IPv6: The Future of Connectivity

Discussion in NetAuto Group

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Agenda

Architecture

Understanding the 128-bit address space and header improvements

Value & Challenges

Analyzing the business case, hardships and strategic risks

Automation

Leveraging IPv6 for cleander, more scalable network automation

What is IPv6?

The Definition

IPv6 (Internet Protocol version 6) is the most recent version of the Internet Protocol (IP). It provides an identification and location system for computers on networks and routes traffic across the Internet.

Key Characteristic: **128-bit Address Space**

Hexadecimal Notation

Unlike IPv4's decimal format (e.g., 192.168.1.1), IPv6 uses hexadecimal notation, grouped into eight 16-bit blocks.

2001:0db8:85a3:0000:0000:8a2e:0370:7334

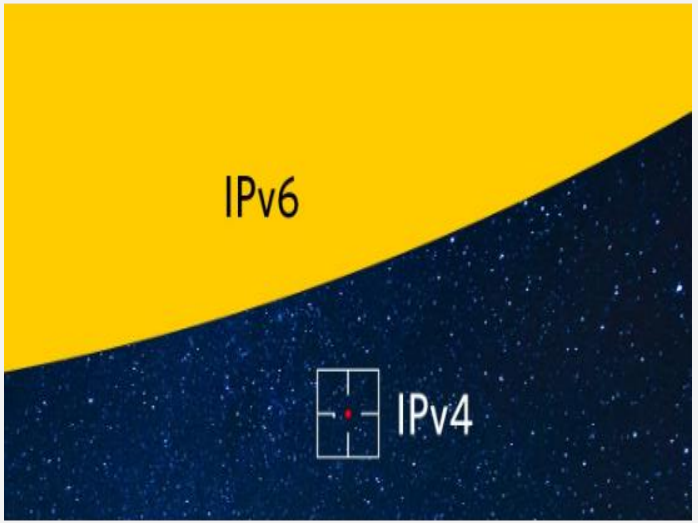
(Simplified: 2001:db8:85a3::8a2e:370:7334)

Visualizing the scale

The jump from 32-bit to 128-bit is not just 4x larger; it is exponential.

- **IPv4:** 4.3 Billion addresses. (Exhausted in 2011)
- **IPv6:** 340 Undecillion addresses.

"If the entire internet (IPv4) was the size of a golf ball, IPv6 would be the size of the sun."



Key Advantages

- **No NAT (Network Address Translation):** Restores true end-to-end connectivity. simplifies peer-to peer apps and VoIP.
- **Built-in Security:** IPsec support is mandatory in the standard, ensuring better authentication and integrity frameworks.
- **Efficiency:** Fixed header size allows routers to process packets faster, reducing latency.
- **Multicast & Anycast:** Native support allows for efficient bandwidth usage, sending a single stream to multiple recipients.

The Hardships: Reality Check

- **Compatibility:** IPv4 and IPv6 are not backwards compatible. You need "Dual Stack" or translation mechanisms (NAT64/DNS64).
- **Complexity:** Running Dual Stack means managing two firewalls, two routing tables, and two monitoring sets.
- **Human Error:** Hexadecimal addresses are hard to memorize and type, increasing the risk of misconfiguration.
- **Legacy Systems:** Old hardware or medical devices may strictly support IPv4, creating "islands" of legacy tech.

The Business Value

IoT Scalability

With 340 undecillion addresses, every sensor, lightbulb, and vehicle can have a unique public IP, enabling massive IoT deployments without complex gateways.

Global Reach

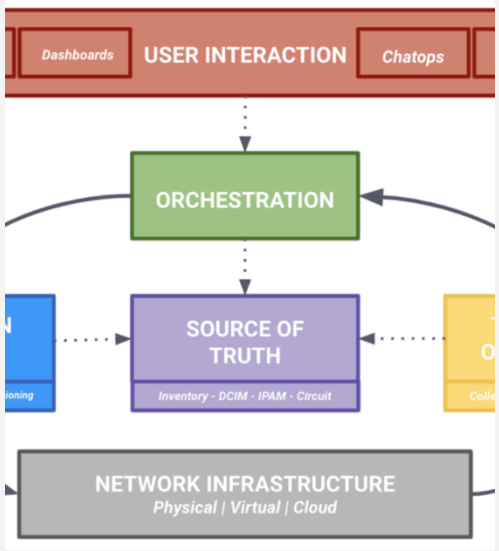
Mobile networks (5G/LTE) are increasingly IPv6-only. Ensuring your services are IPv6-native guarantees reachability to mobile-first markets (e.g., India, China).

Long-term Cost

IPv4 addresses are now a scarce commodity, costing $30-$50 per IP. IPv6 addresses are effectively free. Scaling with IPv4 is becoming financially punitive.

Value for Automation

- **Structured Addressing:** The vast address space allows for hierarchical, logical addressing plans (e.g., encoding location/service in the IP). This makes regex and automation scripts cleaner.
- **Zero-Touch Provisioning: SLAAC** allows devices to self-configure instantly upon connection. Scripts don't need to manage DHCP reservations or IP pools.
- **Simplified Logic:** Removing NAT simplifies connectivity checks. Automation no longer needs to handle split-horizon DNS or "inside vs outside" logic.



When is IPv6 "Bad"?

Strict Legacy Environments

If your environment consists of industrial controllers (SCADA) or medical equipment from 1999 that hardcode 32-bit integers, IPv6 is non-functional. Forcing a wrap-around is dangerous.

Security Maturity Gap

If your security team/tools are not trained on IPv6, enabling it opens a huge attack surface. Default-enabled IPv6 on OSs often bypasses IPv4-configured firewalls ("Shadow IPv6").

Demo

Questions

- What is you experience?
- Is ipv6 an implementation detail or something the customer asks for?
- What are the challenges?

NetAuto Meetup

Episode 5

05.02.2026

Logicalis Office NIS (here)

Every 2 months

- Start at 6 pm
- Talks at 6:30 pm
- 2-3 talks

- 04.02.2026
- 09.04.2026
- 18.06.2026

Thank you!

Registration is already open!
Give us your feedback!