2nd Visions for Future Communications Summit

Technologies and Services Towards 6G

27th, 28th November 2019

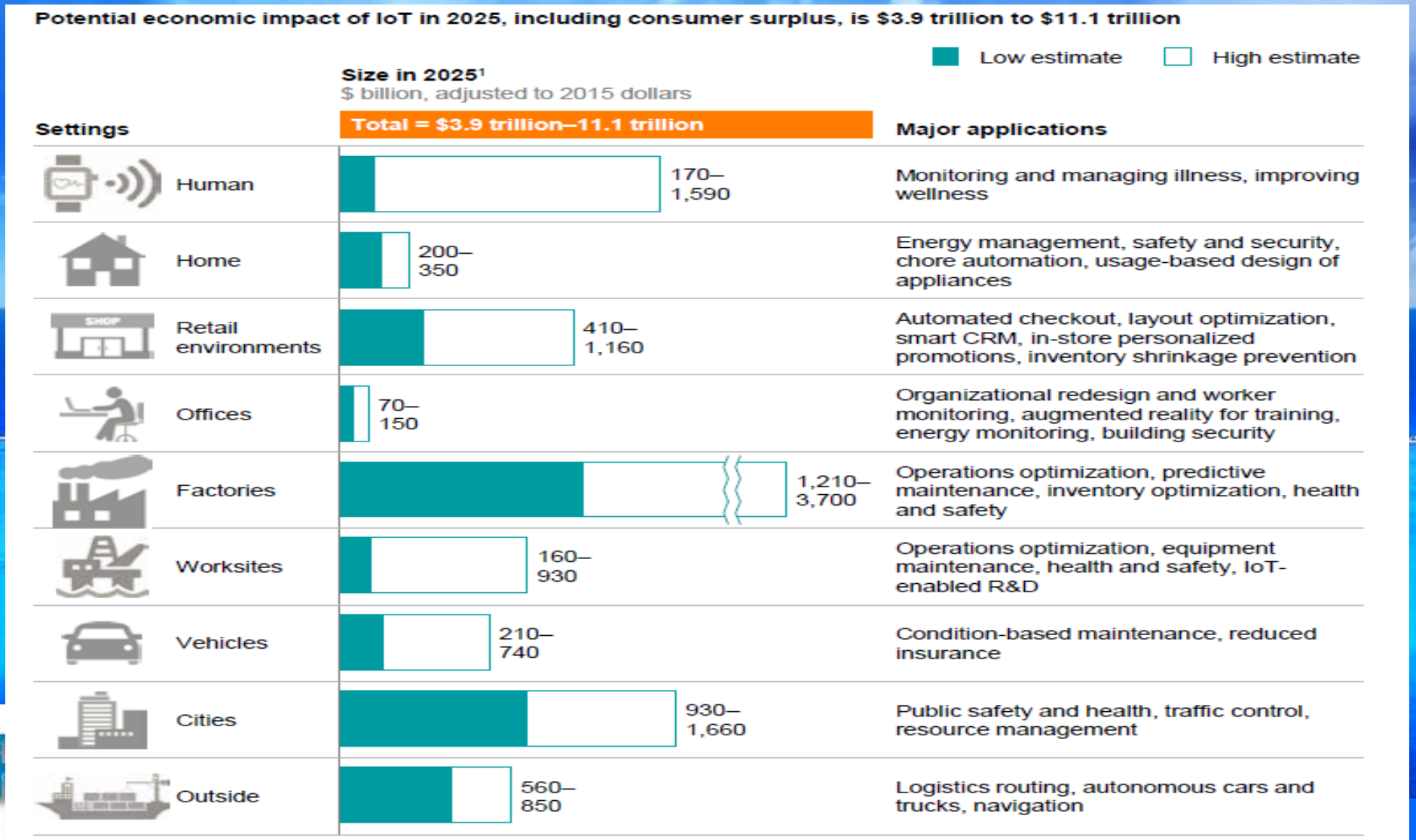
ISCTE - University Institute of Lisbon, Lisbon (Portugal)

IPv6-based

IPv6 FORUM

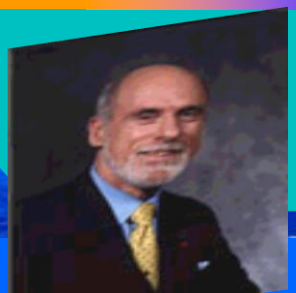
Potential Economic Impact of IoT in 2025

