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New Generation of Internet Protocol IPv6 Are You Ready?

Chris Fung

22/2/2011

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IPv4 Address Allocation Exhausted

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The Internet Corporation for Assigned Names and Numbers

ICANN

NEWS RELEASE

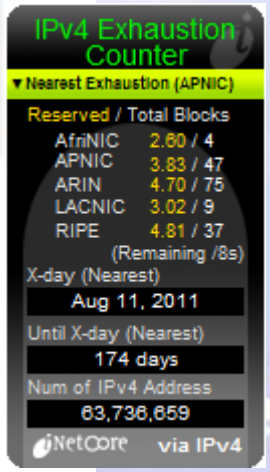
Brussels ♦ Sydney ♦ Washington ♦ Los Angeles

FOR IMMEDIATE RELEASE
February 3, 2011

Available Pool of Unallocated IPv4 Internet Addresses Now Completely Emptied

The Future Rests with IPv6

A critical point in the history of the Internet was reached today with the allocation of the last remaining IPv4



http://www.icann.org/en/news/releases/release-03feb11-en.pdf
http://inetcore.com/project/ipv4ec/ as of 18/2/2011

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Allocation Projected Timeline (Nov,2009)

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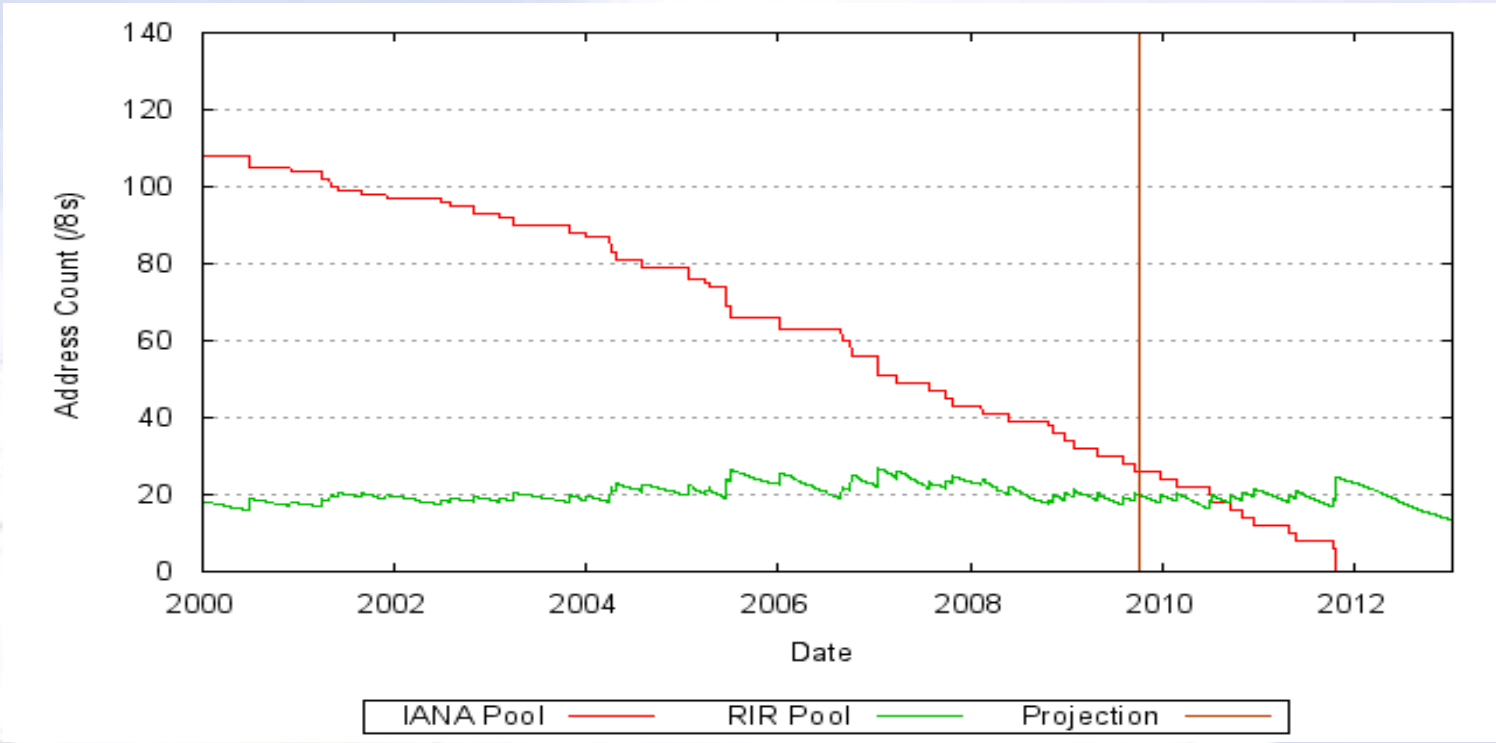
- **Projected IANA unallocated address pool exhaustion: 9 Sept, 2011**
- **Projected RIR unallocated address pool exhaustion: 3 Sept, 2012**



