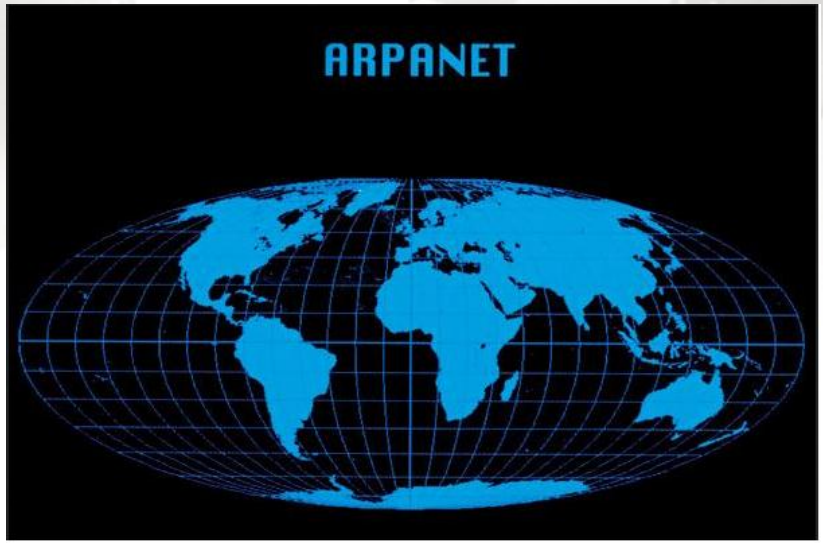
IPv6 deployment determines the future of the Internet

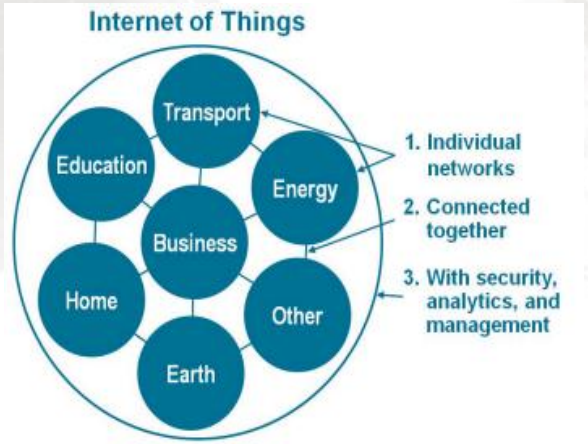
About Internet

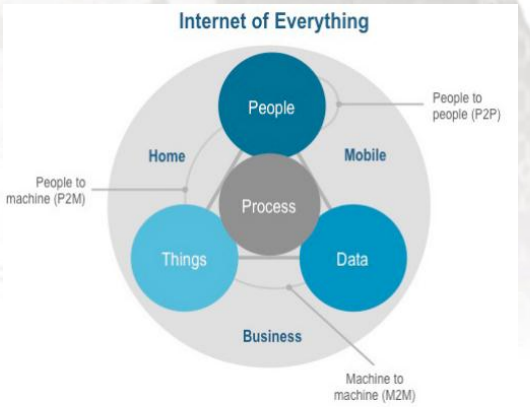
- ARPANET - 44 years old (1969).
- Internet - 30 years old (1-Jan-1983).
- The major goal of Internet is connectivity (rfc1958).



Internet of Things/ Everything

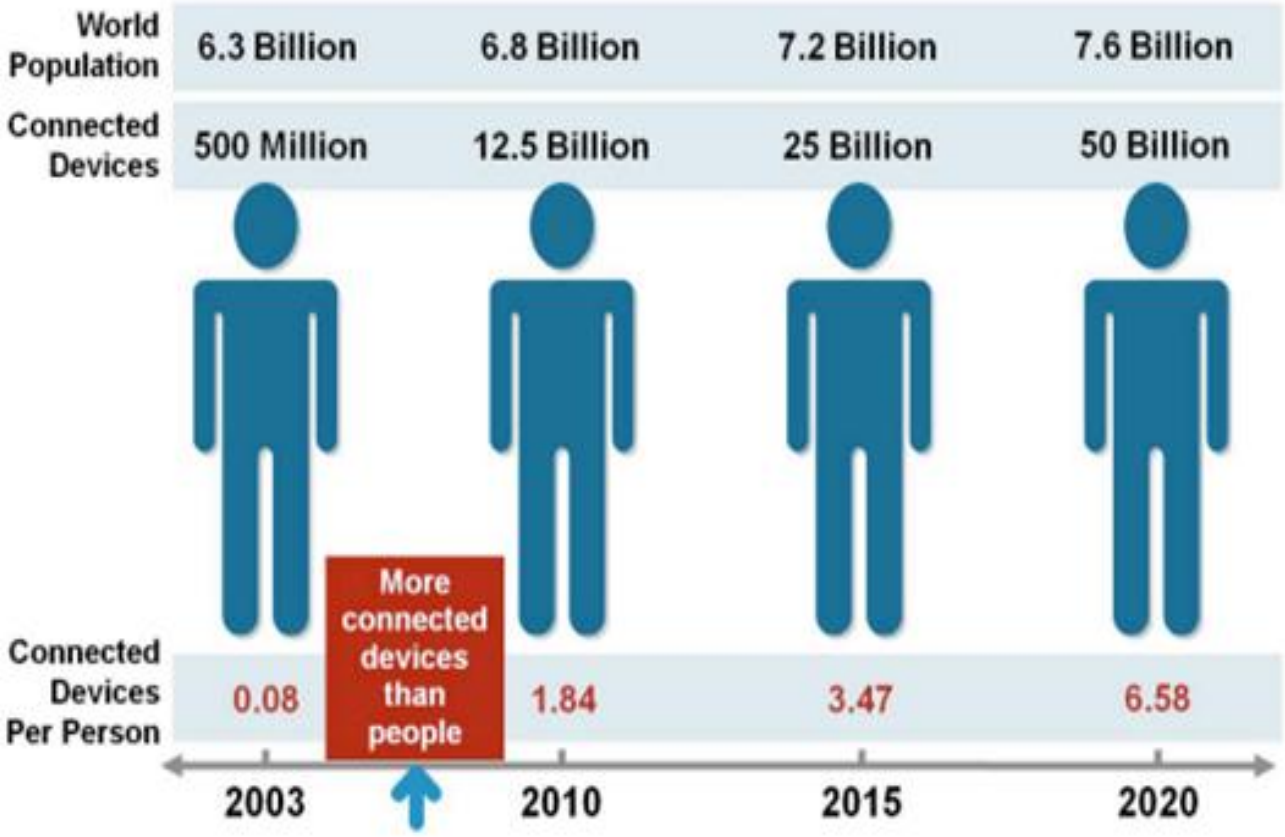
- Internet of Things (IoT), Internet of EveryThing (IoE).
- Network of networks
- Moving toward a Smarter Internet





