The IPv6 Forum
The New Internet

IPv6-ENHANCED COUNCIL

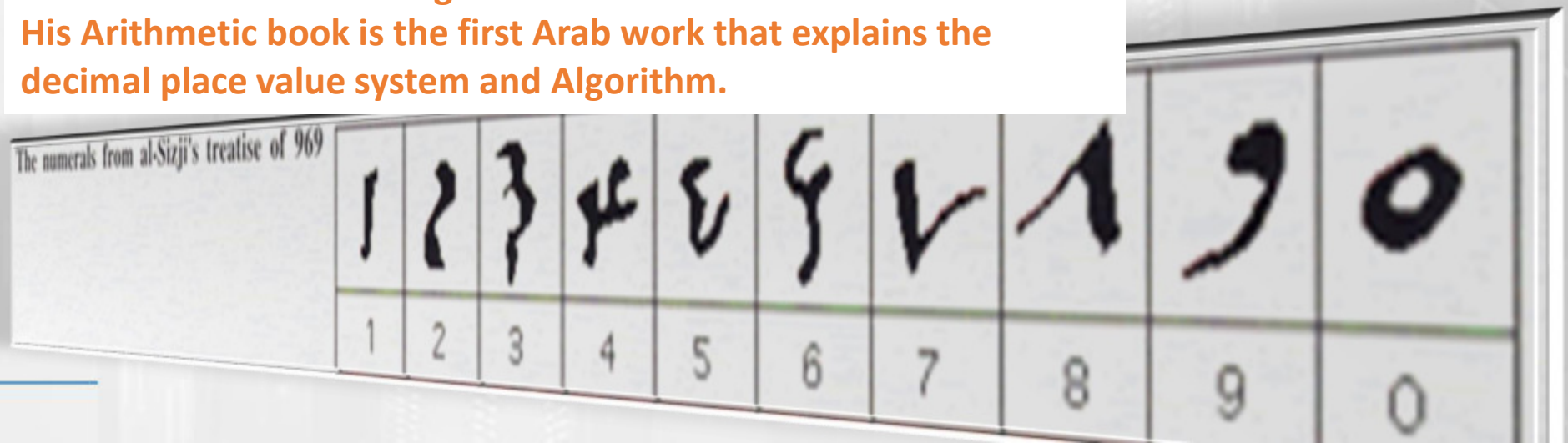
AICTO

ARAB IPv6 COUNCIL

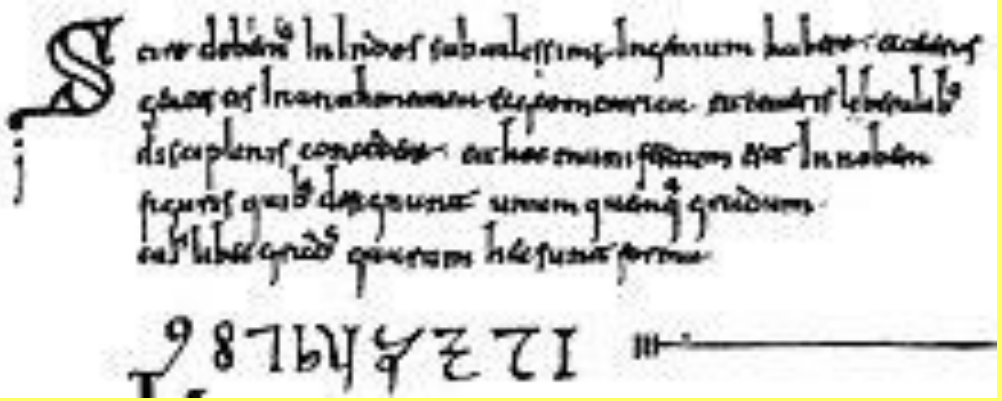
Al Khawarizmi
The Father Of Algorithm
The Pioneer of the Digital Age

Zero Is Computing
Roman Numbers Survived

Al-Khouarizmi was the first to explain the Hindu system of numerals. He created "Algebra" and "Arithmetic" around 820 AD. His Arithmetic book is the first Arab work that explains the decimal place value system and Algorithm.



Gerbert d'Aurillac (940–1003), The Future Pope, Sylvestre II



Leonardo Fibonacci (v. 1175 à Pise - v. 1250)