http://www.potaroo.net/tools/ipv4/index.html as of 11/2009

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Overview of IPv4 Addresses Allocation

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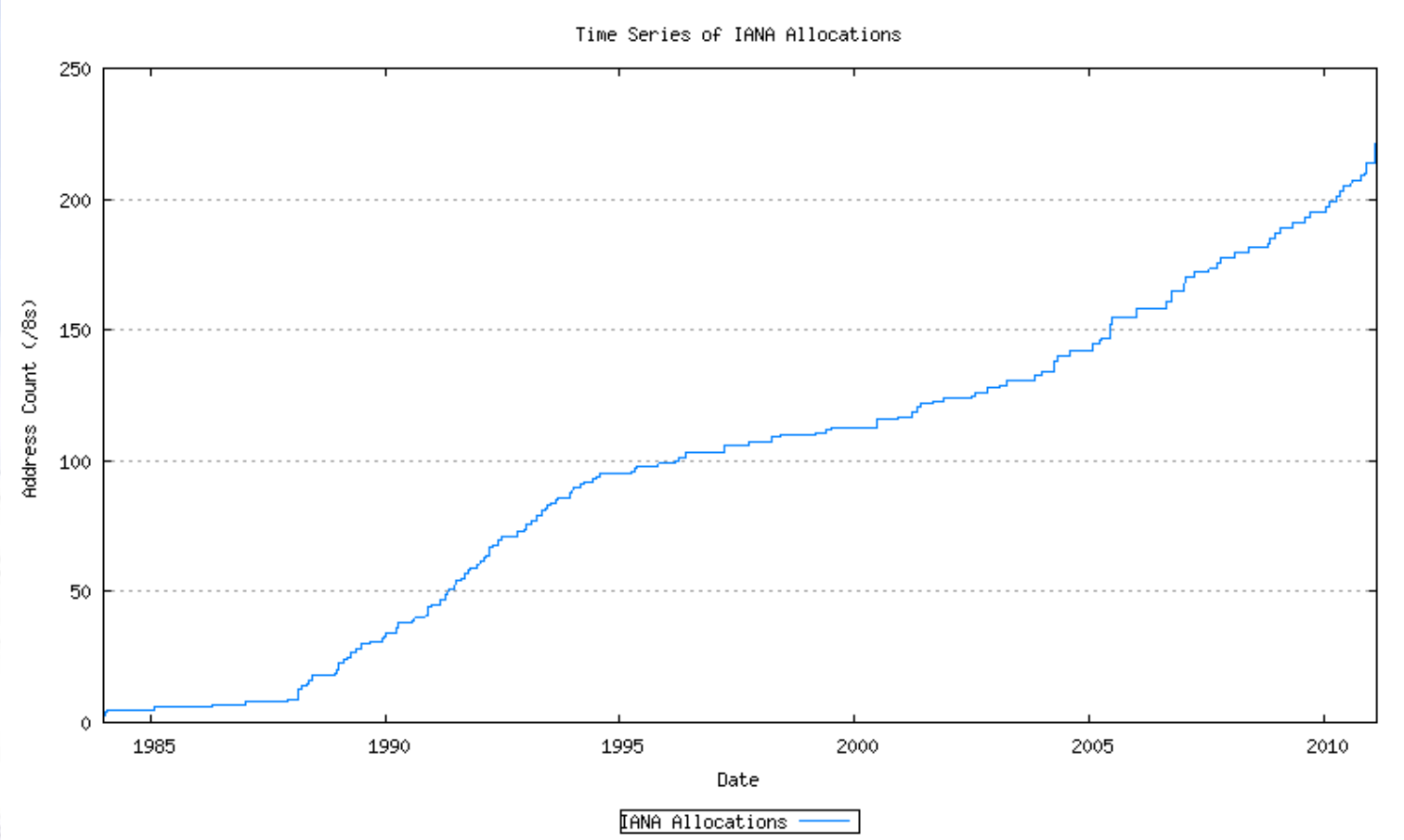

