Global IP Industry Trends Towards 2030
IPv6 Enhanced Drives Digital Transformation

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IPv6 Forum

IPv6 fully ready in the value chain: Device - Network - Content

Networks are the next target

Devices: 100% IPv6 support
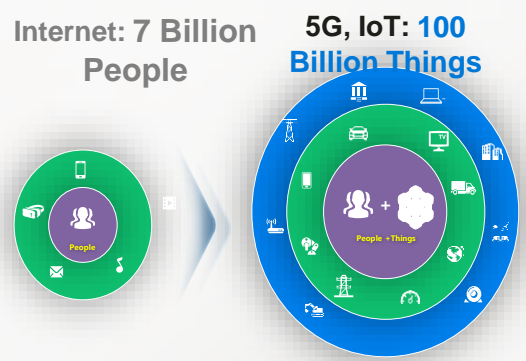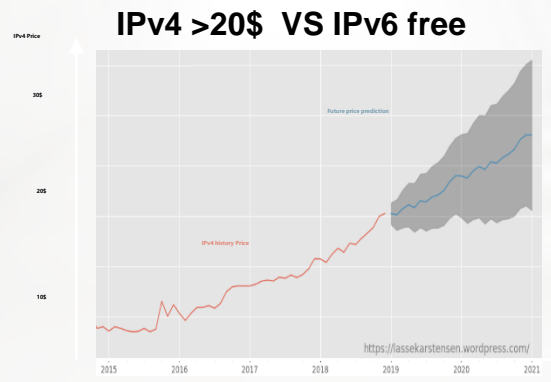5G

Networks: 25% IPv6 support
Metro — Backbone — Metro

Contents: 60% IPv6 support
Google, YouTube, facebook, WIKIPEDIA

IPv6 benefits for operators

Addresses for growth

Internet: 7 Billion People

5G, IoT: 100 Billion Things

People → People + Things

- 5G, IoT need IPv6

https://teamarin.net/2019/06/25/why-is-ipv6-faster/

Saving money

IPv4 >20$ VS IPv6 free

Future price prediction

IPv4 history Price

https://lassekarstensen.wordpress.com/

- IPv6 address Space
- No NAT cost

Low CAPEX & OPEX

IPv4/IPv6 Dual Stack

Gateway

IPv4 — IPv6

- IPv6 with upgrade: low CAPEX
- No OSS change: low OPEX

Improved experience

Dual Stack / NAT64

RTT Diff (V6-V4)(ms) vs V6 Fail Rate (%)

- IPv6 access delay (RTT) <= IPv4

IPv6 Enhanced has an Impact on Global Economy. It can create 10 Trillion $ by 2030
https://www.rolandbe_rger.com/en/Insights/Publicationsh/Global-IPv6-and-IPv6-Development-Measurement-and-Analysis-on-Social-and.html

IPv6 Enhanced: Next 20 Years Direction to Increase Services QUALITY for Digitalization