INTERNET GENERATIONS

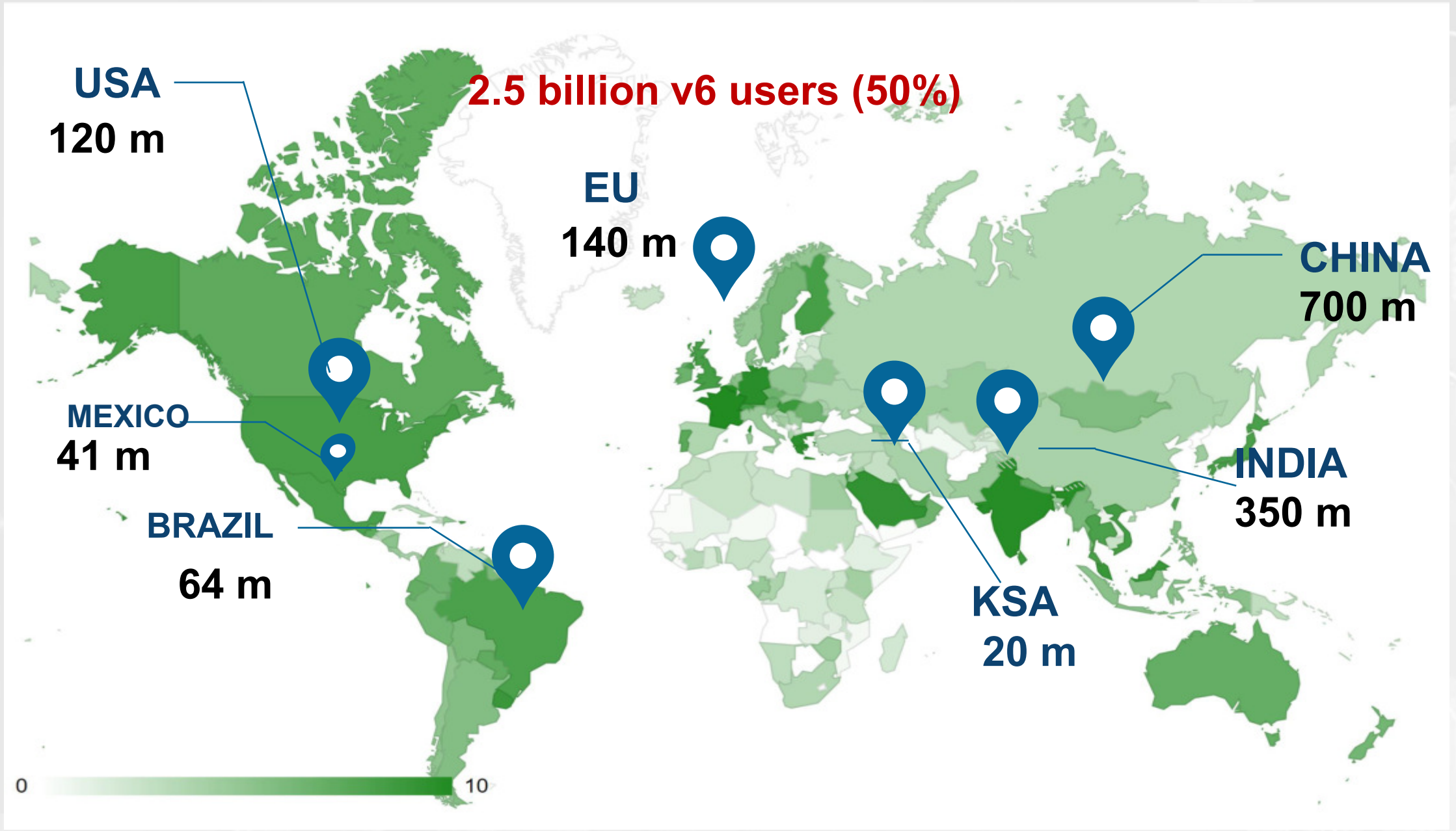
Arpanet	Internet (1981-1985)	Internet Shut Down	Internet/Intranet	New Internet
NCP			IPv4/NAT	IPv6
2^8			2^{32}	2^{128}
Pioneers		OSI (1985-1991)	Innovators NAT engineers	Everyone and everything
Email FTP			Client/Servers	End-to-end Blockchain and Gaming
				RESIDENTS
Government Internet			Public internet	Global internet

TOURISTS

Our Target: One InterNET with IPv6-only NETwork

	InterNET InterNAT	Dual-NET	New InterNET
	IPv4/NAT 2^{32}	*IPv4*/NAT/*IPv6*	*IPv6* 2^{128}
Address Space	NAT Only	NAT / IPv6	No IPv4 – No NAT
Network Control	Loose Ends	IPv4 Fallback	E2E Control
New Functions	None	IPv6	Blockchain SRv6, BIERv6...
CAPEX OPEX	Heavy	VERY Heavy	One IPv6-only Internet

IPv6 DEPLOYMENT WORLDWIDE



IPv6 adoption ranking of Top 100 Countries in terms of Internet Users (Based on to ARCEP statistics, April 2023) https://carteipv6.arcep.fr/

(Aggregation of the publicly available data from 4 sources (Google IPv6 adoption, Akamai IPv6 adoption, Facebook IPv6 adoption, Apnic)

Arab and African Countries	KSA	UAE	Kuwait	Oman	Jordan	Zimbabwe	Kenya	Egypt	South Africa
IPv6 Adoption Rate	57,90%	44,70%	20,30%	18%	13,80%	9,20%	6,90%	3,90%	3,50%
Ranking	6	16	39	42	51	58	65	70	71

IPv6 Brings User-Experience from the Economy Class to the Business Class

IPv6 Forum Chapters
IPv6 Task Forces (90)

IPv6 will be Widely Used for Next-generation Services

WEB GENERATIONS

WEB 1.0	WEB 2.0	WEB 3.0	WoT	WEB3
IPv4	IPv4 / NAT		IPv6	
HTTP	HTML	XHTML	1 Gbps +	1 Gbps +
WWW	Interactive	Semantic Web	Global Internet	Global Bockchain Internet
Tim Berners-Lee	Tim O'Reilly	W3C	Dave Raggett	