http://www.potaroo.net/tools/ipv4/index.html

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Global Internet Population

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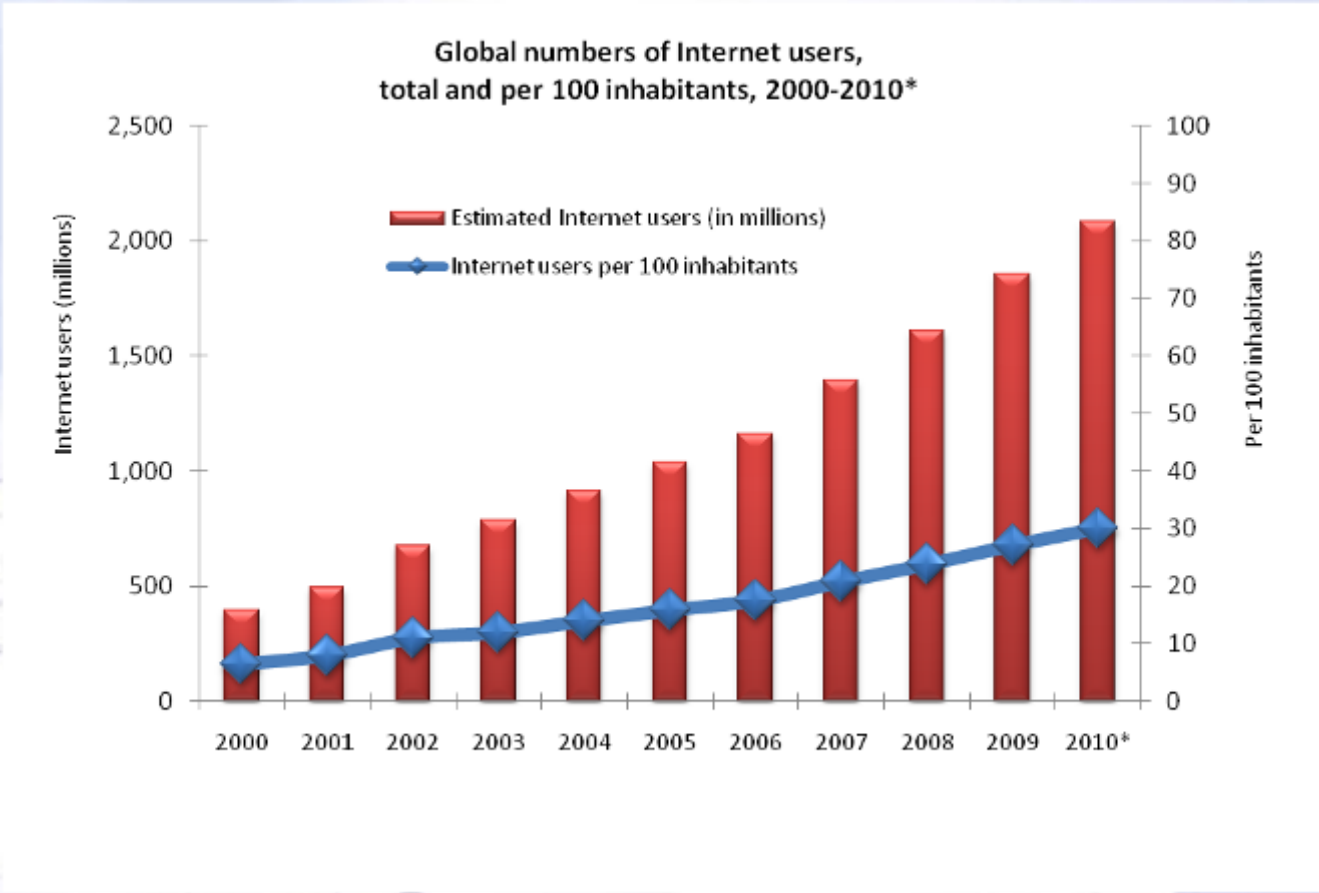