IPv6 increases address QUANTITY

IPv6 Enhanced improves QUALITY

- Increased address space
- Reduced admin
- Auto config

- Improved programmability
- Improved SLAs
- Reduced latency
- Enhanced network operations
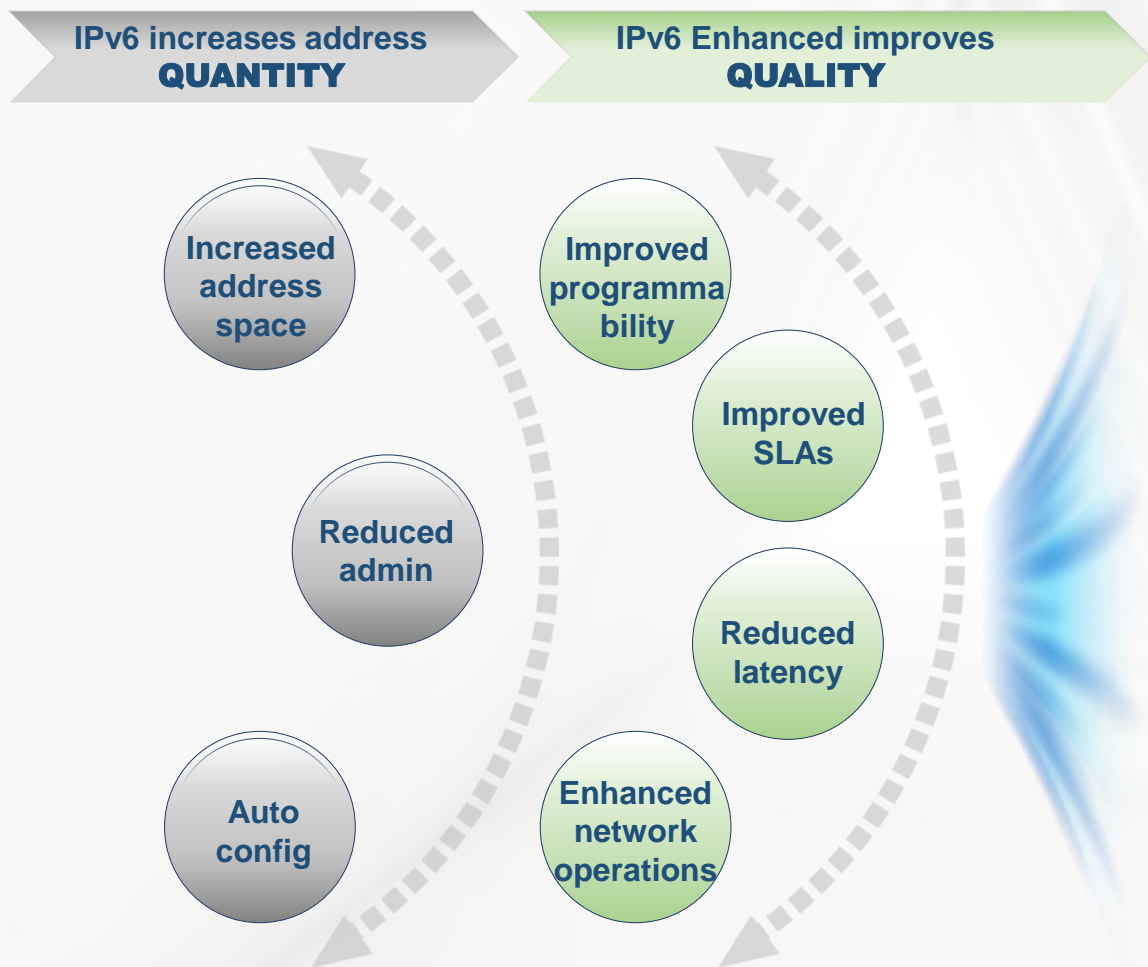
Scenario	Technical Benefits
Smart city, live streaming	Service cloudification: multi-hop to cloud → one-hop to multi-cloud
HD video, AR/VR, HPC	Metro Backbone & DCN: **100GE** → 400GE
Cloud private line, cloud service	Service provisioning: **days** → minutes Fault recovery: **days** → minutes
Smart manufacturing, storage synchronization	Jitter: **no guarantee** → 10 µs (per hop) Packet loss: **with packets loss** → 0 packet loss
Telemedicine, securities trading	Latency: **best effort** →30 µs (per hop)
Government big data, city IoT	Threat containment: **days** → minutes