WIRELESS GENERATIONS

0G	1G	2G	3G	4G	5G
Non-IP			IPv4 / NAT	IPv6	
Analogue	Analogue	GSM	WCDMA	OFDM	MIMO/mmWAVE
Voice	Voice	Digital V	WAP	IMS	IoT
Surprise: Fax & Modem	Eavesdropping	SMS	WEB	YouTube WhatsApp	Verticals
				Public Internet	W. Internet

IoT GENERATIONS

	IoT 1	IoT 2	IoT 3
IP	Non-IP	IPv4/NAT	IPv6
Technology	RFID/KNX BackNet LoRA	One-Way Gateways	Two-Way Things-2-Things
Media	Network of Things	IoT Devices	IPv6 Sensors
	Kevin Ashton		Global IoT Internet

DATA GENERATIONS

	DATA	BIG DATA	BIG IoT DATA
IP	Non-IP	IPv4/NAT	IPv6
Technology	Telex Fax Telegraph	Hadoop Gateways	Mix GW 6LowPan-Roll
Media	-	All	Sensors Iot Devices
Volume	KB	TB Global Data	HB Global IoT Data



BLOCKCHAIN GENERATIONS

Blockchain needs IPv6 and secure routing

Blockchain 1.0

Blockchain 1.0 is the CURRENCY, the deployment of cryptocurrency in apps related to cash, and financial transactions

Blockchain 1.0 is the decentralization of money and payments

X-coin

Blockchain 2.0

Blockchain 2.0 is the CONTRACTS, the deployment of smart properties, digital assets and smart contracts

Blockchain 2.0 is the decentralization of markets

Digital Notary

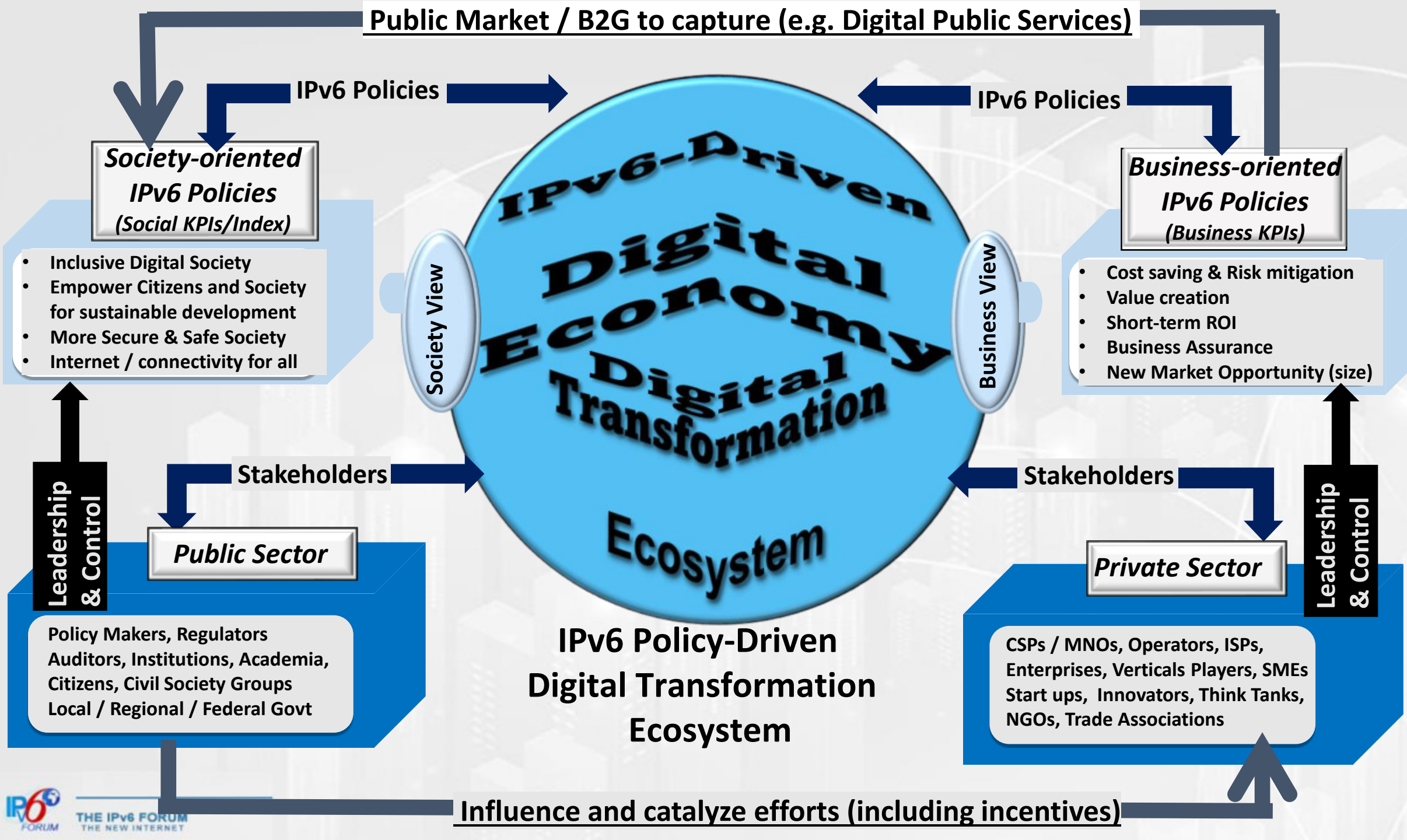
Blockchain 3.0

Blockchain 3.0 is new areas of smart cities, IoT, M2M, government, health, science, and art