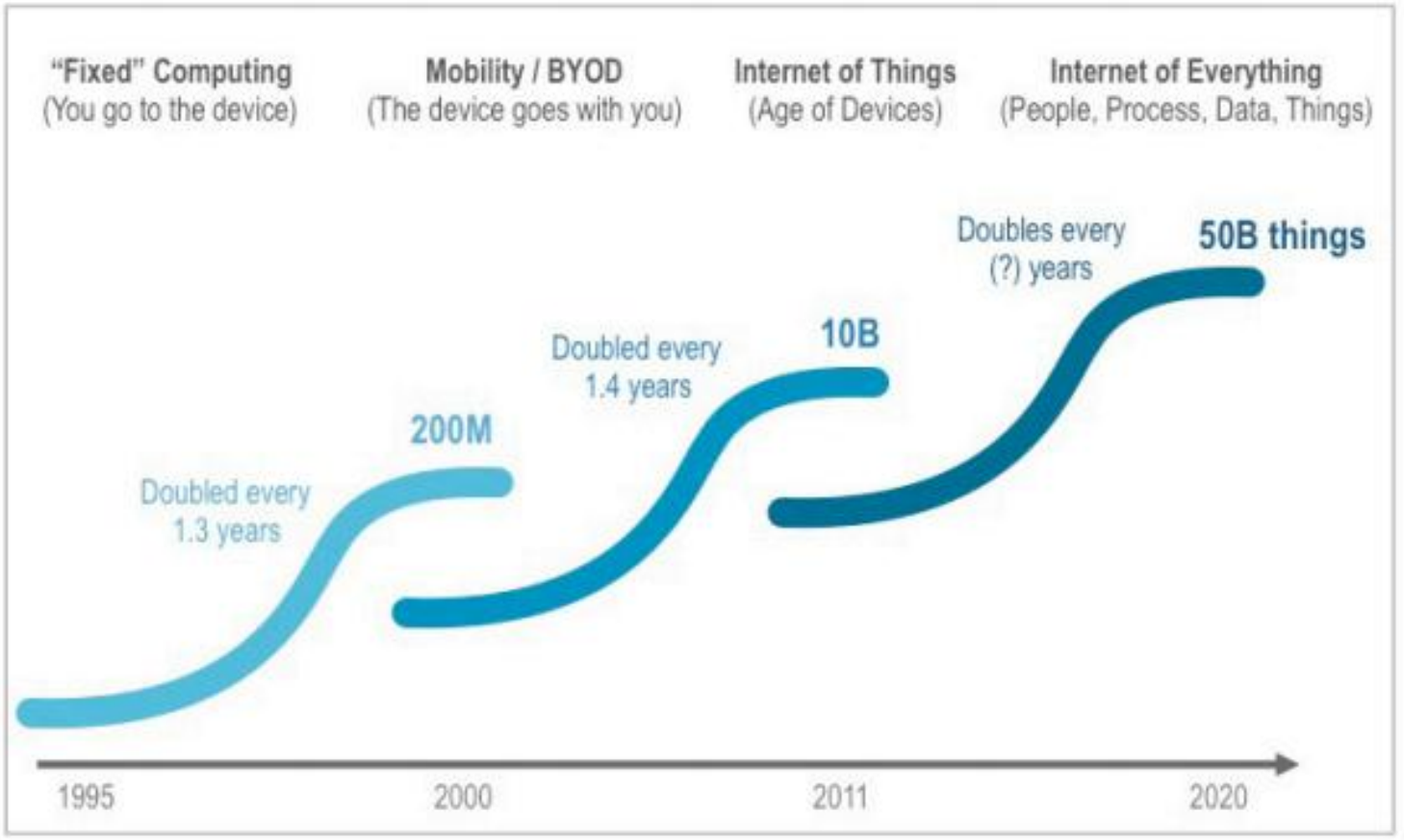
Source: Cisco IBSG, 2012

Internet Growth



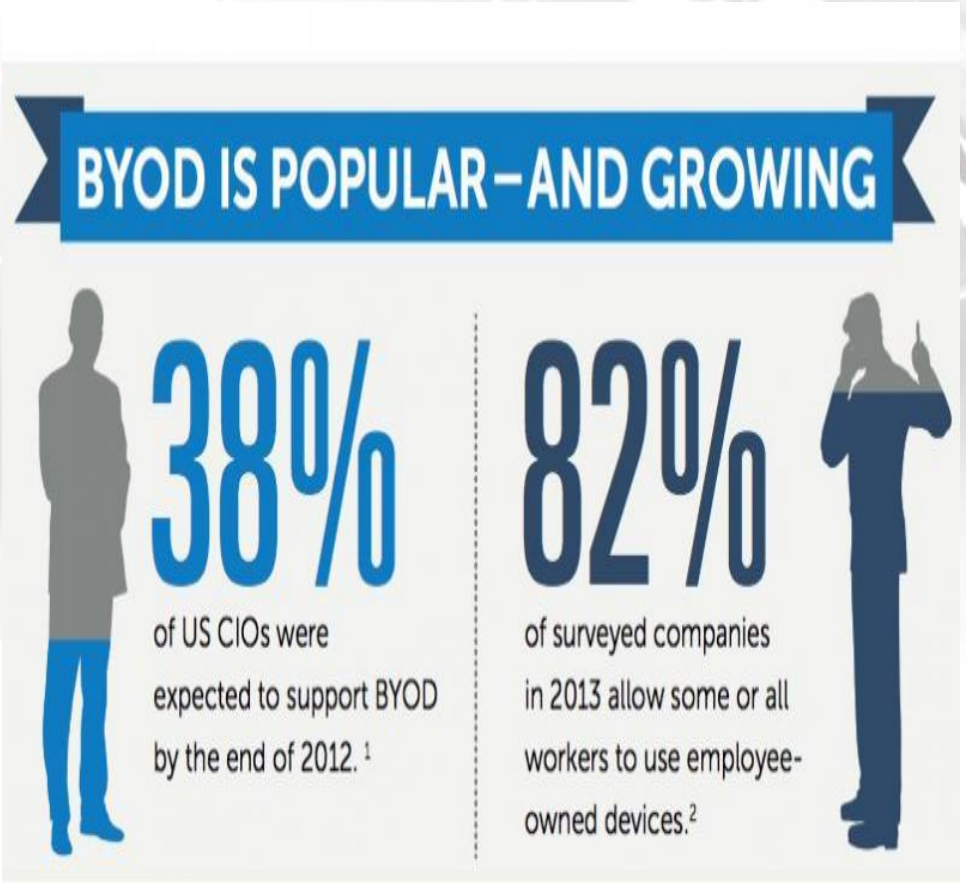
Source: Cisco IBSG, April 2011

Internet Growth



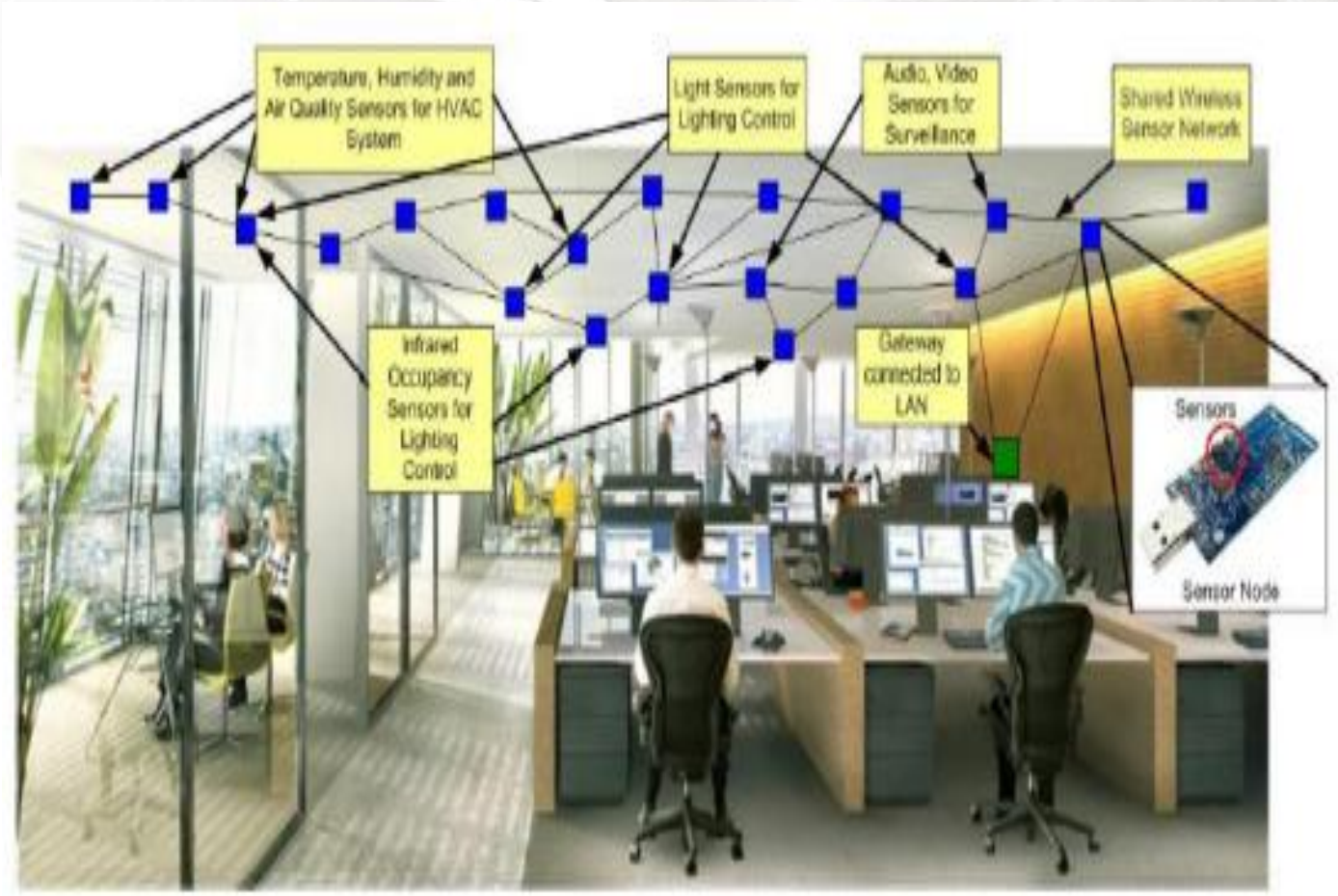
Source: Cisco IBSG, 2012

Bring Your Own Device (BYOD)