IPv6 Enhanced: Innovation based on IPv6 to enhance network quality

IPv6 FORUM

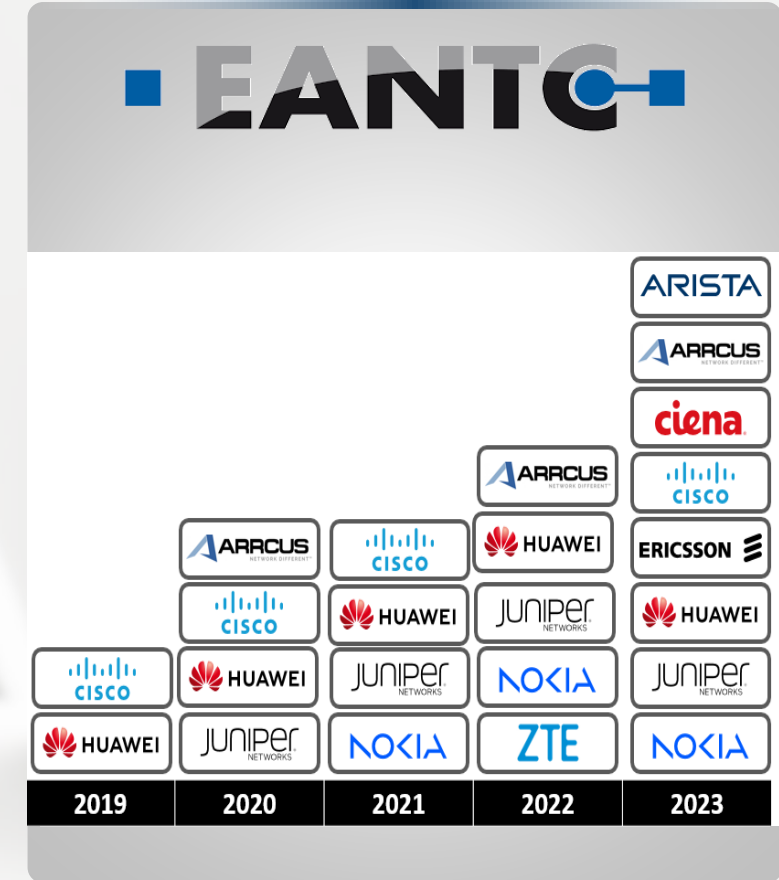# IPv6 Enhanced is already Mature and Widely Deployed

220+
Carrier Use Cases

20+
Standards/Drafts

10+
Multi-vendor interop

swisscom

orange
Spain

POST
LUXEMBOURG

Telefónica

zain

indosat
OOREDOO HUTCHISON

T · ·

stc

中国电信
CHINA TELECOM
世界触手可及

China
unicom中国联通

MTN

中国移动
China Mobile

etisalat by e&

SoftBank

RFC8402: SR Architecture	RFC8754: SRH
RFC9256: SR Policy	RFC9252: VPN

RFC9341: Alternate-Marking Method

RFC8986: SRv6 Network Programming

EANTC

	2019	2020	2021	2022	2023
					ARISTA
					ARRCUS
					ciena
			ARRCUS	CISCO
		ARRCUS	CISCO	HUAWEI	ERICSSON
	ARRCUS	CISCO	HUAWEI	JUNIPER	HUAWEI
	CISCO	HUAWEI	JUNIPER	NOKIA	JUNIPER
	HUAWEI	JUNIPER	NOKIA	ZTE	NOKIA