Source: ITU

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Global Internet Population

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Internet users	2005	2010 (estimated)	% of population (2010)
World	**1 billion**	**2 billion**	**30.1%**
Developing countries	**0.4 billion**	**1.2 billion**	**21.1%**
Developed countries	**0.6 billion**	**0.9 billion**	**71.6%**

Source: ITU

	Population	Internet users	%
China	**1.3 billion**	**457 million** *	**34.3%**
India	**1.17 billion**	**~100 million** **	**~8.5%**

Source: * CNNIC; Dec 2010
** hindustantimes.com

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Devices Using IP Addresses

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IPv4 was Running Out

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- The IPv4 address was really running out fast
- More and more users connect to the Internet and more devices are internet enabled, more IP needed to be used
- But the Internet will not STOP growing

Can We Keep Using NAT ?

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Network Address Translation (NAT) has many serious issues

- Breaks end-to-end model of IP
- Some applications do not work through NATs
- Not a long term solution

Any Other Solutions?

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- Reclaiming historical address space?
- IPv4 address trading?
- Most viable option is to head towards IPv6

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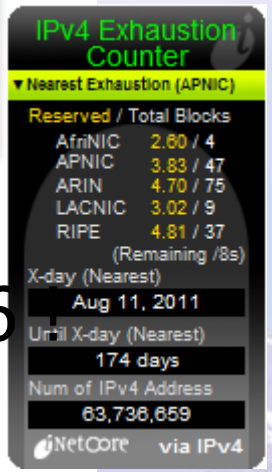

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Background of IPv4 & IPv6

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	Internet Protocol version 4 (IPv4)	Internet Protocol version 6 (IPv6)
Deploy	**1981**	**1998**
Address Size	**Addresses are 32 bits (4 bytes) in length**	**Addresses are 128 bits (16 bytes) in length**
Number of Addresses	**2^{32} = 4,294,967,296 4.3 billion**	**2^{128} = ~3.4 x 10^{38} 340 trillion, trillion, trillion**
Address Format	Dotted Decimal Notation: **4 groups of 8-bit e.g.192.0.2.76**	Hexadecimal Notation: **8 groups of 16-bit separated by colon e.g. 2001:DB8:234:AB00: 123:4567:8901:ABCD**

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IPv6 Address Space

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IPv6 uses 128 bits: (2^{128} possible addresses)

4 times the size in bits

340 trillion, trillion, trillion (3.4×10^{38}) unique addresses.

340,282,366,920,938,463,463,374,607,431,768,211,456

World population ~ around 6.8 billions today

→ approximately 5×10^{28} IPv6 addresses for each people

Almost infinite address space

Why IPv6 is Important ?

