	68
7	MICROSOFT-CORP-AS	81.47%	81.10%	545
8	NOKIA-INDIA Nokia India	72.37%	37.61%	912
9	CMCS-AS-AP COMCAST INDIA ENGINEERING CENTER I LLP	70.83%	69.79%	96
10	AIRFIBER-AS AirFiber Networks Pvt Ltd	54.20%	54.01%	20,162
11	FACEBOOK-CORP	51.50%	51.50%	266
12	YUVACOM-AS-IN Yuvaa Communications Private Limited	50.85%	50.42%	236
13	PRACNETW-AS Praction Networks Pvt Ltd	50.73%	50.50%	10,455
14	NDIMENZ-AS Ndimensionz Solutions Pvt Ltd	48.00%	48.00%	75
15	HIGHTECH1-AS-IN Hightech Broadband Services Pvt Ltd	47.11%	47.04%	2,889
16	FROZECOMM-AS-IN Froze Communications Private Limited	38.46%	38.46%	52
17	HARMANCONNECTED-AS-AP HARMAN CONNECTED SERVICES CORPORATION INDIA PRIVATE LIMITED	36.14%	4.82%	166
18	NETCLUES-AS-IN Netclues Technologies Private Limited	34.15%	0.00%	82
19	CHAMPIONS-AP Champion Infometrics Pvt Ltd	34.10%	34.10%	217
20	M247	28.42%	28.42%	183

Source – APNIC Labs 11th June 23

IPV6 Capable vs. IPV6 Preferred

- **IPv6 Capable:** When a device or network is labeled as "IPv6 capable," it means that the device or network stack is designed to handle IPv6 traffic and is equipped with the necessary software and hardware components to process IPv6 packets. However, **being IPv6 capable does not necessarily mean that IPv6 is actively used or preferred over IPv4**.

- **IPv6 Preferred:** When a device or network is set as "IPv6 preferred," it means that **IPv6 is prioritized over IPv4 when both protocols are available**. In this configuration, if a device has an IPv6 address assigned and there is IPv6 connectivity, it will prefer to use IPv6 for communication. However, if IPv6 connectivity is not available or there are limitations in IPv6 connectivity, the device will fall back to using IPv4.

IPv6 Transition : Govt. Policy Initiatives

- The National Telecom Policy 2012 aimed to achieve substantial transition to new Internet Protocol (IPv6) in the country in a phased and time bound manner by 2020.
- IPv6 transition also finds mention in the National Digital Communication Policy (NDCP) -2018 as under:

➢ ‘**Ensuring the Transition to IPv6 for all existing communications systems, equipment, networks and devices**.’

- India has two **IPv6 Ready Logo approved labs** to ensure network infrastructure is IPv6-Ready certified, which is the first significant step towards complete IPv6 transition.

Timelines set by DoT for IPV6 adoption

- **Government Organizations**: All Govt. Organizations were mandated to complete IPv6 transition and migration of their websites on IPv6 by 30th June ‘22
- All new retail wireline customer connections provided by Service Providers after 31st Dec. ‘22 to be capable of carrying IPv6 traffic either on dual stack or on native IPV6
- The Service Providers shall endeavor to progressively replace/upgrade the CPEs which are not IPv6 ready and are owned by Service Providers latest by 31st Dec. ‘22.

IPv6 Ready devices and systems

- All PCs with Windows 7 and above
- All Servers with Windows 2012 and above
- All LINUX servers
- All website servers (Apache, Tomcat, IIS etc.)
- All database servers (MSSQL, MySQL, PostgreSQL etc.)
- All LAN switches
- All routers and L3 devices procured in the last 8-10 years
- All security device procured in the last 8-10 years
- All DSL devices deployed and procured in the last 5 years

Challenges in migrating to IPv6

- **Legacy System issues**: Most of the ISPs are using legacy billing software which are non-IPv6 compliant & cannot account for IPv6 Traffic and ISPs are not willing to migrate as it involves migration cost.
- Lack of sufficient **skill set** and resources to deal with IPv6.
- Heavy **usage of NAT**ing in the current ISPs network dissuades them to migrate to IPv6.
- Challenging task for the network operators to focus on IPv6 security, to define IPv6 security rules in parallel to IPv4 policy to secure network devices, protect against undesired traffic, routers, multilayer switches, firewalls, routing protocols authentication, DHCPv6, and DNS A, AAAA record.