EANTC: European Advanced Networking Test Center

IPV6 FORUM

IPv6 Enhanced Council is an Industrial Organization Promoting Innovation

Standard Maker

Industry Development Organization

Wireless
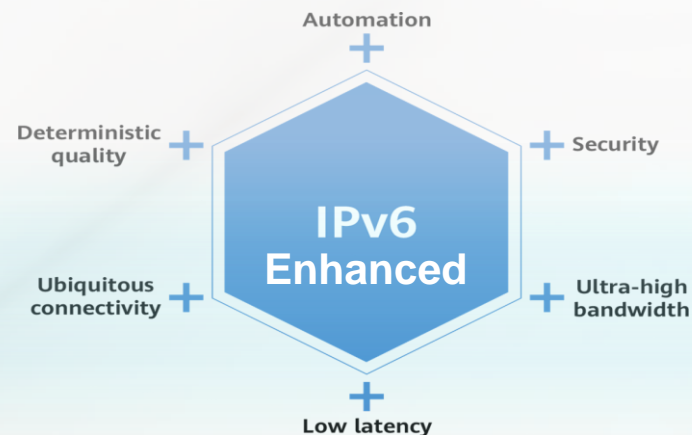
IP

Six Dimensions of IPv6 Enhanced

- Automation
- Deterministic quality
- Security
- Ubiquitous connectivity
- **IPv6 Enhanced**
- Ultra-high bandwidth
- Low latency

IPv6 Enhanced Council provides:

- **Use cases**
- **e2e Reference Architecture**
- **Deployment Practices**
- **Guidelines**
- **PoC Program**

IPv6 Enhanced Council Poster

IPV6 FORUM
IPv6-ENHANCED COUNCIL

IETF BULDING Block #N
IETF BULDING Block #M
IETF BULDING Block #F
IETF BULDING Block #Z
IETF

"Digital Transformation Framework"

"Digital Economy Framework"

IETF RFCs Applicability

Use Cases within Internet-based Digital Transformation

Deployment Frameworks of Enablers empowering Digital Transformation

Industry Consensus & Readiness (Maturity Model)

PoCs Series Program (Test & Certification)

Regional Sub-Alliances and Deployment Guide
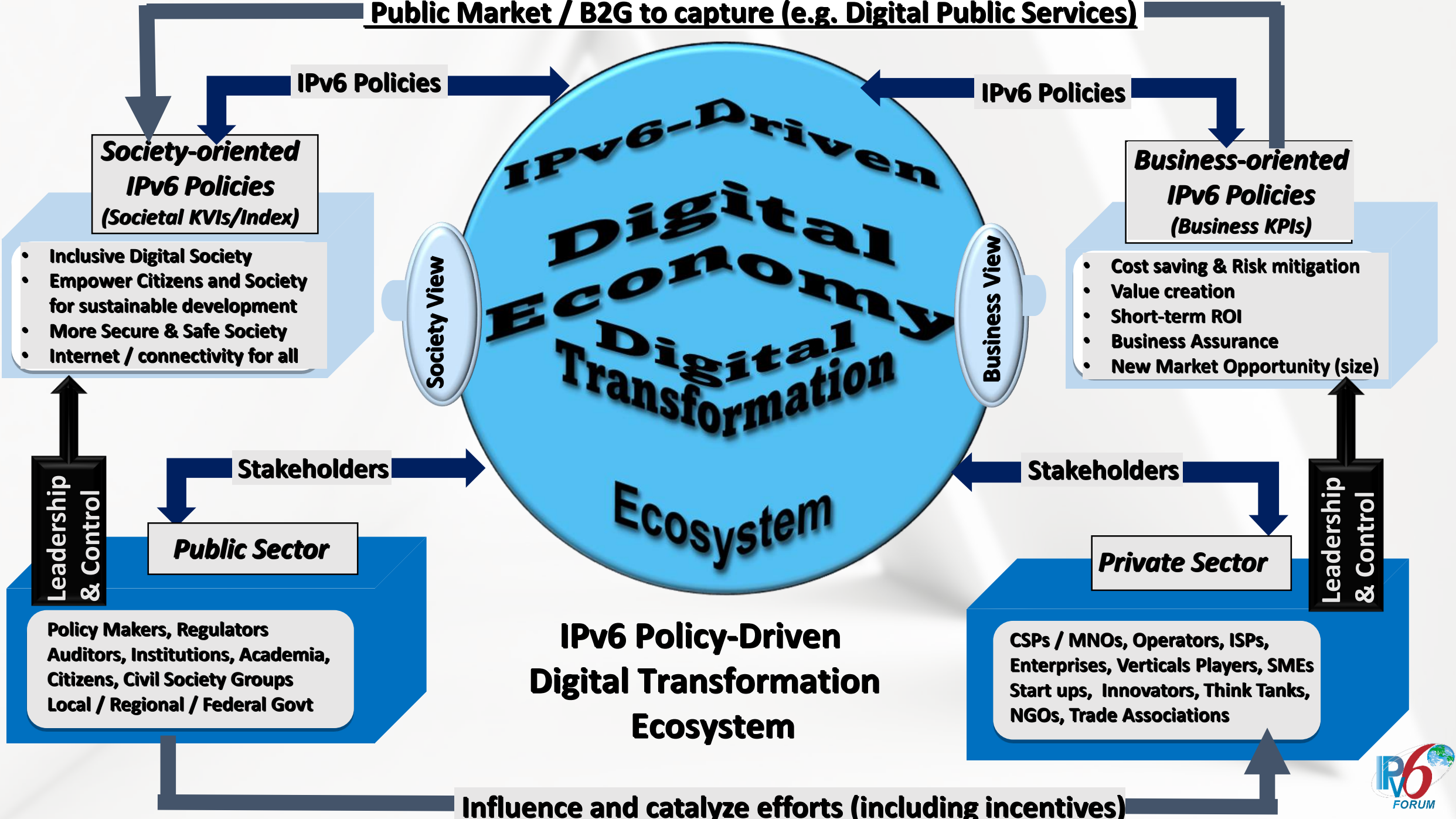EU US ASIA LATAM AFRICA ME