Typical application : Food Supply Chain

Digital Keys

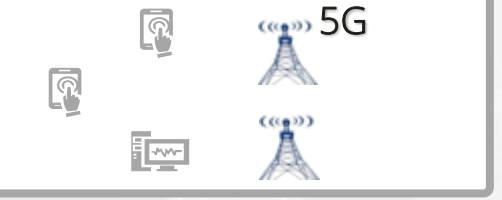
Relations	**Smart Contracts** Application Layer
Assets	**Record of Transactions** Blockchain Layer
Governance	**Consensus Rules** Blockchain Layer
Network	**P2P Network** Blockchain Layer
Infrastructure	IPv6 / ~~IPv4~~ — **TCP/IP** Internet Layer — BitTorrent, IPv6 READY


Public Market / B2G to capture (e.g. Digital Public Services)
IPv6 Policies
IPv6 Policies
Society-oriented IPv6 Policies (Social KPIs/Index)
Business-oriented IPv6 Policies (Business KPIs)
Inclusive Digital Society
Empower Citizens and Society for sustainable development
More Secure & Safe Society
Internet / connectivity for all
Cost saving & Risk mitigation
Value creation
Short-term ROI
Business Assurance
New Market Opportunity (size)
IPv6-Driven Digital Economy Digital Transformation Ecosystem
Society View
Business View
Leadership & Control
Stakeholders
Stakeholders
Public Sector
Private Sector
Leadership & Control
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)
THE IPv6 FORUM
THE NEW INTERNET

A Different IPv6 Today: "User Device–Network–Content" Value chain ready for the 1st Time