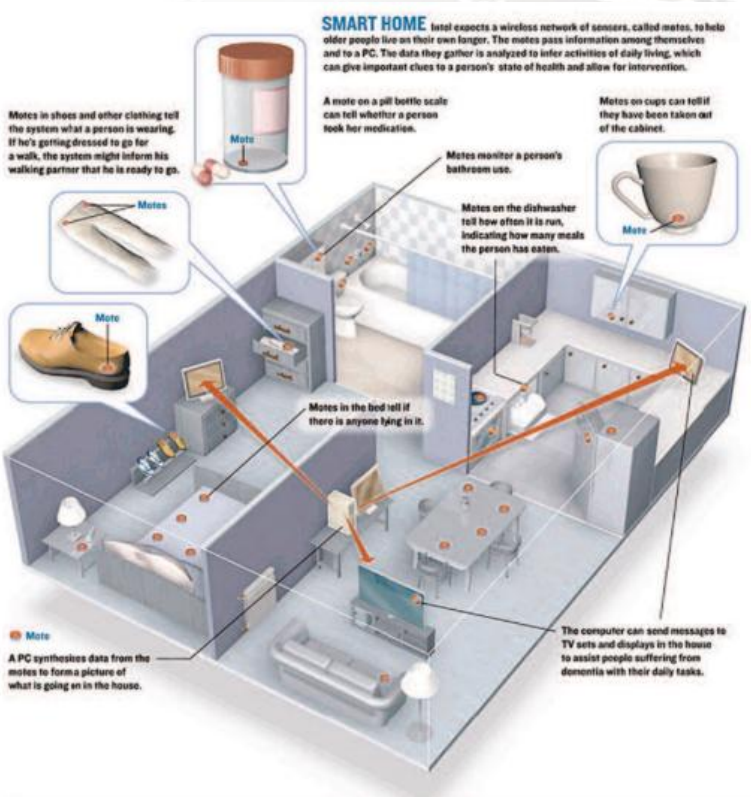


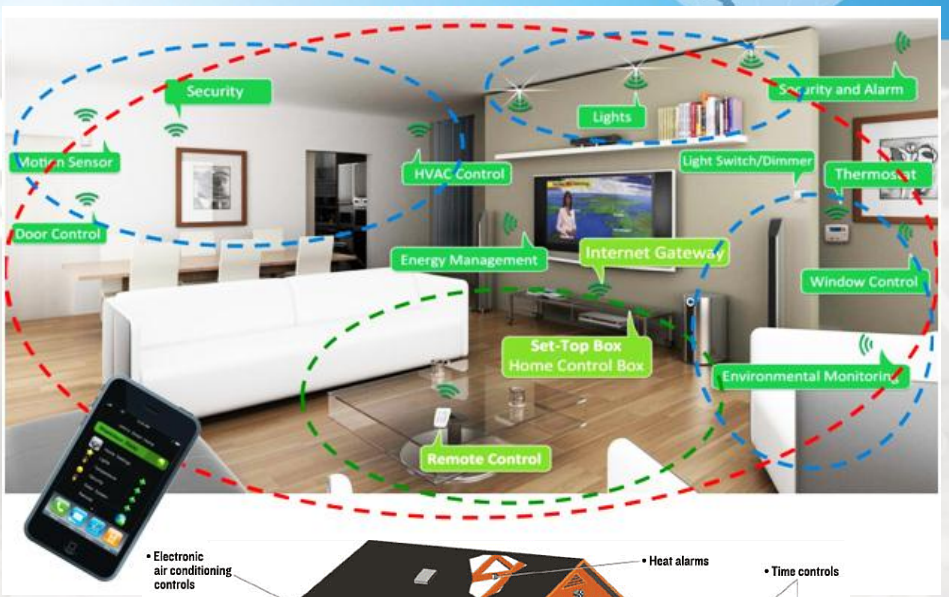
Source: Intel & readwrite

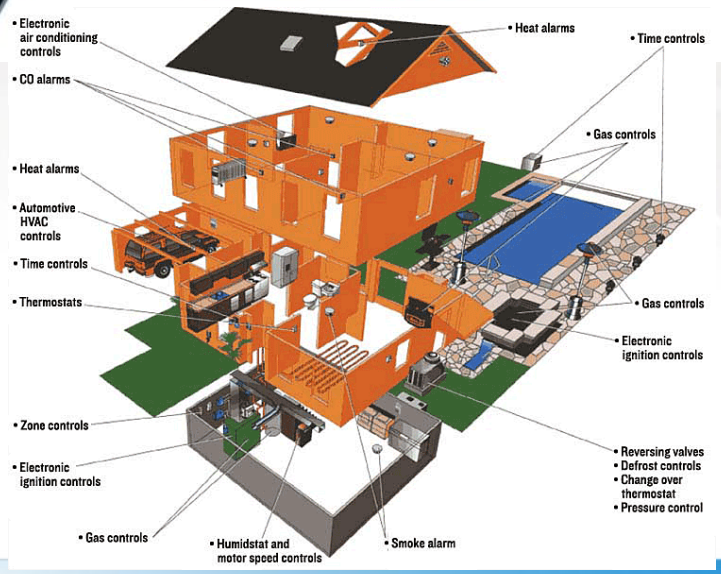
IoT – Smart Office



IoT – Smart Home

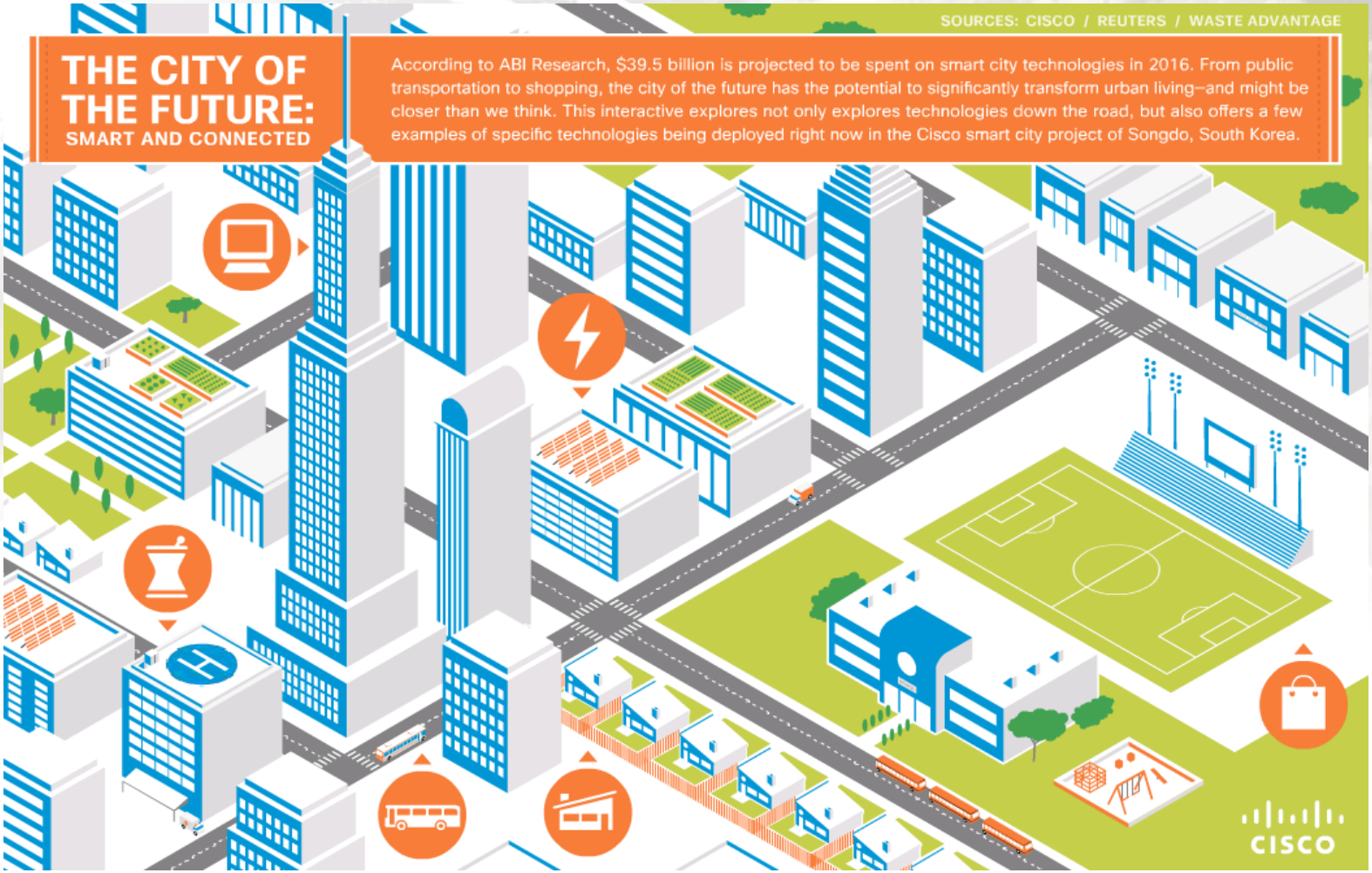






Source: Intel & Embedded.com

IoT – Smart City



Technology radar

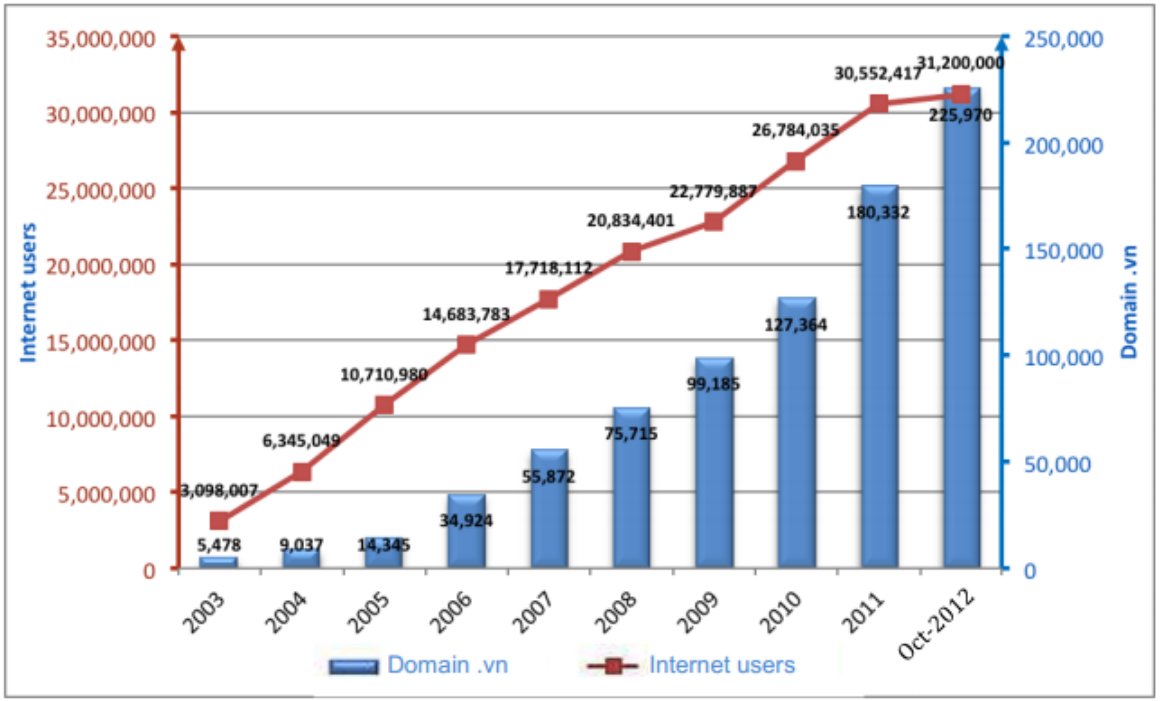
- Lower latency communication technologies, Broadband network.
- System-on-Chip (SoC), Nano technology, Ultra-low power chipsets.
- Wireless Sensor Networks (WSN): ZigBee standard.
- Falling cost of technology components.
- Software technologies.

		< 3 Years	3 – 5 Years	> 5 Years
Management Service	Processing	In-memory analytics	Streaming analytics	