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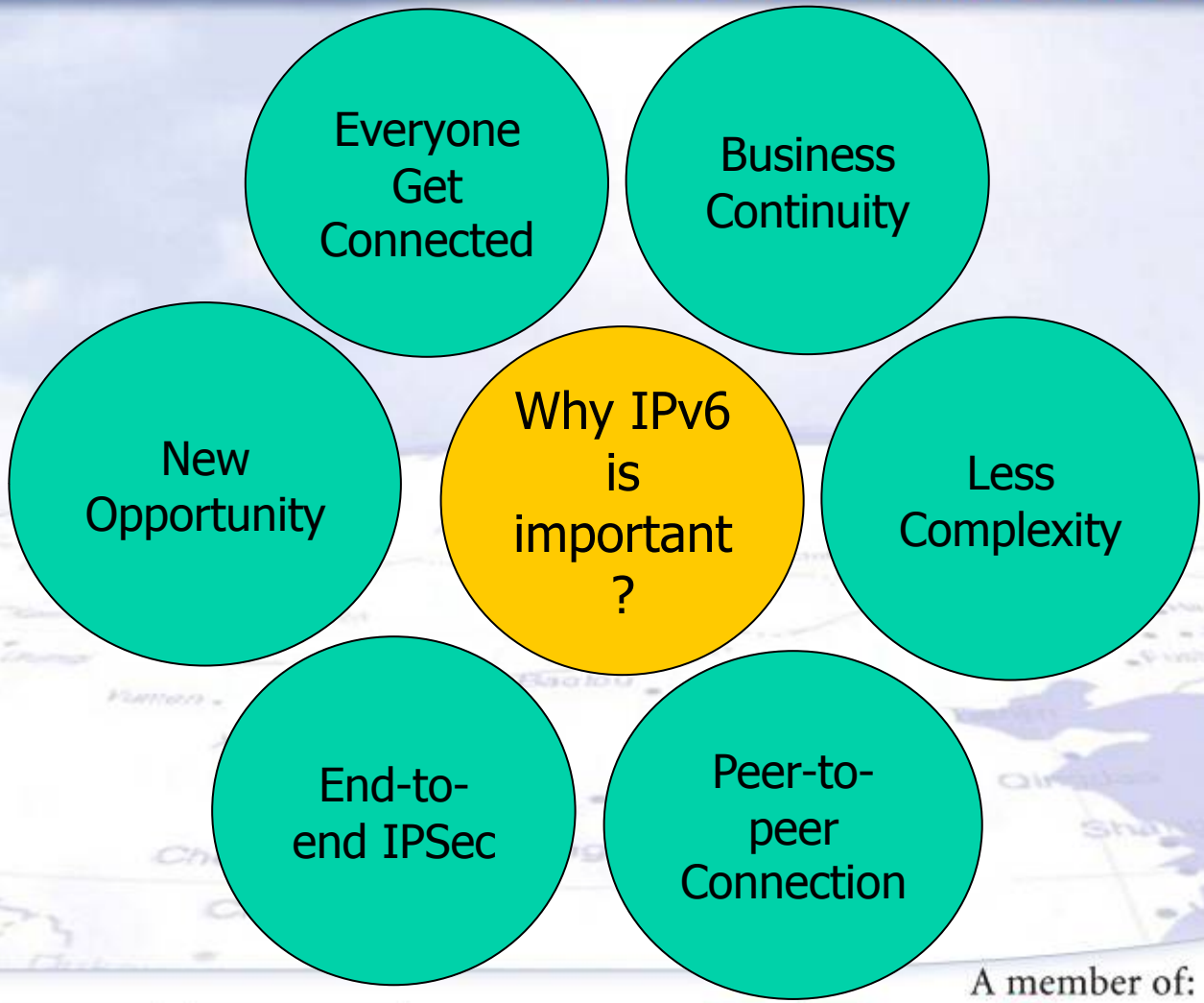

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Everyone Get Connected

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As the end users, they can get connected through…

- Email
- Web browsing
- e-banking, e-shopping, e-learning, e-…
- P2P, like messaging, file sharing, VoIP…
- Streaming media
- Social networking, blogging / microblogging

A "Connected" Life

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Business Opportunities

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- Facebook
  - Founded in 2004
  - > 500 million active users
- Taobao
  - Founded in 2003. B2C / C2C online shopping platform
  - $60b transaction in 2010
  - 48k items sold per minute

Business Continues with IPv6

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More…

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- Less complexity
  - Every device has unqiue IP address
  - Network Address Translation (NAT) no longer required
  - Less consideration in HW and SW design
- Peer-to-peer communication
  - Two way applications such as IP Telephony, Video Conferencing and Gaming will be much simpler to develop
- End-to-end IPSec
  - Improve security of data transmission