$3.9 – 11.1 Trillion value of IoT



Internet Generations

ArpaNET	InterNET InterNAT	New InterNET
NCP 2^8	IPv4/NAT 2^{32}	IPv6 2^{128}
Pioneers	Innovators NAT engineers	EveryOne Everything
Email, FTP	WWW- Client/Server	Wireless, Streaming Media, P2P, GRID
TOURISTS		RESIDENTS
Gov. Internet	Int	Global Internet



IETF

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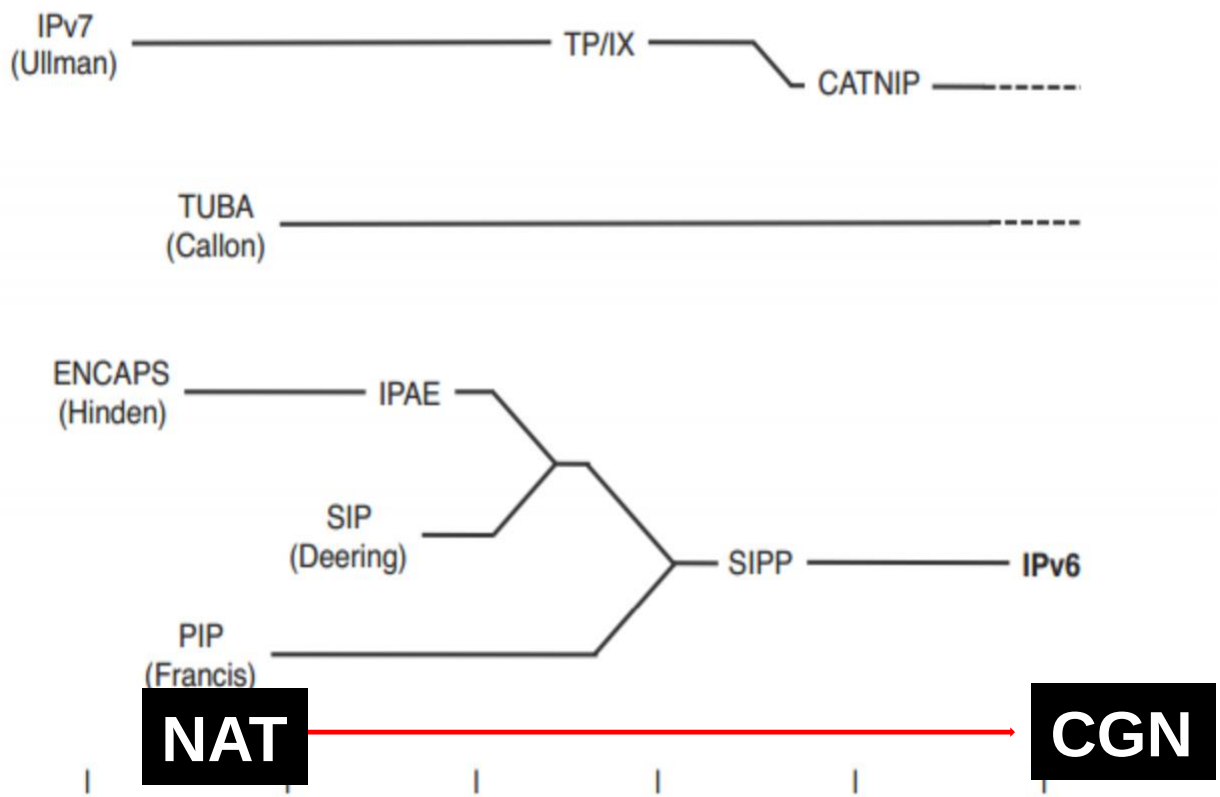
IPv6, IPv7, IPv8, IPv9 History

IPng Candidates

Check Point SOFTWARE TECHNOLOGIES LTD.