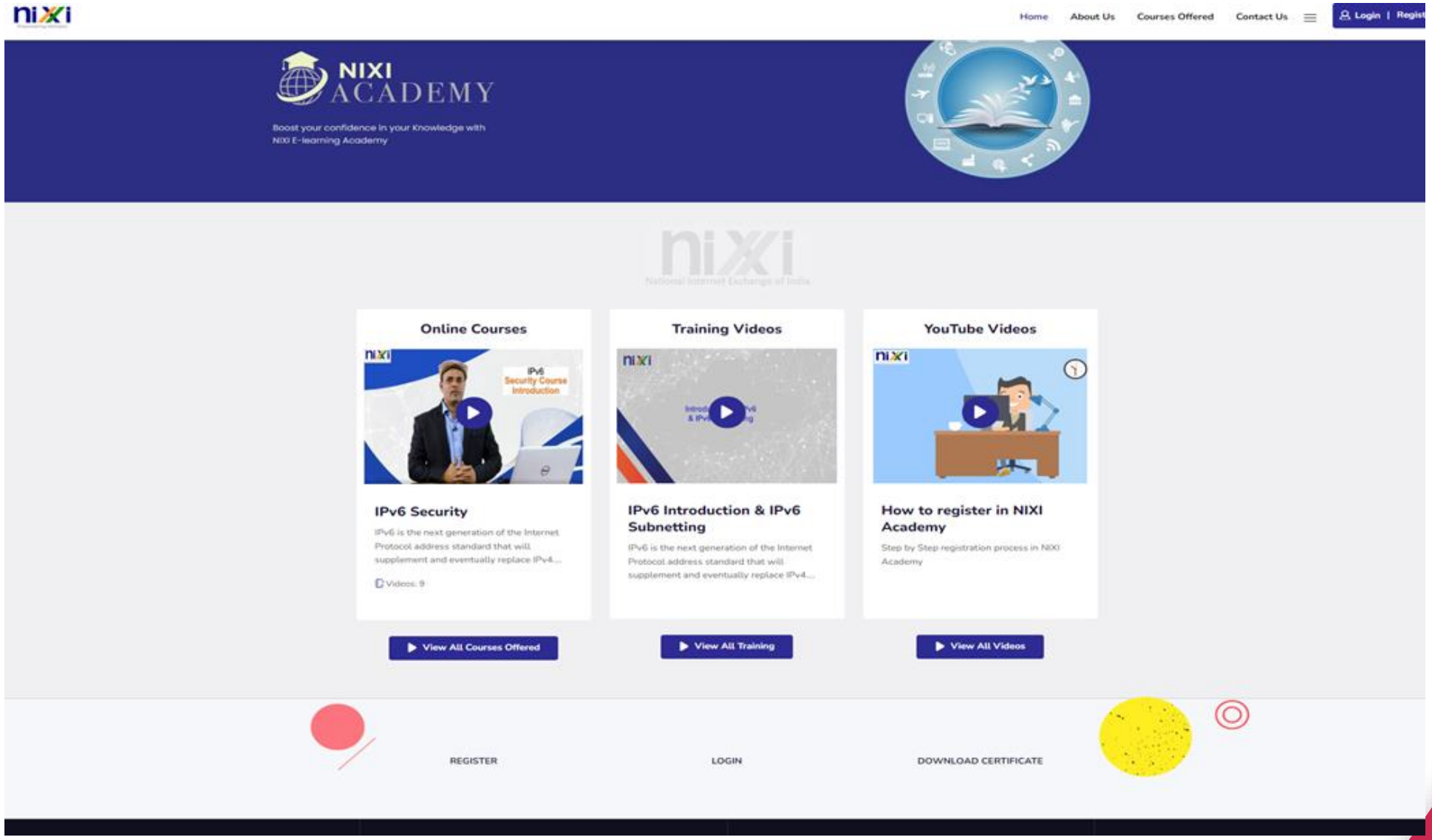
Special efforts to promote IPv6

NIXI Academy — https://training.nixi.in/

IPv6 Index — https://ipv6.nixi.in/

IP Guru — https://ipv6.nixi.in/#/IPV6/expert

NIXI Academy



IPv6 Courses

List of available Courses

- IPv6 Fundamental Design and Deployment
- Advanced Course on IPv6
- DNS Fundamental DNS Abuse and DNS Security
- IPv6 Security

Upcoming Courses

- DNS Abuse/Security

Initiatives by NIXI to promote IPv6

- IPv6 training and certification is free of cost.
- IPv6 is virtually free of cost.
- IPv6 support is free of cost for all.
- IRINN can provide ample IPv6 addresses to Government organizations and other stakeholders and help them to maintain a scalable Internet for everyone.
- IRINN is organizing monthly workshops for its Affiliates on topics such as IPv6, DNS security, Benefits of ROA/RPKI.
- NIXI recognizes the futuristic role of IPv6 and aims to achieve substantial transition to IPv6 in the country in a phased and time bound manner.

Initiatives to promote IPv6

NIXI has prepared IPV6 awareness videos-

IPv6 vs IPv4 (Hindi Version)

IPv6 vs IPv4 (English Version)

About Internet Protocol

IPV6 training module videos have been recorded with the help of experts and are freely available on social media platforms. IPV6 training videos could be accessed through https://training.nixi.in

Way Forward

- **Upgrade infrastructure:** ISPs need to invest in upgrading their network infrastructure to support IPv6. This includes upgrading routers, switches, firewalls, and other networking equipment that can handle IPv6 traffic efficiently. Making the necessary infrastructure investments is crucial to enable widespread IPv6 adoption
- **Dual-stack deployment:** Implement dual-stack configurations, where networks support both IPv4 and IPv6 simultaneously. This allows for a gradual transition, as devices and applications can use either protocol depending on their capabilities. Dual-stack deployment ensures backward compatibility with existing IPv4 infrastructure and ensures uninterrupted connectivity during the transition period.