IETF part (central crcle)
- ❑ IETF RFCs in IPv6 / SRv6 constitute the foundation, the IPv6 Enhanced Council leverages in its Industry-oriented work

IPv6 Enhanced Council part (Blue cone)
- ❑ It expands, spreads, and promotes IETF IPv6 Building Blocks (RFCs) throughout the Industry (concentric circles) by identifying their applicability in the Industry

- ❑ **IPv6 Enhanced Council operationalizes these IETF IPv6 Building Blocks**
- ❑ It selects the appropriate Building Blocks and assembles them for various Business Scenarios / Use Cases of high interest to the Industry
- ❑ It develops « IPv6 Deployment Fameworks », « Practical Guides » and Tools

- ❑ **IPv6 Enhanced Council develops an « IPv6 Regional Deployment Framework »**
- ❑ It is an « IPv6 Regional Blueprint » for Key Regions (Europe, North America, Asia, Latin America, Africa) to support their Digital Transformation jurney
- ❑ It offers a Platform for Regional Dialog, Cooperation and Partnerships to harmonize National IPv6 Policies and coordinate Countries positions on a Regional scale

- ❑ **IPv6 Enhanced Council put in place an « IPv6 PoCs & Cerification Program »**
- ❑ It is an "Industry-Grade Proving Ground Testbed" that emulates Real-Word Carriers and Enterprises IPv6 Networks to reach "Operations-Ready" status
- ❑ It offers "Test & Certification Framework" for IPv6 / SRv6 that enables IPv6 / SRv6 solutions to be quickly accepted by the Industry than proprietary non-standards driven innovations that often face low intake.

- ❑ **Value to join IPv6 Enhanced Council**
- ❑ Be part of a Platform for debate on critical issues of IPv6 deployment
- ❑ Contribute to this IPv6 Enhanced Ecosystem to jointly overcoming shared challenges and contribute to building trust & confidence in the IPv6 / SRv6 Technology
- ❑ Influence standardization work by placing Top key requirements on IP Networks to maximize the benefit IPv6 / SRv6 Technology brings to Industry

IP6 FORUM

Public Market / B2G to capture (e.g. Digital Public Services)

IPv6-Driven Digital Economy Digital Transformation Ecosystem

Society View

Business View

IPv6 Policies

IPv6 Policies

Society-oriented IPv6 Policies
(Societal KVIs/Index)