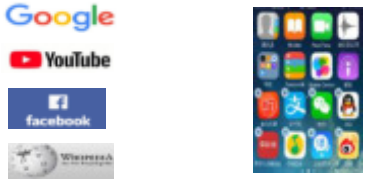
Networks are the next target

Devices: 100% IPv6 support



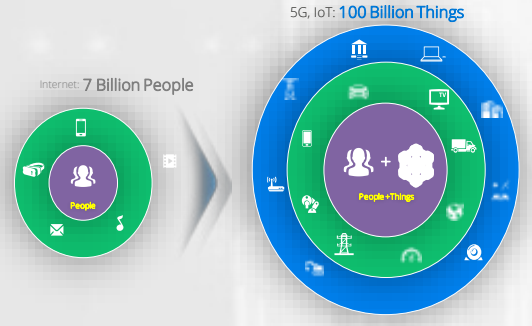
Networks: 25% IPv6 support

Contents: 60% IPv6 support



IPv6 benefits for operators

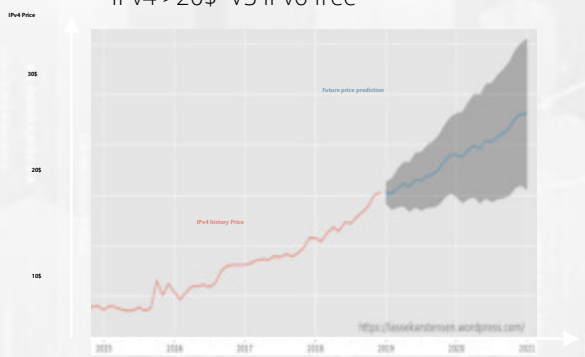
Addresses for growth



- 5G, IoT need IPv6

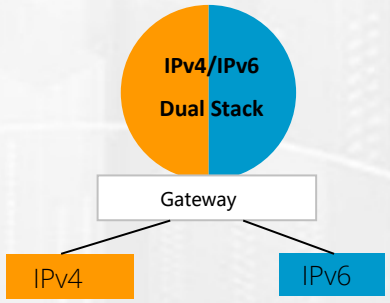
Saving money

IPv4 >20$ VS IPv6 free



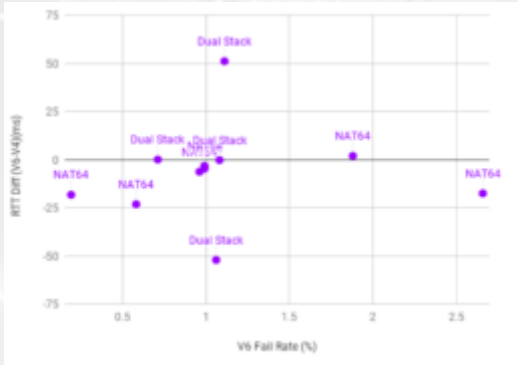
- IPv6 address Space
- No NAT cost

Low CAPEX & OPEX



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

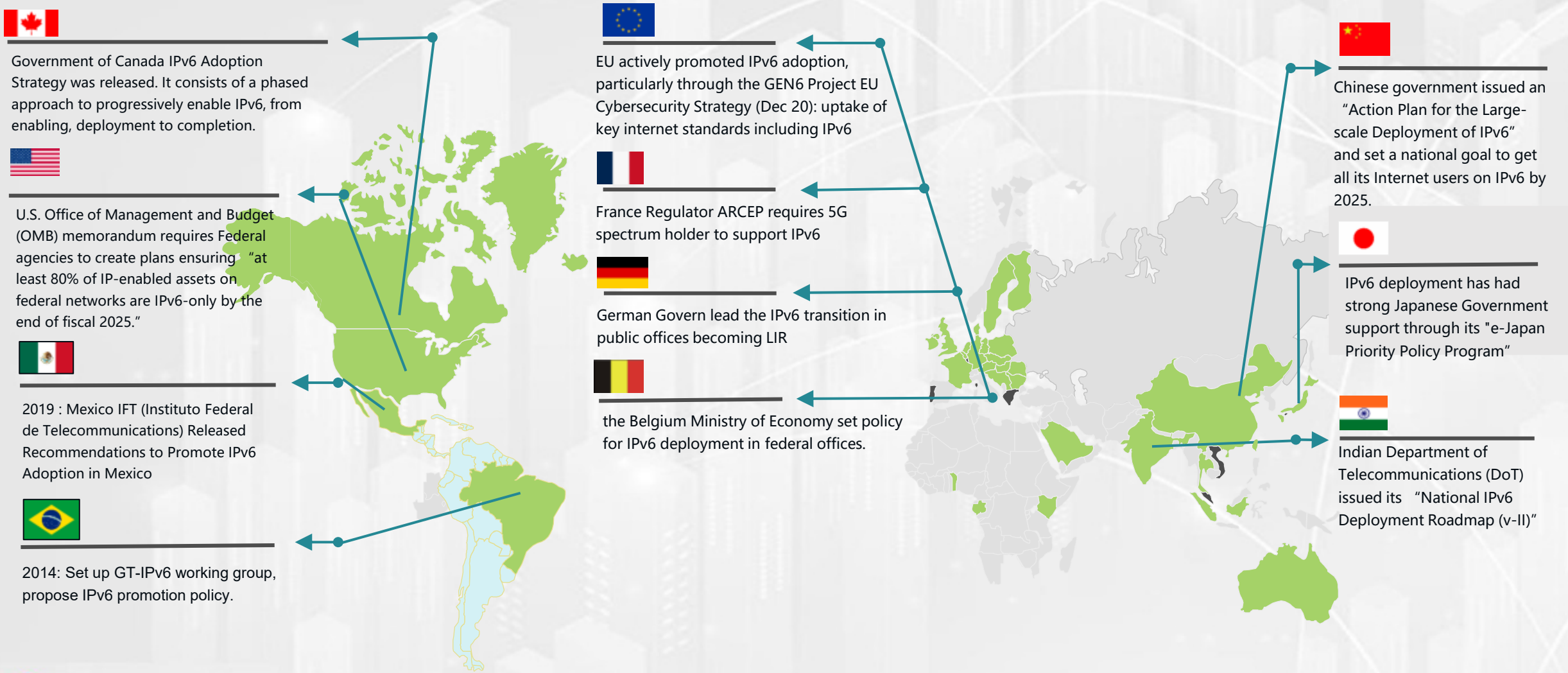
Improving experience



- IPv6 access delay (RTT) <= IPv4

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

Governments around the world are promoting IPv6



Government of Canada IPv6 Adoption Strategy was released. It consists of a phased approach to progressively enable IPv6, from enabling, deployment to completion.

U.S. Office of Management and Budget (OMB) memorandum requires Federal agencies to create plans ensuring "at least 80% of IP-enabled assets on federal networks are IPv6-only by the end of fiscal 2025."

2019 : Mexico IFT (Instituto Federal de Telecommunications) Released Recommendations to Promote IPv6 Adoption in Mexico

2014: Set up GT-IPv6 working group, propose IPv6 promotion policy.

EU actively promoted IPv6 adoption, particularly through the GEN6 Project EU Cybersecurity Strategy (Dec 20): uptake of key internet standards including IPv6

France Regulator ARCEP requires 5G spectrum holder to support IPv6

German Govern lead the IPv6 transition in public offices becoming LIR

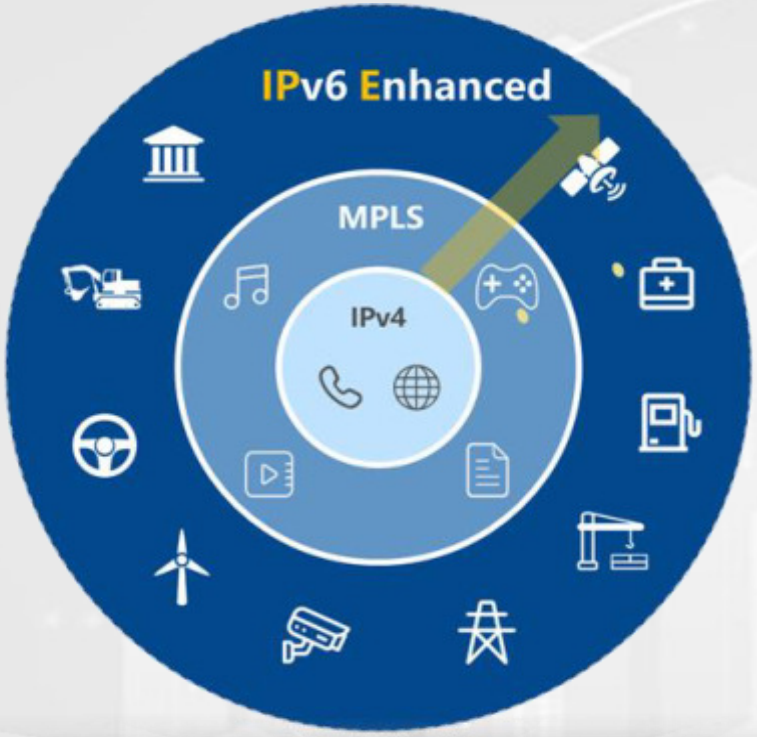
the Belgium Ministry of Economy set policy for IPv6 deployment in federal offices.