	Intelligence	Context-aware computing Predictive analytics	Complex event processing	Behavioral analytics
Gateway and Network	Network Capacity & Latency	LTE		LTE-A
	Network Sharing		Software-defined radios	Cognitive networks
Sensors Connectivity and Network	Wireless sensor network	ZigBee	6LowPAN	
	Miniaturisation	Coil-on-chip Monolithic/Single chip device		Nanotechnology
	Intelligence		Adaptive learning analytics	
	Power and Energy storage	Ultra-low power chipsets	New batteries	Energy harvesting

Source: IDA.gov.sg

Vietnam - Internet development

- Internet users (35% population) and domain name .VN

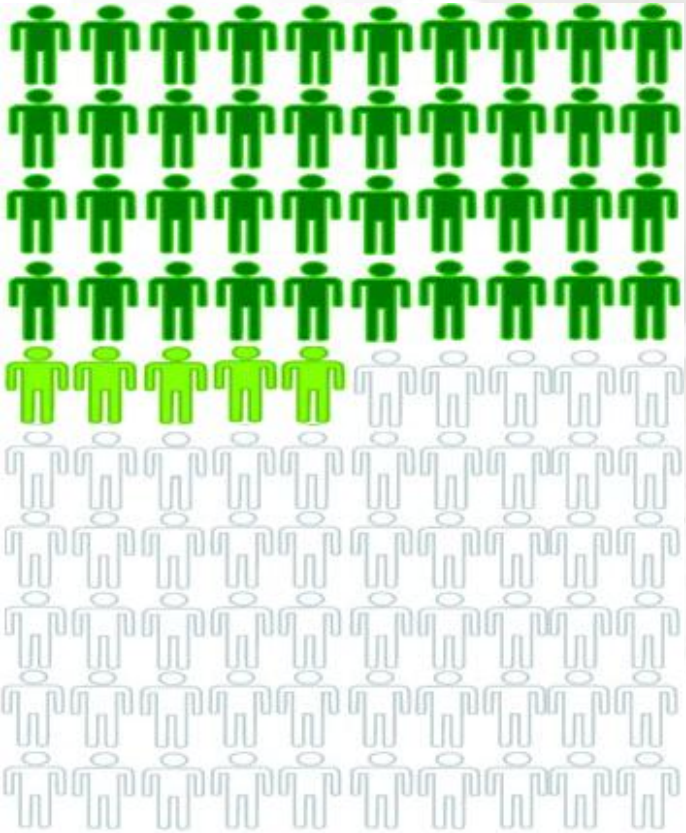


- Vietnam becomes now the third leader of the ASEAN in Internet development and investment, only after Singapore and Malaysia