- Inclusive Digital Society
- Empower Citizens and Society for sustainable development
- More Secure & Safe Society
- Internet / connectivity for all

Business-oriented IPv6 Policies
(Business KPIs)

- Cost saving & Risk mitigation
- Value creation
- Short-term ROI
- Business Assurance
- New Market Opportunity (size)

Leadership & Control

Leadership & Control

Stakeholders

Stakeholders

Public Sector

Private Sector

Policy Makers, Regulators Auditors, Institutions, Academia, Citizens, Civil Society Groups Local / Regional / Federal Govt

CSPs / MNOs, Operators, ISPs, Enterprises, Verticals Players, SMEs Start ups, Innovators, Think Tanks, NGOs, Trade Associations

IPv6 Policy-Driven Digital Transformation Ecosystem

Influence and catalyze efforts (including incentives)

IPv6 Enhanced Council achievements

IPv6 Enhanced Council is steadily growing

ETSI ISG IPE
(IPv6 Enhanced Innovation)

https://ipv6enhanced.ipv6forum.com/

| Carriers |
| Vendors |
| Government and enterprise |
| academic community |

100
End of 2022
→
129
Sept 2023

Region (Quantity)	Key players (including 30+ carriers and 10+ industries and governments)
Europe	Telefonica, Swisscom, Post Lux., Sky Italy, EDF (France Electric Power)
Asia	Globe, Indonesia Telkom, China Telecom, China Unicom, VNNIC
Americas	Cisco, Verizon, Totalplay, Megacable, Entel Chile
Africa + Middle East	MTN, ATM Mobilis, STC, MCINET, AFRINIC

5 plenaries, 1 white paper, many regional committees and presentations

- **6 Plenary meetings** held involving major industry players
- Work with European universities to release the **IPv6 evolution white paper** for education networks.
- **Support global industry**: more than **90 regional committees** established around the whole geography
- **Presentations** from many areas, like **AWS, Vodafone, Cisco, France IPv6 Task Force, UK IPv6 Council, Ireland TUS university, IDSA, GAIA-X**

Key Deliverables

Type	Work Items	Rapporteur
Vision	IPv6 Enhanced Innovation Analysis	Huawei
Guide	5G transport use cases	POST Lux.
	Datacenter and Cloud Integration	China Telecom
	Industrial Internet and Enterprise	CISCO
Use Case and Applications	IPv6-based DataBlockMatrix	BIIGROUP
	5G for automated mobility	Uni. of Lux.
	IPv6-based Blockchain	nChain
	SRv6 based service function chain	China Unicom
	IPv6-based Root server	SAAM C.A.
	IPv6 Only use cases and transition	Internet A.te
	CGA for IPv6 Zero Trust	nChain
	IPv6 for Universities	Uni. Shannon
	IP Transport with SRv6	MTN
PoCs Test & Certifications	IPE Proof of Concepts Framework	Globe Telecom
	IPv6 Ready Logo: IoT & 6TiSCH	IoT LAB
	Testing/Validation IPv6/SRv6 net.	IPv6 Forum

IPv6 Forum and its 90+ Local Chapters Ready to Support in Different Regions

90+ Local Chapters

Platform for IPv6 Deployment

IPv6 Enhanced Council

Started in ETSI @ 2021
Moved to IPv6 Forum @ 2023

Platform for IPv6 Innovation

130+ Players
Operators, Regulators, Vendors, Verticals Plyers, Research Institutes, Universities

Members
Participants

Future Work

New Scenarios and Requirements

(2023 - 2024)

- Network Automation
- 5G Advanced Transport
- Digital MSP Network
- Cloud & Computing
- Green
- Industrial Network