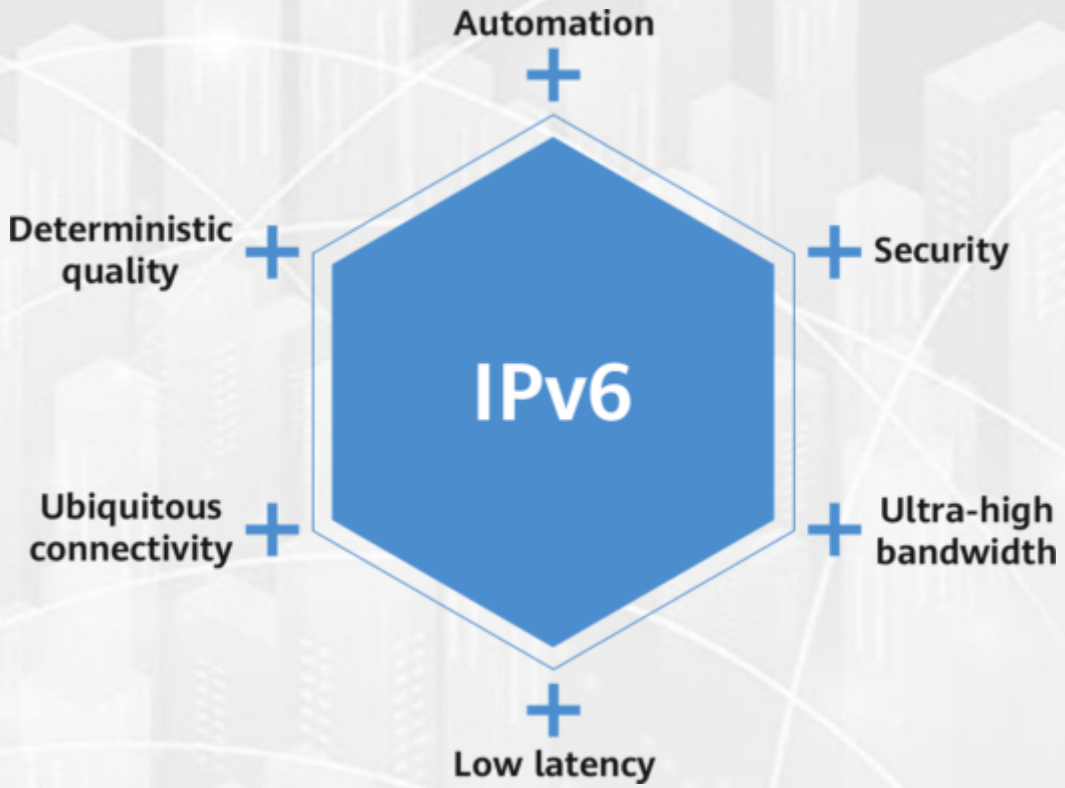
Chinese government issued an "Action Plan for the Large-scale Deployment of IPv6" and set a national goal to get all its Internet users on IPv6 by 2025.

IPv6 deployment has had strong Japanese Government support through its "e-Japan Priority Policy Program"

Indian Department of Telecommunications (DoT) issued its "National IPv6 Deployment Roadmap (v-II)"

IP Generation Evolution and IPv6 Enhanced





- Discussing the IPv6 based emerging **industry transport scenarios**, highlighting **best practices** and **practice guides** benefitting all stakeholders
- IPE plans is providing **Use cases, E2E Reference Architecture** and **Deployment Best Practices** and **Guidelines** for IPv6
- IPE is adding value to IETF, but not discussing Protocol specification

The IP Industry Cooperates to Accelerate IPv6 Enhanced Deployment

SRv6 Standardization on Basic Solutions

Service	Description	Status
Base	SRv6 Arch-Network-Programming	RFC 8986
	SRH – SRv6	RFC 8754
VPN	SRv6 VPN – BGP ext.	RFC Ed
IGP	ISIS ext. for SRv6	RFC Ed
	OSPFv3 ext. for SRv6	WG
SDN Interface	BGP-LS ext. for SRv6	RFC Ed
	BGP ext. for SRv6	WG
	PCEP ext. for SRv6	WG