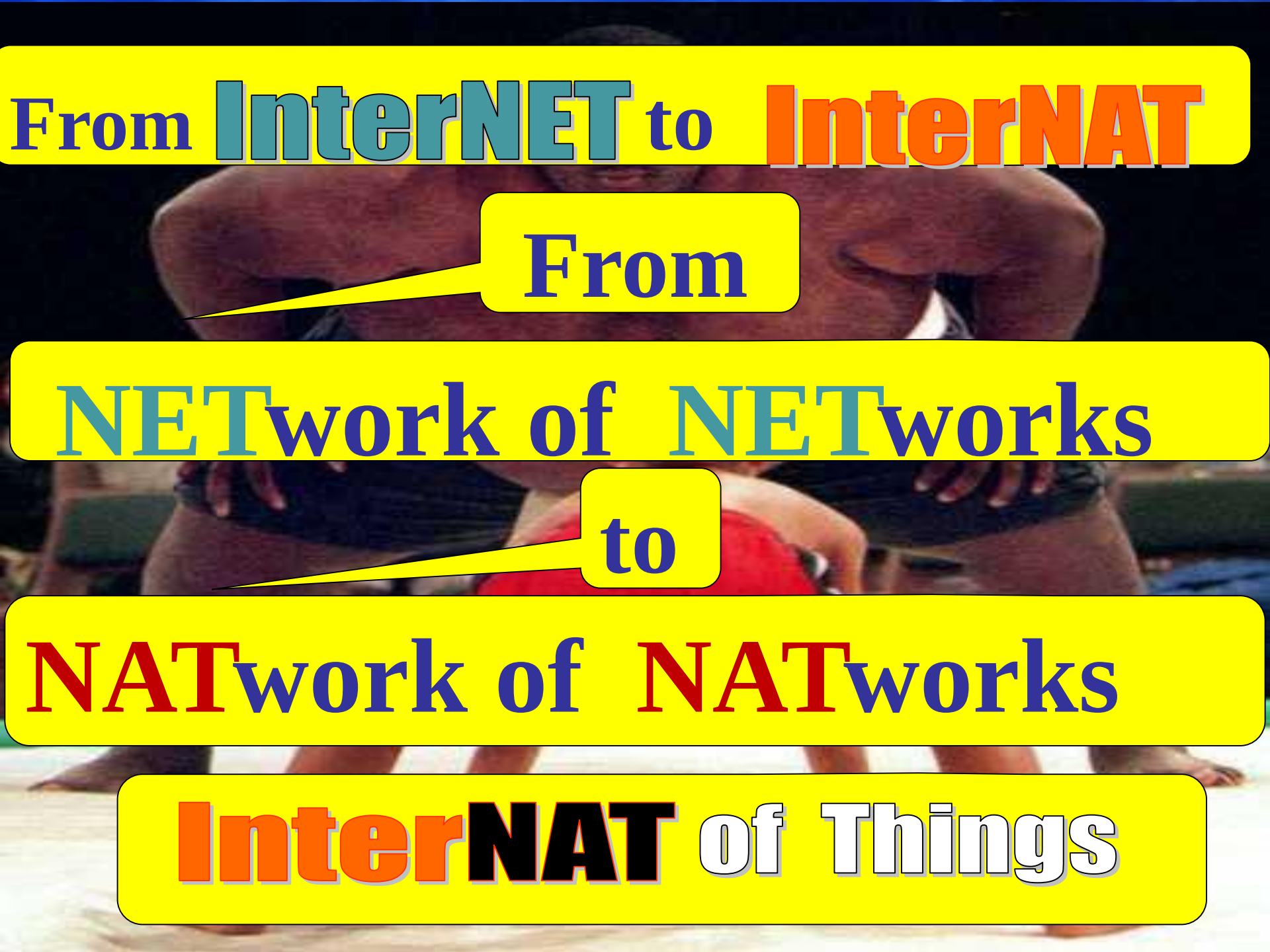


softwareblades

Version	Name
0-3	Unassigned
4	Internet Protocol (current IPv4)
5	Stream Protocol (ST) (not an IPng
6	SIP – SIPP – IPv6
7	IPv7 – TP/IX – CATNIP
8	Pip
9	TUBA
10-15	unassigned

China : IPv9

Jim Fleming: IPv8 & IPv16

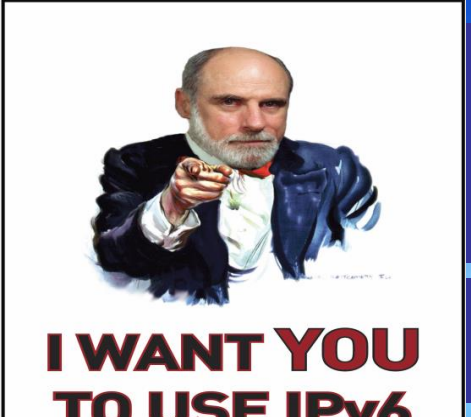

From InterNET to InterNAT
From
NETwork of NETworks
to
NATwork of NATworks
InterNAT of Things