2025 vision of Internet: 10G to Home, Consumer, Campus and Business

10G To Home

Home Holographic Classroom

8K HD video

High-Fidelity hologram

100Mbps Single stream

10 Gbit/s Single stream

Network Requirements: Bandwidth: 10 Gbit/s

10G To Consumer

Mobile XR Games

Requirements: high BW, low delay

10G To Campus

Office WIFI

Factory WIFI

Requirements: high BW, high user density

Requirements: high reliability, deterministic, lossless roaming
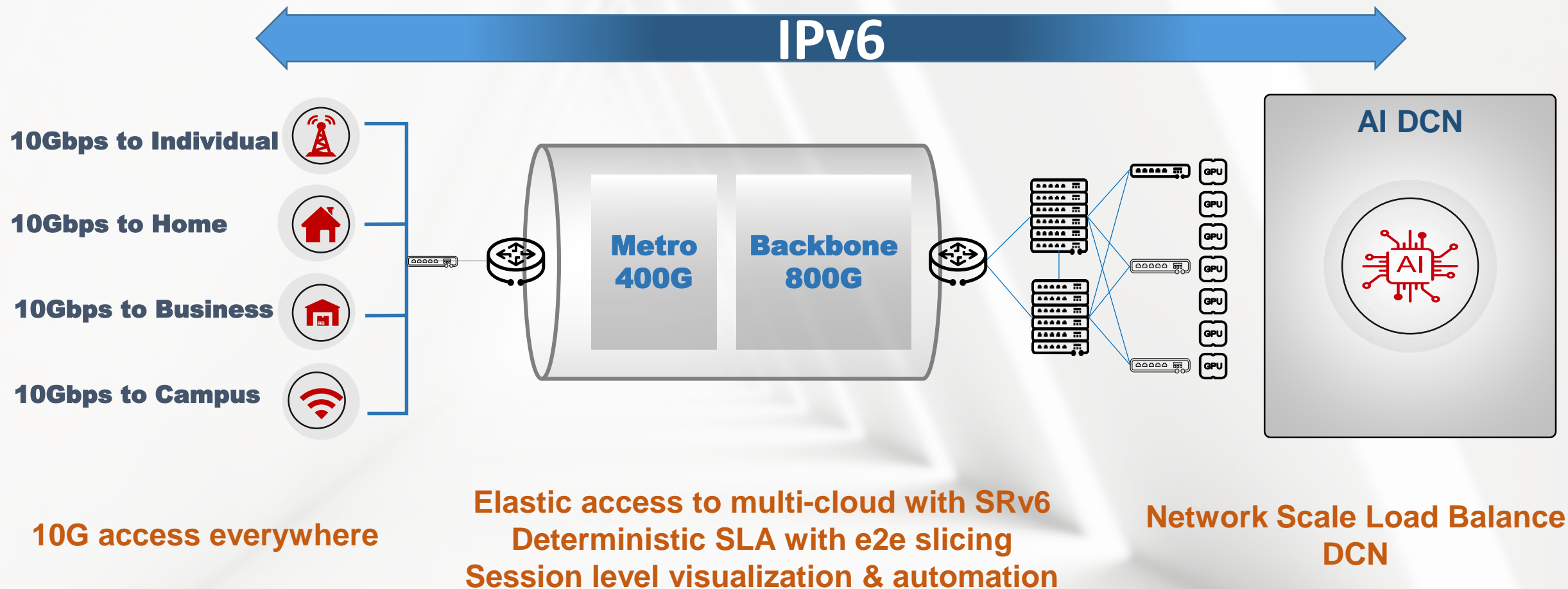
10G To Business

Requirements: Bandwidth: 1 ~ 10 Gbit/s, multi-link access, elastic capacity

AI DCN
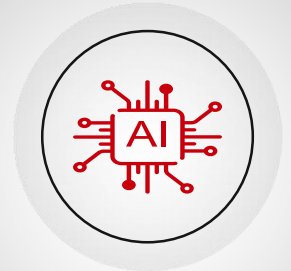
Requirements: Ultra Bandwidth, 100% Throughput, Autonomous Driving O&M

I WANT **YOU**
TO USE IPv6
— VINT CERF