Source: VNNIC

Vietnam - Internet users

2015 (40-45%)

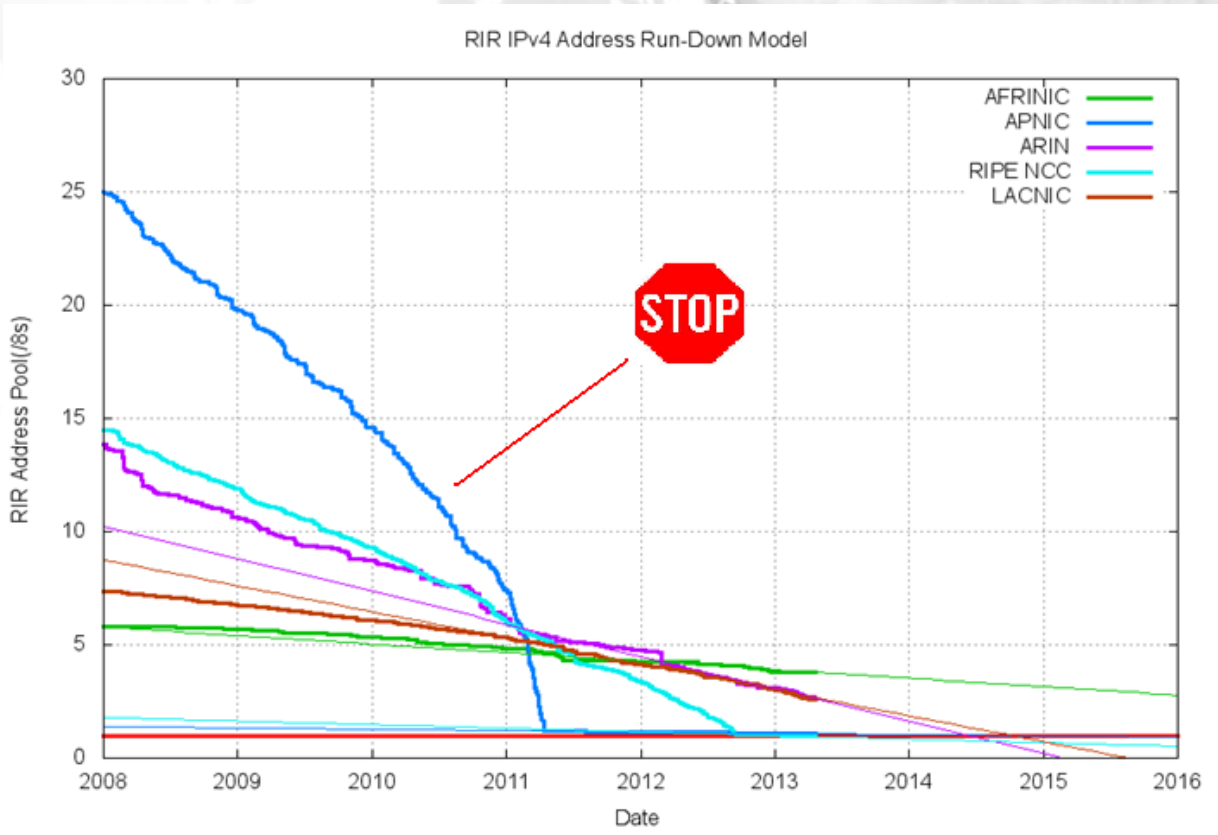


2020 (55-60%)

Source: Vietnam National Telecom Master Plan until 2020

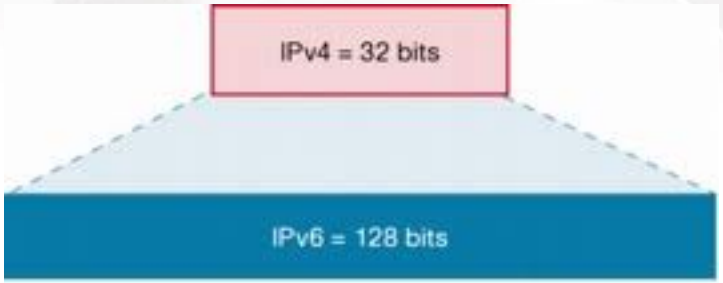
Internet – the challenge

- IPv4 exhaustion (APNIC: 15/04/2011)

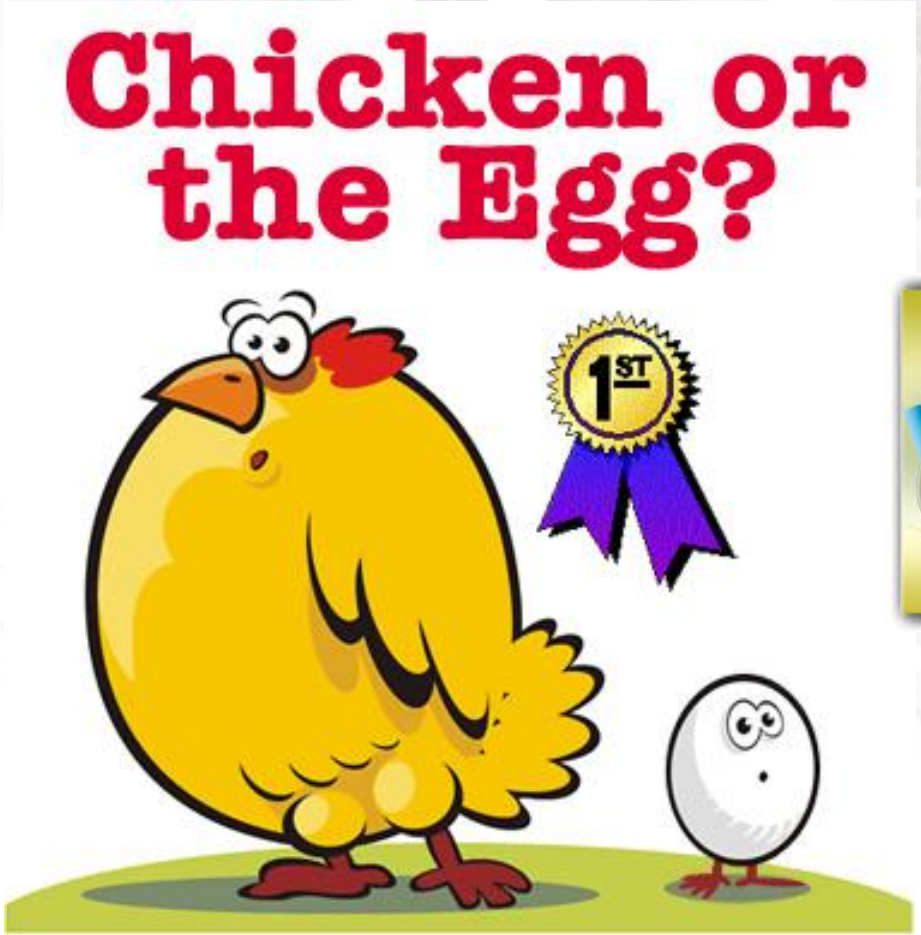


IPv4 exhaustion - solution.