Massive Capacity

Adrian Scrase
CTO – ETSI
Secretary 3GPP

April 2019

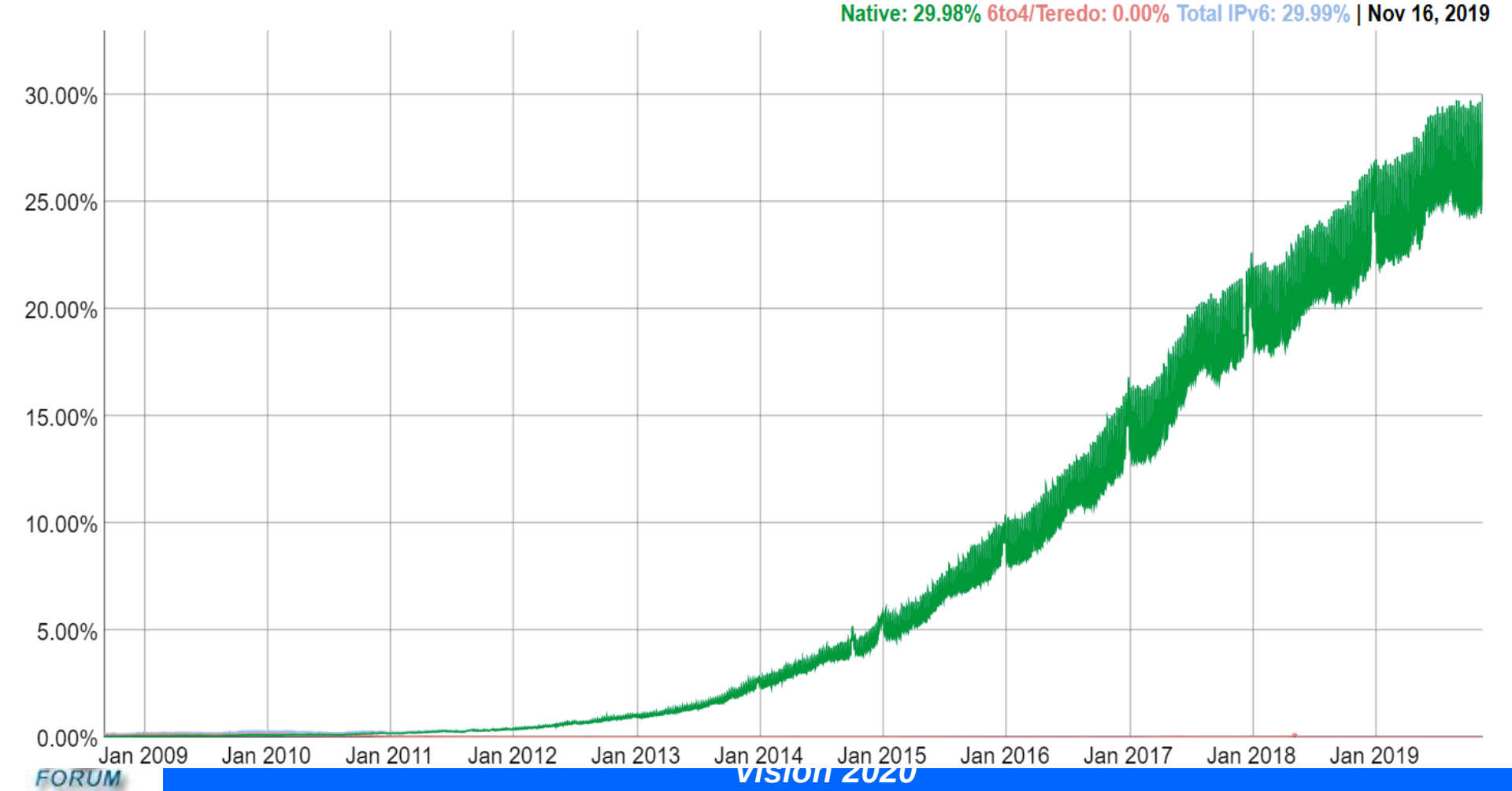
- Key requirement for IoT-dedicated radio interfaces. Besides the physical layer itself, this is achieved by a set of improvements such as:
  - No data transmission when the device has "nothing to say" (also improves consumption)
  - Random spread of start transmit time, so e.g. all the electricity meters do not start sending their data at the same time
  - Devices Grouping, so e.g. all the electricity meters can be addressed at once
- Naming, numbering and addressing:
  - Alternatives to E.164 for Machine-Type Communications:
  - Use of IPv6 addressing, instead of (capacity limited) E.164 numbering