Future landscape of the Internet – Internet of Things

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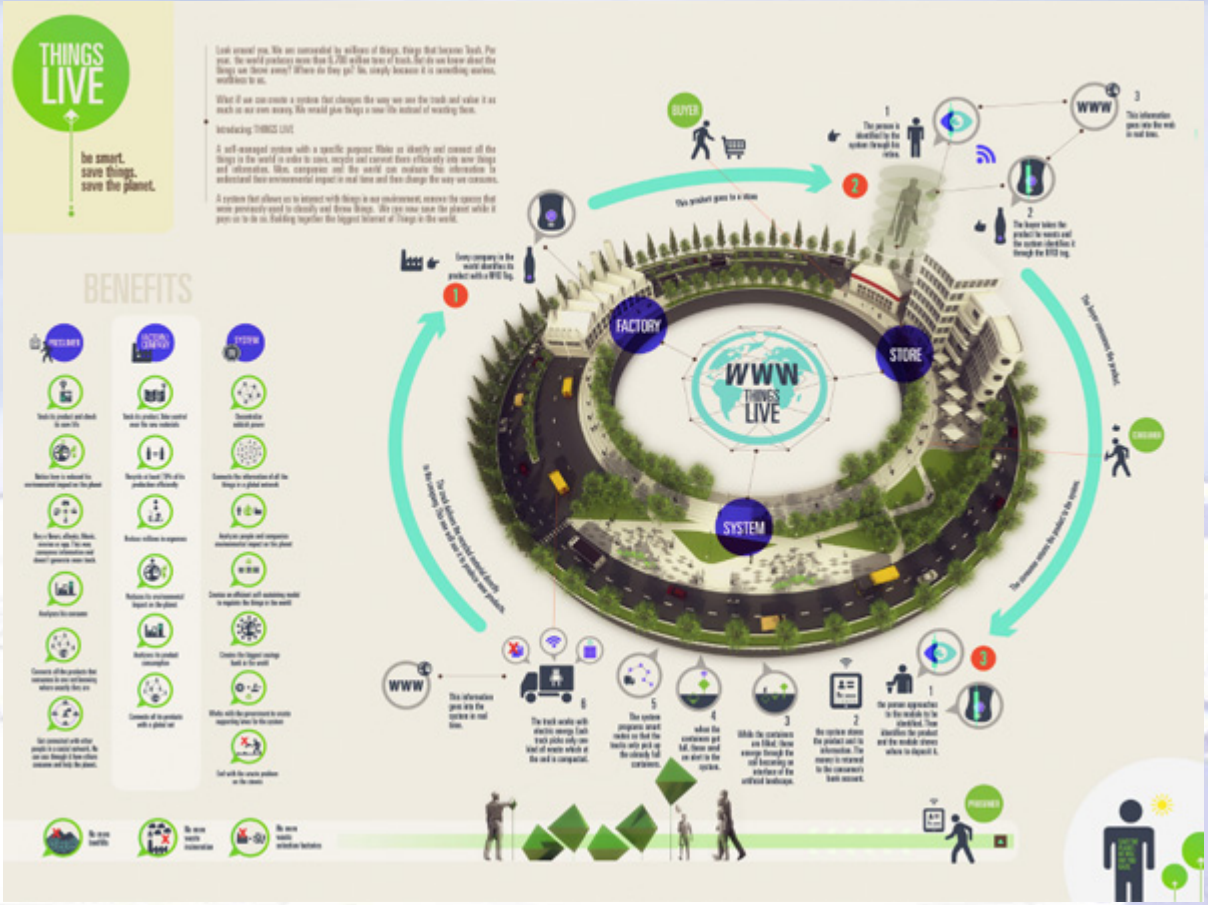