- Reuse remained IPv4 address,
  - A little.
  - Fragment.
  - Expensive.
- NAT, Large Scale NAT: end to end (N/A), expensive ?
- **Transition to**



IPv6 - ISP and Content Provider (CP)



IPv6 - transition

- **The transition to IPv6 is important not only because the 4.3 billion IPv4 addresses are running out,**

but also

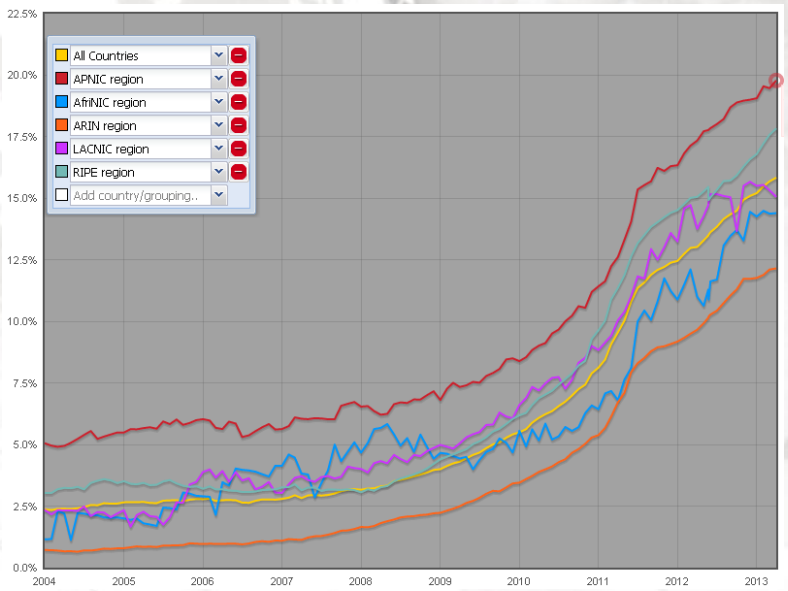
because the proliferation of Internet-connected devices is creating a new environment of information.

World IPv6 Launch

- http://www.worldipv6launch.org/
- IPv6 on by default

IPv6 – All regions

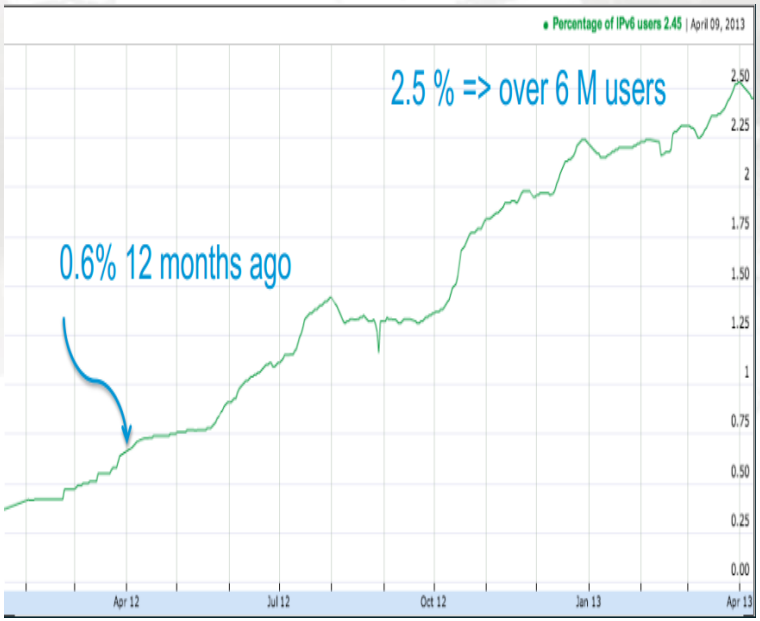
- Percentage of networks (ASes) that announce an IPv6 prefix
- http://www.ipv6actnow.org/info/statistics/



- TLDs with IPv6 nameservers: 278
- Percentage of TLDs with IPv6 nameservers: 87.7%
- Percentage of IPv6 rDNS Nameservers where IPv6 is as fast or faster than IPv4 (within 1ms): 75.2%

IPv6 Internet users.

- USA: 0.6% -> 2.5%; 6M users
- Verizon wireless: 26.25%



Network operator measurements, 15th April 2013 (notes)

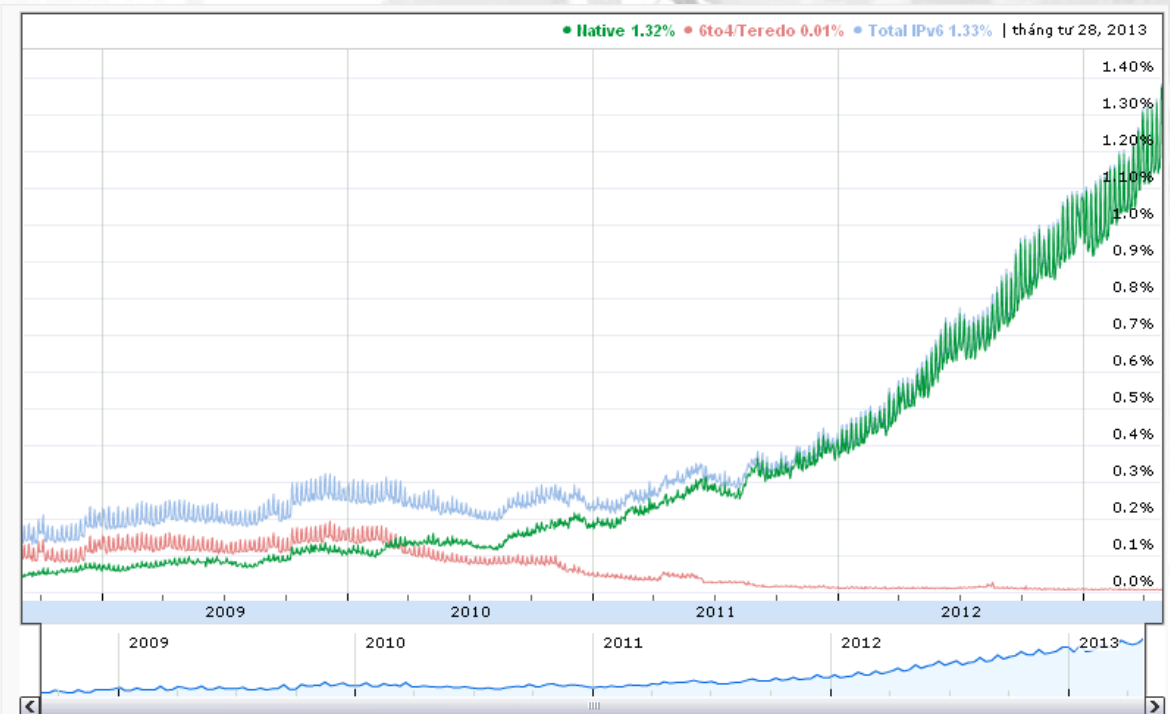
Show 10 entries Search:

Participating Network	ASN(s)	IPv6 deployment
ATT	6389, 7018, 7132	8.26%
KDDI	2516	8.85%
Free	12322	17.21%
RCS & RDS	8708	16.10%
Verizon Wireless	6167, 22394	26.25%
Comcast	7015, 7016, 7725, 7922, 11025, 13367, 13385, 20214, 21508, 22258, 33287, 33489, 33490, 33491, 33650, 33651, 33652, 33653, 33654, 33655, 33656, 33657, 33659, 33660, 33661, 33662, 33664, 33665, 33666, 33667, 33668, 36733	1.72%
Deutsche Telekom AG	3320	2.75%
SoftBank BB	17676	0.78%
Chubu Telecommunications	18126	13.54%
Telefonica del Peru	6147	1.09%