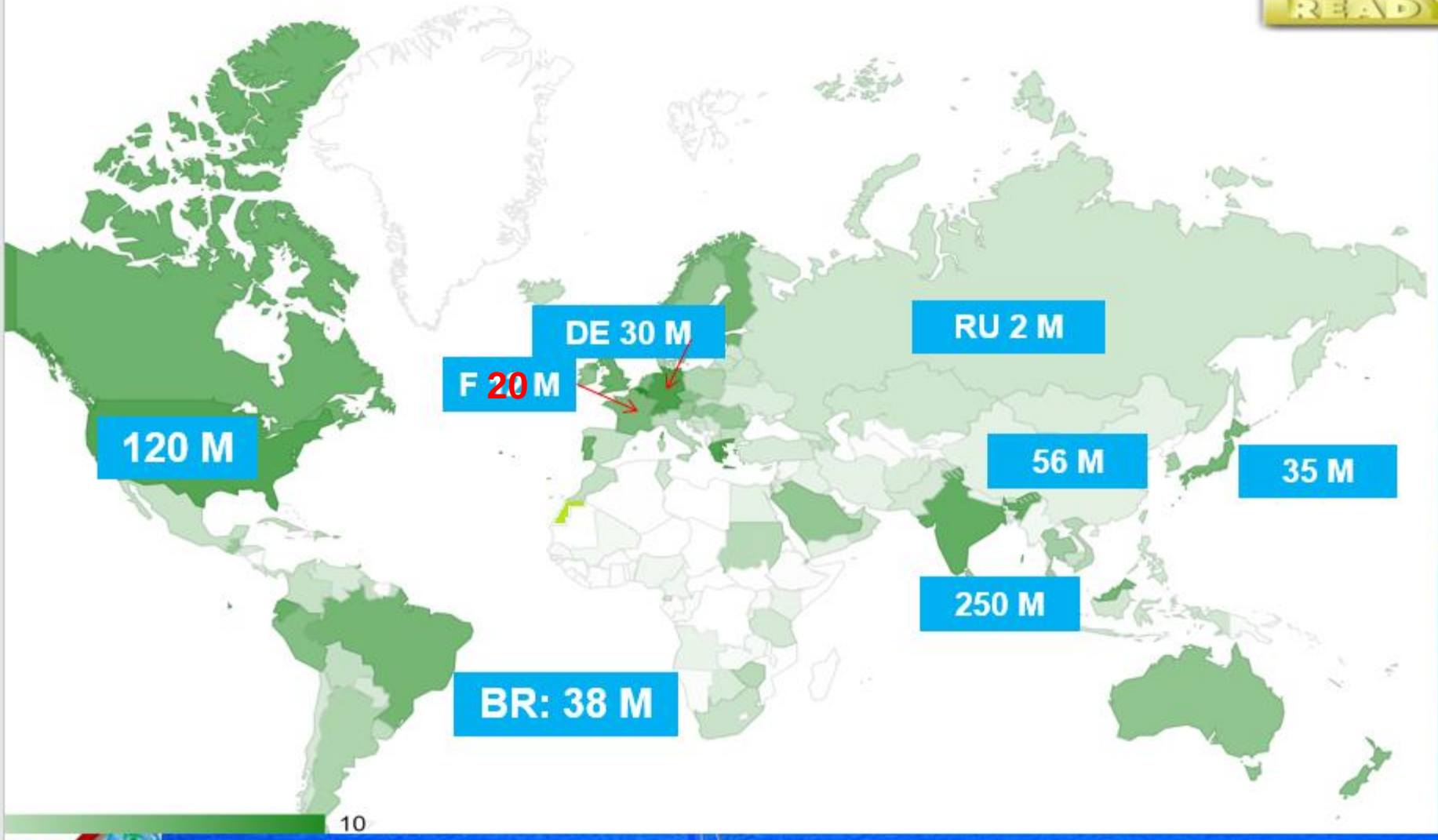
Crossing 30% Google v6 Users 2019

100% by 2025

Google



IPv6 Deployment Worldwide



IPv6 Deployment Worldwide

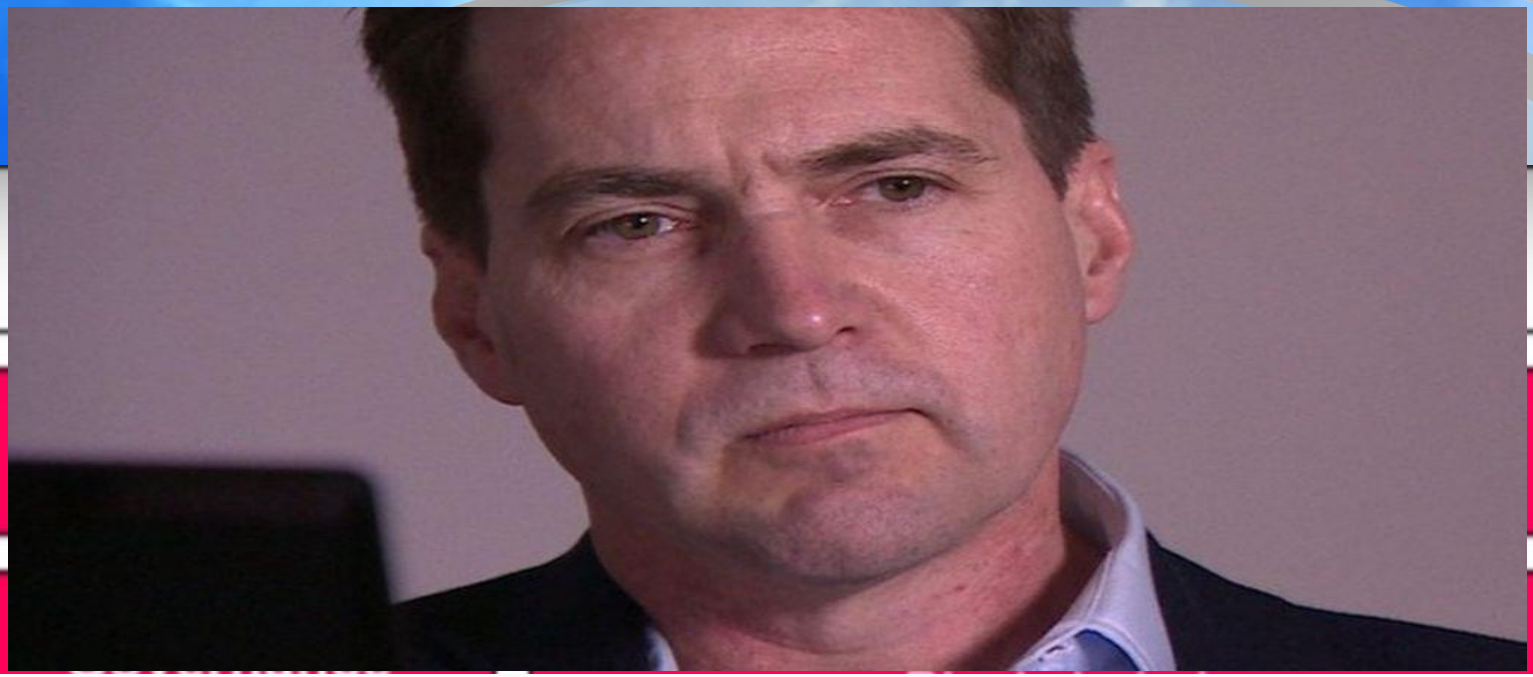
Date: 28 Aug 2019

Index	ISO-3166 Code	Internet Users	V6 Use ratio	V6 Users (Est)	Population	Country
1	BE	10455894	57.77	6040362	11562784	Belgium
2	IN	604824912	54.52	329734189	1368737513	India
3	US	248895097	44.39	110494460	329093110	United States of America
4	DE	69578211	41.46	28846183	82438639	Germany
5	GR	8087464	36.95	2988500	11124603	Greece
6	CH	8733149	32.66	2852497	8608259	Switzerland
7	UY	2518258	31.77	800007	3482156	Uruguay
8	LU	589856	31.54	186025	596992	Luxembourg
9	JP	113034971	28.70	32438594	126854745	Japan
10	GB	64592642	27.51	17770657	66959016	United Kingdom of Great E
11	MY	28395047	27.16	7712659	32454455	Malaysia
12	BR	167448638	25.32	42403060	212392717	Brazil
13	FI	4902136	23.93	1172966	5561389	Finland
14	PT	8200856	23.89	1958859	10254666	Portugal
15	FR	54450728	22.80	12416702	65480710	France
16	TT	1182658	21.70	256685	1375443	Trinidad and Tobago
17	CA	36083393	21.47	7747848	37279811	Canada
18	EE	1165488	19.45	226737	1303798	Estonia