Commercial Application & Interoperation

China Telecom, zain, China unicom中国联通, MTN Uganda

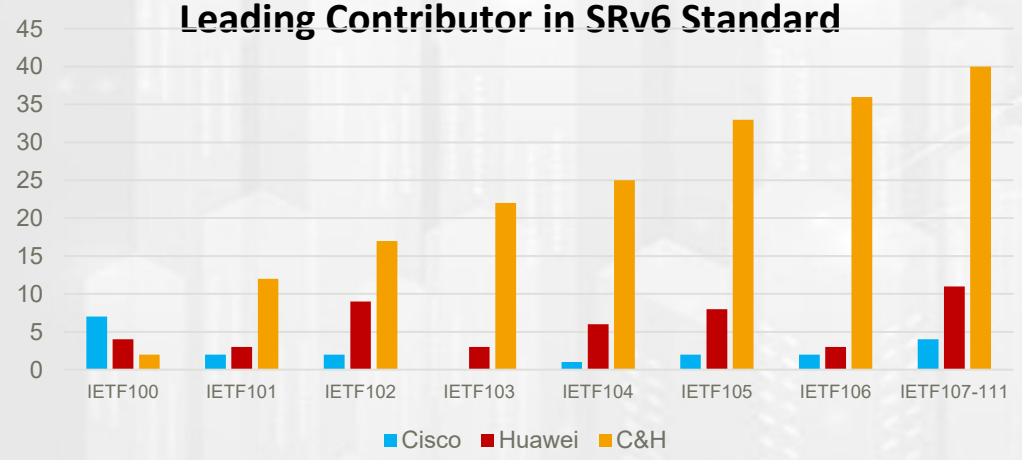
POST

HUAWEI, SPIRENT, CISCO, JUNIPER NETWORKS, ixia

Huawei SRv6 Commercial Case by 2021.6

EANTC SRv6 Interop Test in 2023.3

Leading Contributor in SRv6 Standard



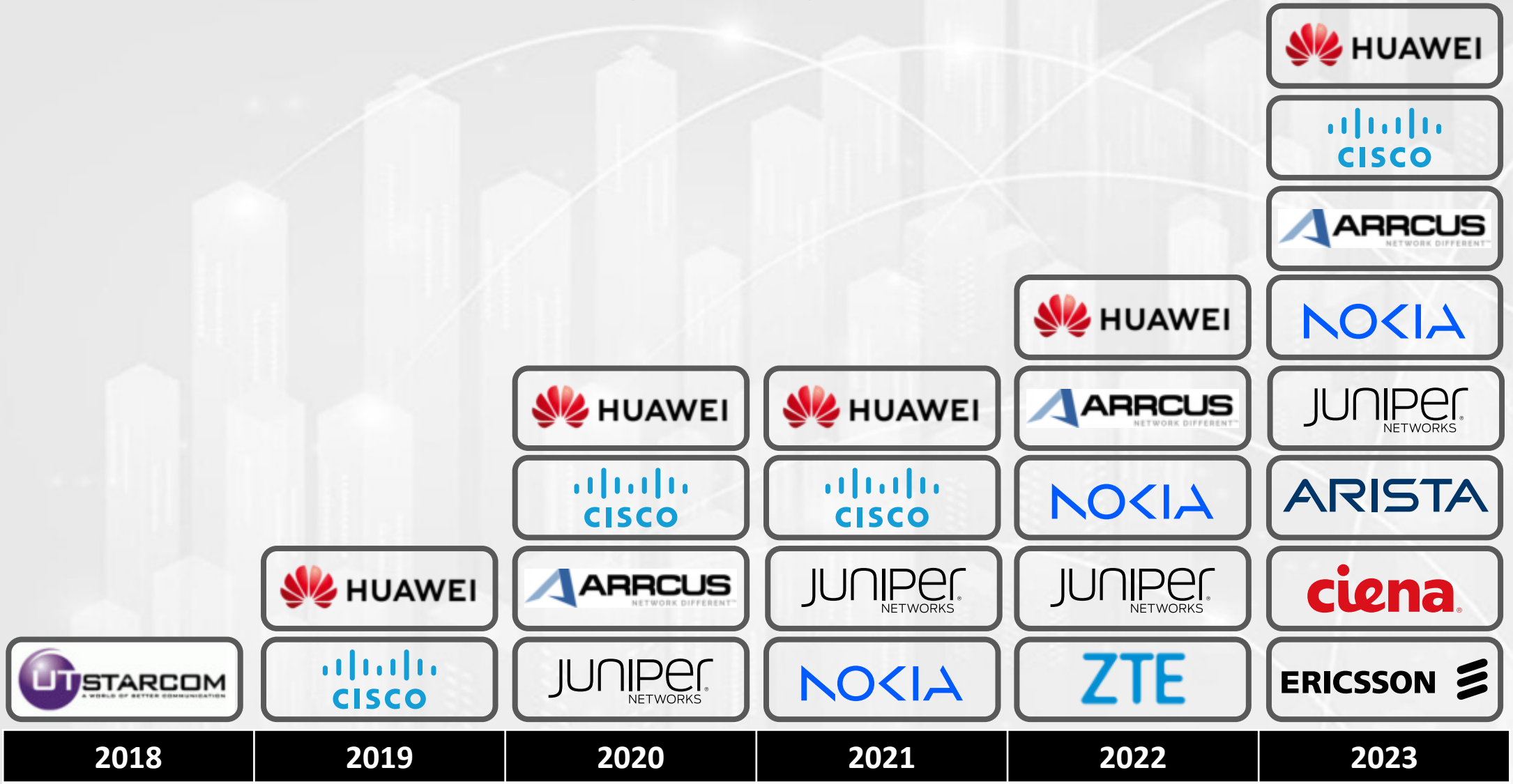
Multiple Implementations are available

Running Code

- **Linux (Feb 2017 – Kernel)**
- **Cisco (April 2017)**
  - 2 OSes (IOS XR, IOS XE)
  - 3 ASICs
- **FD.io VPP (April 2017)**
- **Bell Canada, Barefoot, P4 (May 2017)**
- **Huawei**
  - 6 Platforms with SRH implemented
- **Cisco/Huawei (March 2019)**
  - IETF 104 Hackathon "SRv6 iOAM"
- **Juniper (Prototypes)**
- **See draft-matsushima-spring-srv6-deployment-status for details**