Source: worldipv6launch.org

IPv6 Internet users

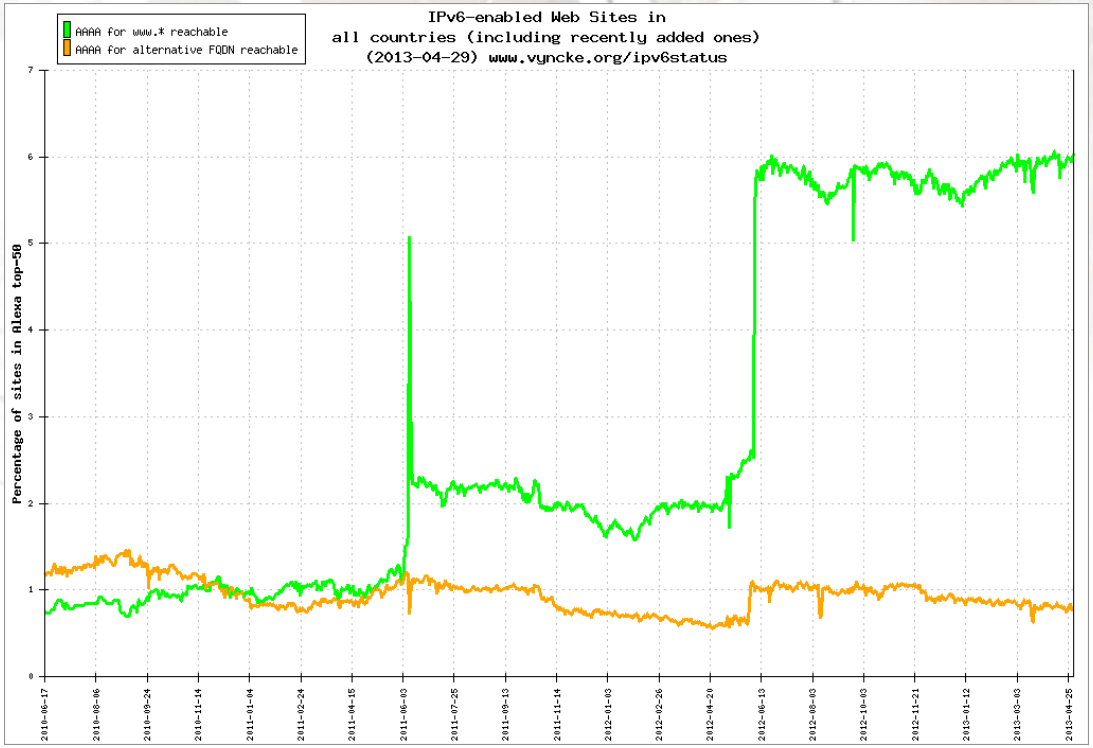
- Google Internet users: ~1.4%



Source: worldipv6launch.org

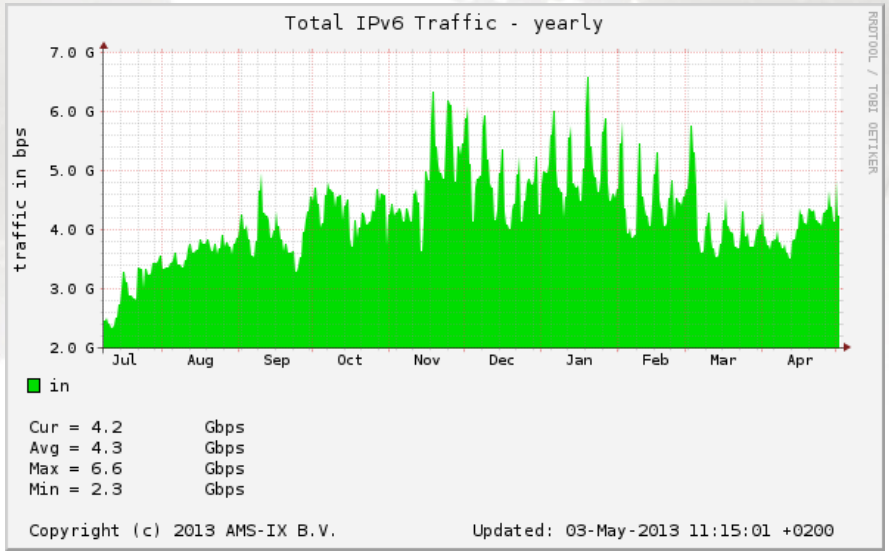
IPv6 enabled Websites

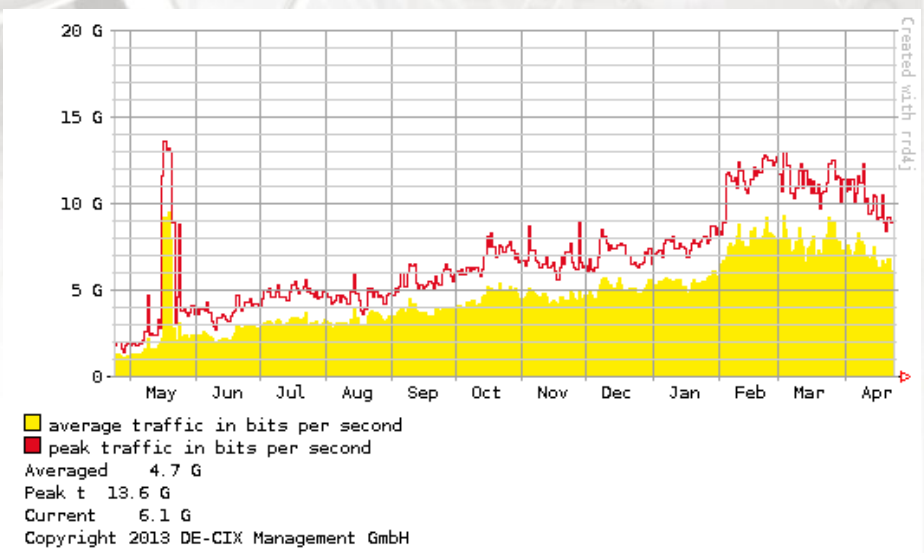
- http://www.vyncke.org/ipv6status
- Top 50 of Alexa: 6%.



IPv6 - Euro

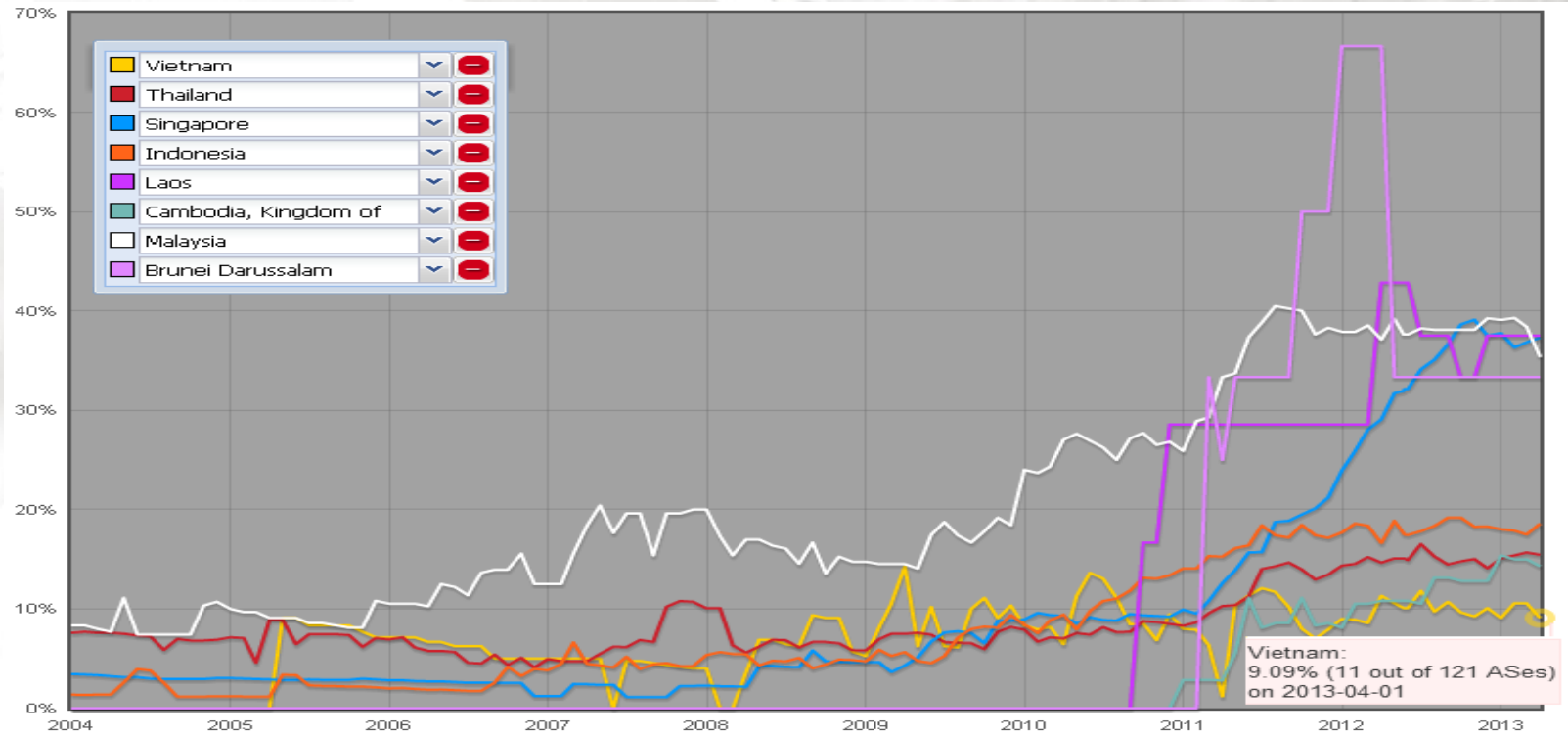
- AMS-IX and DE-IX
- Double after 1 year.