http://www.interactiondesigncontest.com

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SmartGrid

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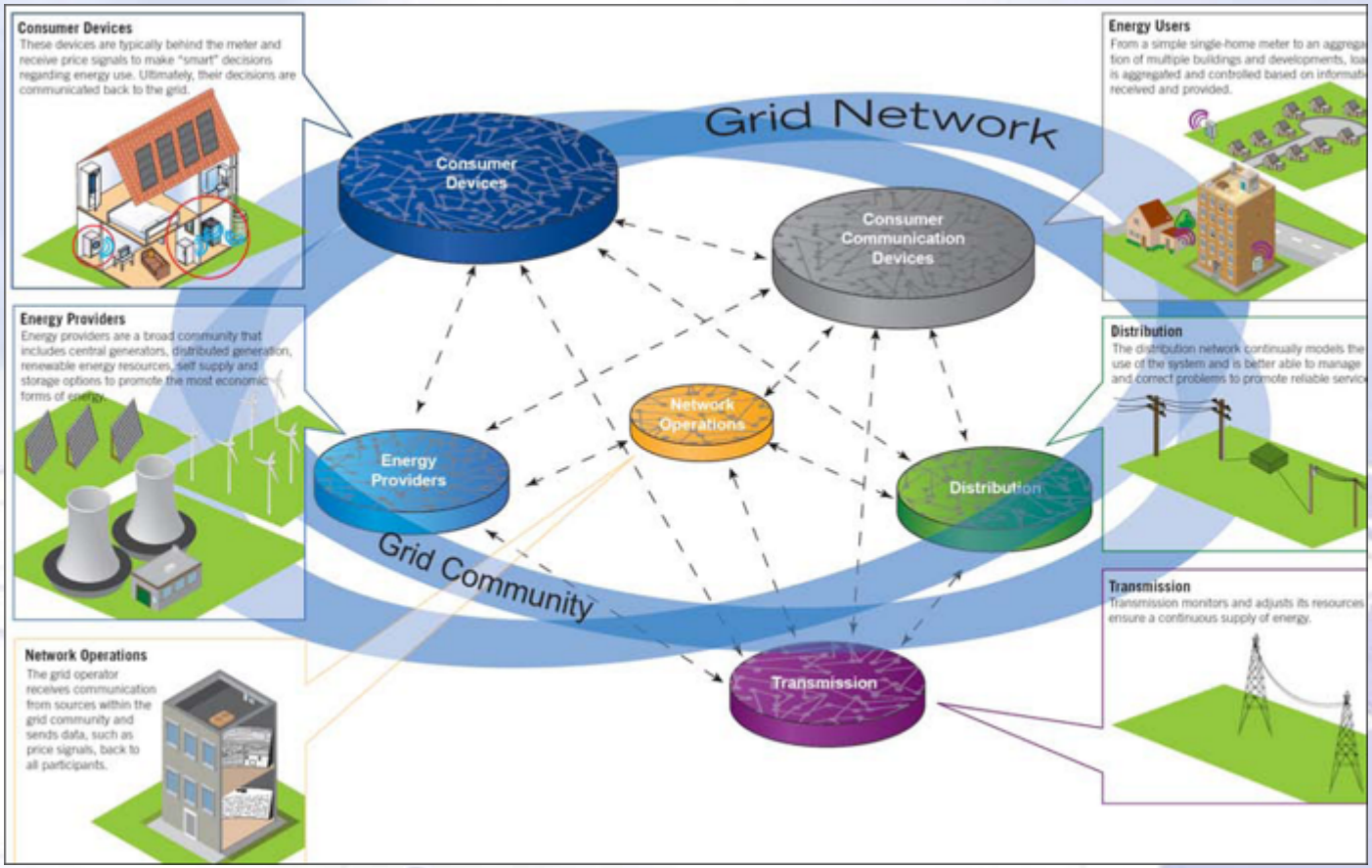

http://lightingcontrolpros.com/the-barriers-to-entry-of-smart-grid-deployment-and-how-to-overcome-them

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Healthcare

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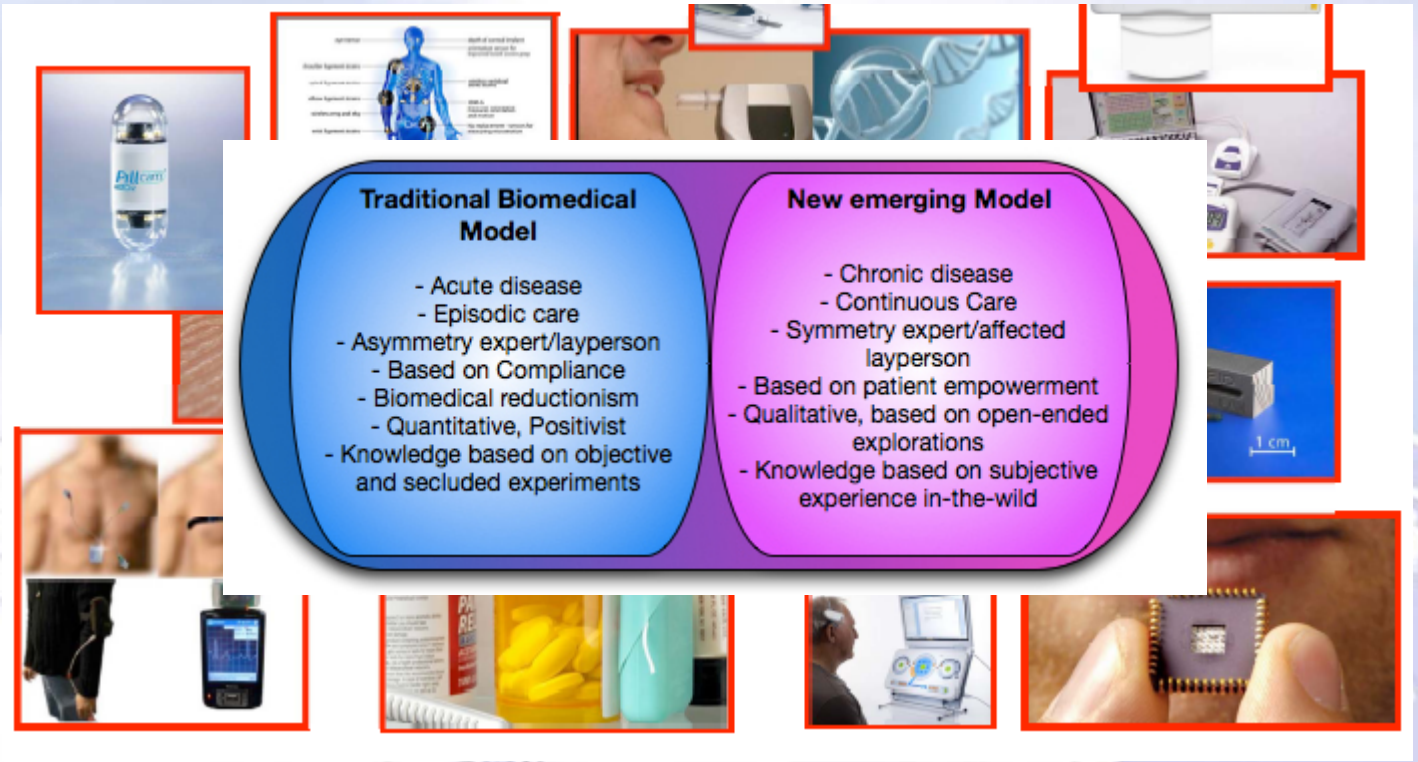