- **IPv6 support in devices:** Device manufacturers need to be encouraged to ensure IPv6 compatibility in their products, including routers, modems, smartphones, IoT devices, and other consumer electronics. This will ensure that new devices entering the market are capable of using IPv6 by default.

Way Forward

- **Industry collaboration:** Collaborate with industry associations, standards bodies, and technology vendors to develop best practices, guidelines, and tools that facilitate IPv6 deployment. Encourage knowledge sharing, collaboration, and cooperation among stakeholders to address common challenges and promote a smooth transition.
- **Increase awareness:** Educate internet users, businesses, and decision-makers about the benefits and necessity of IPv6. Conduct outreach campaigns, seminars, workshops, and training sessions to spread awareness about the limitations of IPv4 and the advantages of IPv6.
- **IPv6 enablement programs:** ISPs can implement IPv6 enablement programs for their customers, providing them with resources, tools, and technical support to transition to IPv6. This may include guides, tutorials, and troubleshooting assistance to help users and businesses adopt IPv6 seamlessly.
- **Content availability:** Content providers, websites, and online services need to be encouraged to make their platforms available over IPv6. When popular websites and services are accessible via IPv6, it creates an incentive to adopt the new protocol.

Conclusion

- **While the transition to IPv6 presents challenges, the advantages it offers in terms of address space, security, scalability, and future-proofing makes it a critical technology for the evolving internet landscape**

- **By implementing the strategies collectively, the industry can work towards increasing the adoption of IPv6 and ensure the long-term sustainability of the internet.**

THANK YOU