IPv6 – ASEAN

- Percentage of networks (ASes) that announce an IPv6 prefix

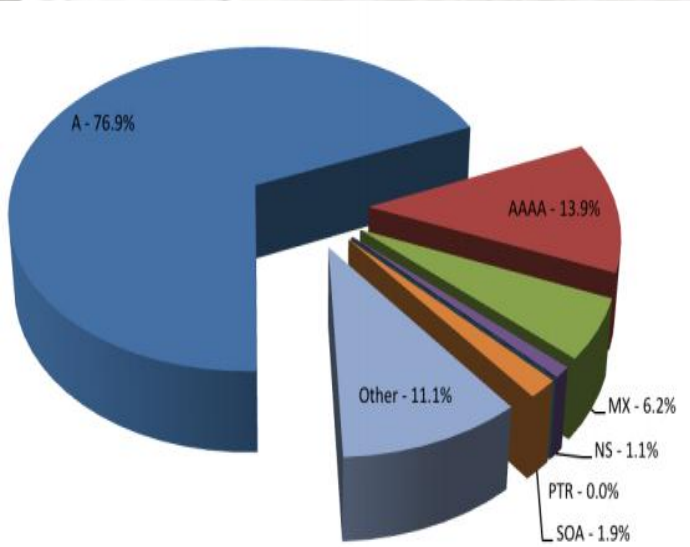


- Vietnam: 9.09%

Source: RIPE NCC

IPv6 – VIETNAM

- .VN IPv6 AAAA record query: 13.9%

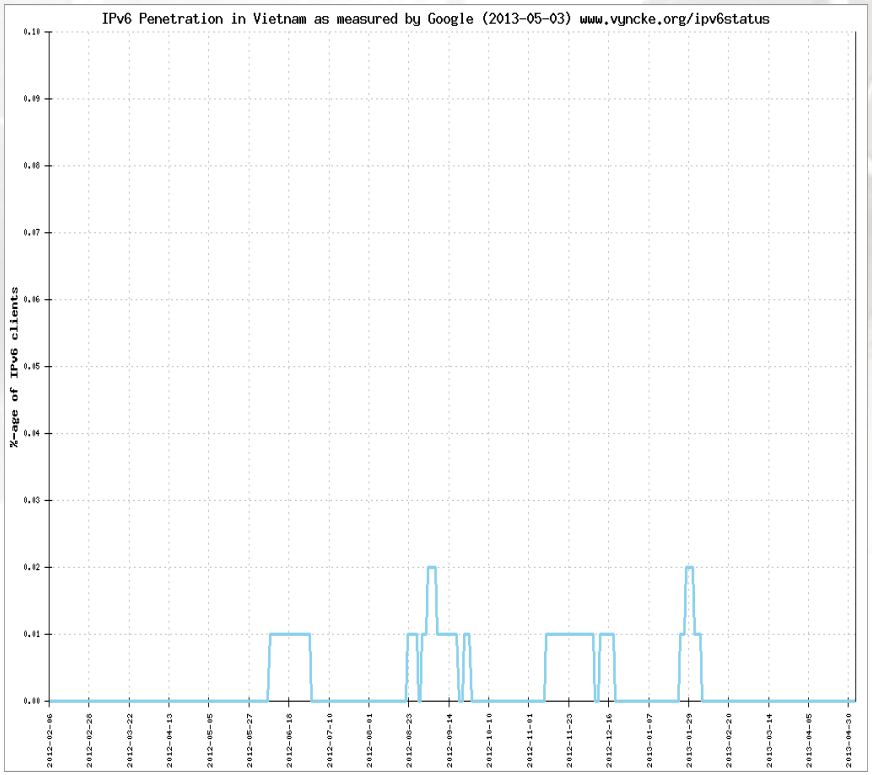


HERE

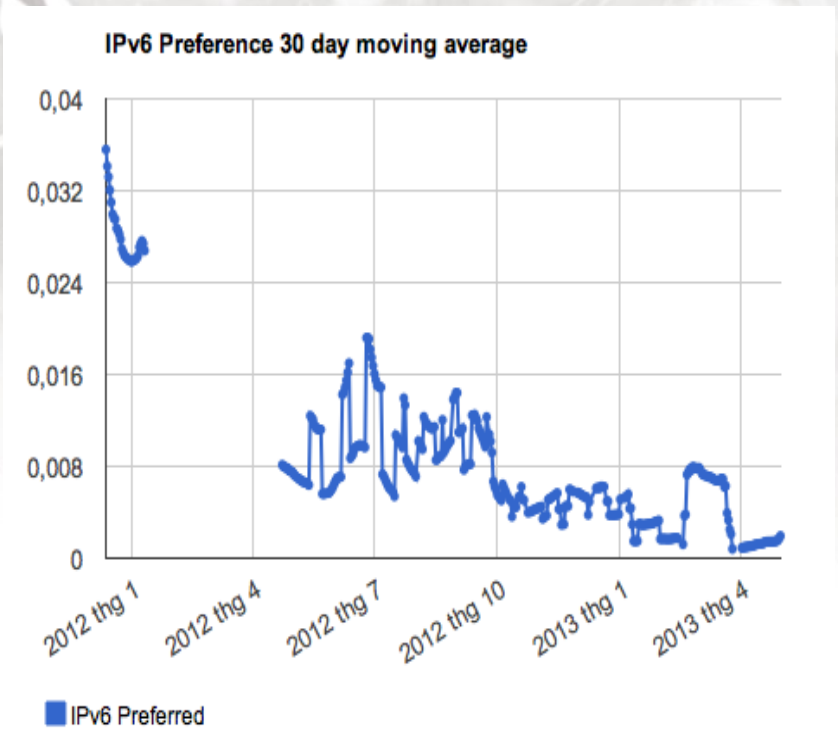
- 2001:678:4:0:0:0:0:12
- 2001:dc8:0:7:0:0:0:105
- 2001:67c:e0:0:0:0:0:126

IPv6 – VIETNAM

http://www.vyncke.org/ipv6status/plotpenetration.php?country=vn

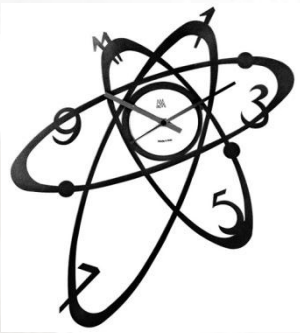


http://labs.apnic.net/ipv6-measurement/Economies/VN/



IPv6 – The time is now

Unlock the potential of IPv6



IPv6 – a new passport to get connected into Internet and determine the future of Internet !

http://ipv6tf.vn

http://www.vnnic.vn/ipv6/