SRv6 standard is mature and ready. Commercial deployment is on-going.

SRv6 is Mature with Support from Different Vendors: Multi-Vendor Testing History at EANTC in 2023



ETSI IPE (IPv6 Enhanced) Value and 2 Years Progress Summary

ETSI IPE (100+ players)

Region	Key Players
Europe	Telefonica, Swisscom, POST Lux., Sky, COSMOTE, Turk Telecom, EDF, CNR
Asia	Globe, China Telecom, China Unicom, Huawei, VNNIC, ZTE, CICT, Optel
Americas	Cisco, Verizon, Totalplay, Megacable, Bell Canada, Entel Chile
Africa + Middle East	MTN, ATM Mobilis, STC, MCINET, AFRINIC, KENIC

Progress: 2 Years in ETSI

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
Test Certifications	IPE Proof of Concepts Framework	Globe Telecom
	IPv6 Ready Logo: IoT & 6TiSCH	IoT LAB
	Testing/Validation IPv6/SRv6 net.	IPv6 Forum

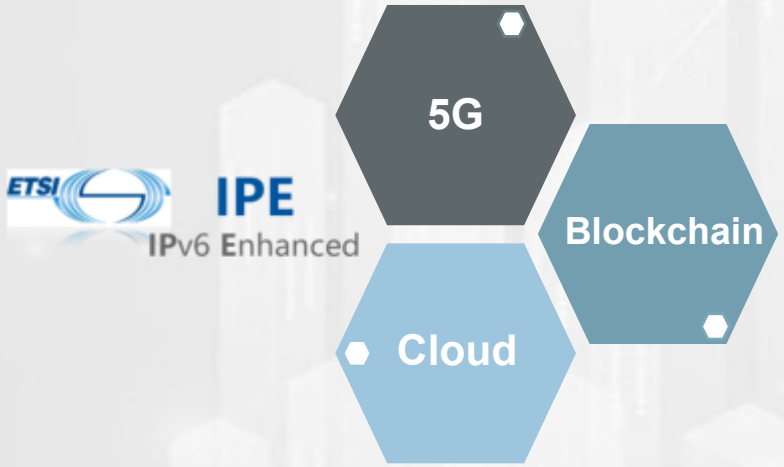
- **16** Work Items started: **8** Reports published
- **2** Annual Webinar sponsored by ETSI
- **IETF #115** side meeting (70 participants)
- **10+ major events**: presented in EU MWC and MPLS Congress. Local area events in America, Africa, Middle East and Asia

IPv6 Enhanced Continuous Innovation for Future IP Network Evolution

IPE current work

IPv6 Enhanced Gap Analysis
Scenarios and requirements

(2021 - 2022)



IPE future work

New Scenarios and Requirements
For 5.5G Era

(2023 - 2024)

After 2 years fruitful work, IPE migrates to IPv6 Forum as IPv6 Enhanced Council, to continue study new scenarios and requirements

IPv6 Enhanced Council value in Industry chain – Promote transport innovative scenarios in full alignment with all industry players across whole geographies

Hot topics & leading trends

- IPv6 Only, transition policies, IIoT, Cloud integration, 5G SA slicing, Metaverse
- Key events including MWC, IPE webinars, Smart Africa, MPLS-SDN congress
- IETF protocols utilization (e.g., SRv6)

Publications

- Gap analysis highlighting use cases and evolution dimensions
- Cloud Integration report
- IPE Whitepaper
- PoC report and plan
- Joint workshop and publication on AN with other ETSI work groups and other SDOs

Long-term strategy

- Adoption of IPv6 Enhanced Innovations within all industry sectors
- Provide guidelines and best practices
- Promote IPv6 Only as target architecture in 5G SA, Cloud, Enterprise and Industry 4.0, Metaverse
- Reduce overall TTM from need identification time

Join hands to participate in IPv6 Enhanced eco-system, improve brand influence in industry

Work Item Contributor

- Provide ideas in industry standards.
- Advertised in new publish press
- Get IPv6 Forum certification.

Certificate of appreciation for IPv6 Enhanced participation

Joint POC

- Join PoC led by IPv6 Forum, take test task.
- PoC result Announcement with industry leaders

Announcement of participation at MWC 2022

Work Item Leader

- Document Rapporteur, leading in industry reports
- IPv6 Forum Summit Speech Speaker

ETSI IPE Summit 2021

How to join?

Contact Latif Ladid, president of IPv6 Forum for with your motivation.

Email: latif@ladid.lu

Message From Dr. Vint Cerf
Honorary Chair IPv6 Forum