http://www.idc.ul.ie/anders/pdf/Ws5_ReassemblingHealth_Council.pdf
http://www.jopm.org/media-watch/conferences/2010/09/29/report-on-the-reassembling-health-workshop-exploring-the-role-of-the-internet-of-things/

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Transportation

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http://www.coactivate.org/projects/campaign-for.nyc/internet-of-things

Everything in the Cloud

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CPCNet, a wholly owned subsidiary of CITIC Telecom International Holdings Limited (previously CITIC1616) (SEHK: 1883), is a leading communications and security solution provider headquartered in Hong Kong.

A preferred partner by multinational corporations (MNCs) and business enterprises requiring seamless connection to Asia Pacific from different parts of the world, CPCNet is set apart for its breadth of knowledge in the Asia market.




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Our Products & Services

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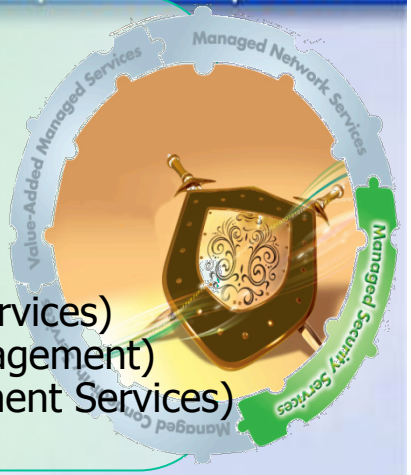
Managed Network

TrueCONNECT™

Managed Security



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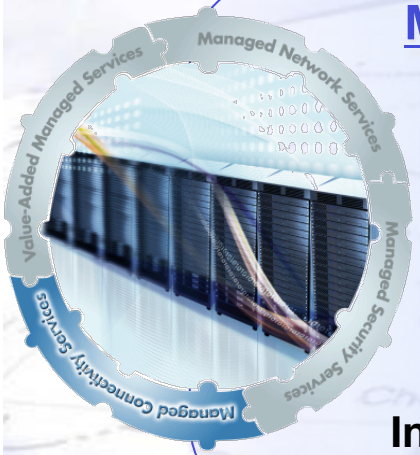

GlobalCONNECT

AlwaysCONNECT

Internet Data Center (IDC)

M@ilSCAN

Vc2 **Managed Video Conferencing Services**

TMS (Traffic Monitoring Services)

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Summary

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IPv4 will definitely run out soon

Service providers & vendors: Do your network infrastructure and products support IPv6?

Content providers & enterprises: Are your online applications compatible with IPv6?

End users: Do your service providers provide IPv6 services?

This is the right moment to start implementing IPv6

Are You Ready ?

Act Now !

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Thank You

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