Blockchain is P2P:
Needs end2end Secure Routing:

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

Dr. Craig Wright
Bitcon creator maybe worth 6 B$



Dr Wright MAY request a loan of Bitcoin for the following reasons (and no others):

- Furthering research into peer to peer systems, IPv6 and Bitcoin
- Commercial activities that enhance the value and position of Bitcoin.

Internet Layer

John McAfee
Bitcon will reach 1 M$ by 2020

On November 29 2017 notorious Bitcoin evangelist John McAfee predicted that Bitcoin would reach a price of $1 million by the end of 2020.
He even promised to eat his own dick if it doesn't. Unfortunately for him it's 92.4 percent behind being on track. Bitcoin's price should have been.

In October 2019, he announced that BitCoin has no privacy, so he will introduce Privacy Coin.

Blockchain Generations

Blockchain Needs IPv6

Blockchain 1.0

- **Blockchain 1.0** is the ***CURRENCY***, the deployment of cryptocurrencies in apps related to cash, and financial transactions
- Blockchain 1.0 is the decentralization of money and payments

Blockchain 2.0

- **Blockchain 2.0** is ***CONTRACTS,*** the deployment of

smart properties, digital assets, and smart contracts

- Blockchain 2.0 is the decentralization of markets

Blockchain 3.0

- **Blockchain 3.0 is**

new areas of smart cities, IoT.M2M, government ,health, science, and art.

- Typical application is ***Solidity***

X-coin? **Digital Notary** **Digital Keys**

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Vision 2020

Cybersecurity Threats Explosion

Technical and Quantitative Metrics of Cybercrime Activity Indicators

* 85% of processed emails are spam
* 7% of all URLs malicious
* Public Block List count: 1,018,203,532 IP addresses
* 2,698,726,309 ids recorded from 'known' Data Breaches
* 350 million+ in total identifiable malware
* 1 million+ measurable cyber-attacks (variable)
* 330 active Real-time Blackhole Lists (RBL & DNSBL)
* € 7.9 million is the average annualized cost of data breaches
* 10.4% net increase cost of data breaches over the past year
* 250,000 – 500,000 malicious binaries / day
* ~280 million malicious binaries collected
* 6 / 10 million unique IP's sink holed / day
* 900,000 malicious domains / day

CyberDefcon

Cybersecurity Threats Explosion

- Recent Metric shows that the minority of Internet traffic is now Human
- 52% is automated
- 23% is malicious in the form of automated threats

- DNSSEC not deployed: 1.00% on top 500 web sites and Banks

The Most Serious Threats are still coming:

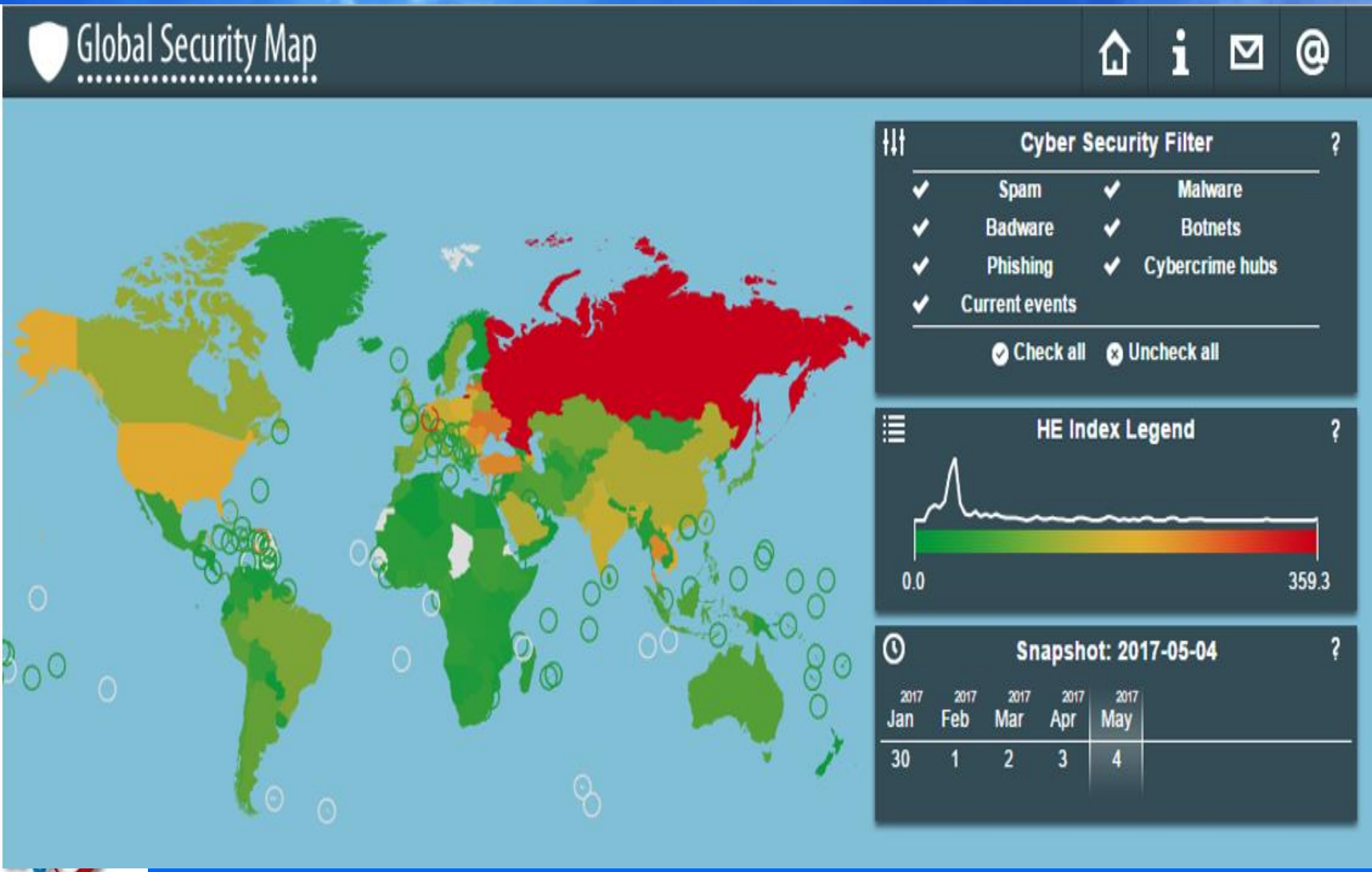
- IoT will be the biggest surface attack (20 B IoT Devices by 2020)

- $134 Billion by 2022 to defend IoT- We need to stop the sources of attacks as it is cheaper: Digital Epidemiology

→ Remove Digital Garbage ☺

http://www.beechamresearch.com/article.aspx?id=4

Global Security Map



WORLD Cybersecurity Mapping threats

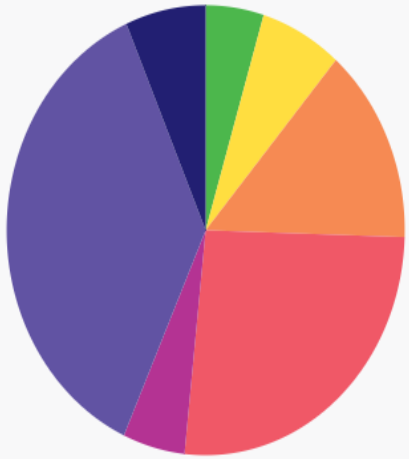
Russian Federation (RU)

Cyber security summary

Russian Federation is ranked **#1** out of 218 countries on the SAINT Index for cyber security at **2019-07-22** (a higher rank equals worse security). The current ranking is Russian Federation's **lowest ranking since the beginning of measurement**. The highest ranking was observed at **2018-04-14** and was a ranking of 12.

There are a total of **3887 ASes** (Autononomous Systems) linked to this country. **3721 (95.7%) are registered** to this country and, of these, **81 (2.1%) are routed** from another country. Of the ASes belonging to Russian Federation, **166 (4.3%) ASes are**

SAINT Index contributions



Spam (5%), Badware (7%), Phishing (14%), Malware (26%),

Alan Musk cars use NAT ☺

Alan Musk proposed to invent a new IP system better than IPv6 ☺

Message form the Honorary Chair of the IPv6 Forum: Vint Cerf