Move to IPv6 for business continuity

NewMedia Express

FUJITSU THE POSSIBILITIES ARE INFINITE

MEDIACORP 1-Net Singapore

Microsoft

About NewMedia Express

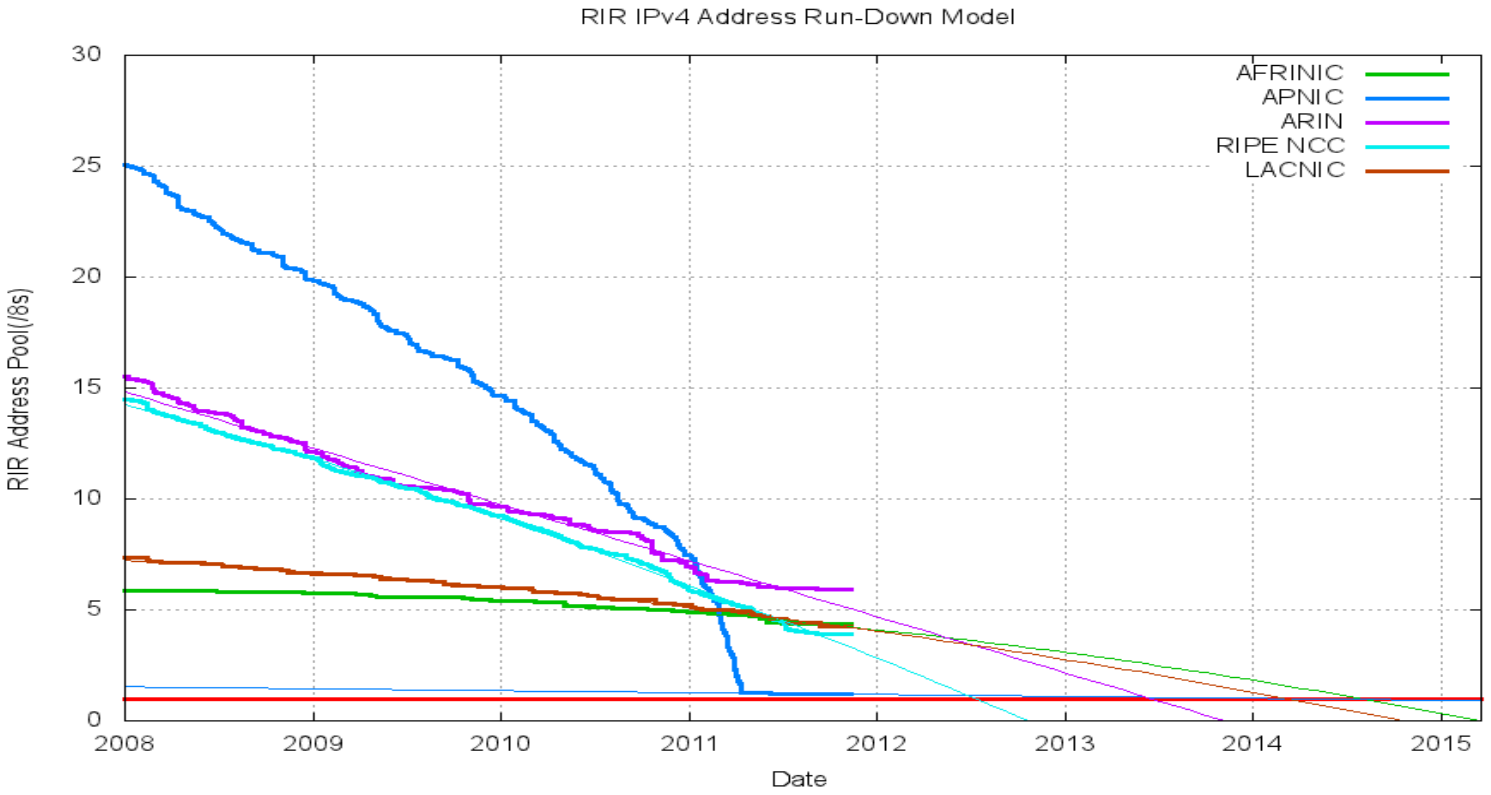
- Managed hosting service provider
- SGNIC accredited registrar (.sg Domain)
- APNIC member
- BGP4 Multihome Network (AS38001)
- Peers with NTT, China Telecom, Starhub, PacNet & SingTel.

Why IPv6

- Most of the internet service providers are facing IPv4 address exhaustion.
- No unallocated IPv4 is available for allocation.
- Huge increase in cost for IPv4 address spaces.
  - Demand is higher than the supply on IPv4 address.
- Customer acquisition is limited due to insufficient IP address.
  - How can we operate and expand our hosting business without additional IP address?

IP Exhausting

- All the organizations providing IP Address Services are running out of IPv4 starting from year 2011.



Benefits of Moving to IPv6

- IPv6 networks provide stateless auto configuration capabilities.
  - IPv4 - Configure manually or with DHCP.
- Vast address space
  - Direct addressing to every single device is possible.
  - Communication to every device will become much easier when all devices have their own unique global IP-address.
  - The elimination of NAT.
- Provides interoperability and mobility which are already widely embedded in network devices.

Benefits of Moving to IPv6

- As a service provider
  - What is the most critical problem we are facing?
  - What is our current scenario?
  - What are the benefits of moving IPv4 to IPv6 in order to expand our business?

Benefits of Moving to IPv6

- IPv4 allocation for customer.
  - 24 blocks of /24 IP addresses
  - Total 6144 IP addresses.
  - Maximum up to 768 customers or devices.
  - Minimum /29 IP block for every single customer and device,8 IP addresses.
  - Insufficient for customers who are providing proxy, dedicated IP web hosting and VPN services.

Benefits of Moving to IPv6

- IPv6 allocation for customer.
  - Up to 4,294,967,296 networks.
  - Minimum /64 IP block for every single customer and device. 18,446,744,073,709,551,616 public IP addresses per customer and device.
    - More than the total number of IPv4 address in the world.
  - Dedicated IP for every single website and other services.
    - Better service isolation and control compared to the shared IP model.

What we are concerning about IPv4 to IPv6 transition

- Router Performance
  - Is our router fast enough to handle IPv6 traffic?
- Operating System
  - Is IPv6 compatible with the current operating system?
- Application and Services
  - Is our application able to receive, process and transfer data through IPv6 network?

What we have done

- To ensure all of our equipments are IPv6 Ready.
  - Routers are IPv6 compatible with no performance degradation in the meantime or after transition.
  - Managed Switch is IPv6 compatible.

What we have done

- Cisco 6500 Series Core Switch
- Supervisor Engine 720
- Firewall Service Module
- Gigabit Switch Module
- 20Gbps Firewall Throughput
- 720Gbps Backbone
- Fully redundant configuration

Performance-Comparison

- **Cisco 3800 Series of Integrated Services Routers**
- **Performance impact is noticeable.**

Frame Size (bytes)	Rel Max Throughput (%) 90% IPv4 / 10% IPv6	Rel Max Throughput (%) 50% IPv4 / 50% IPv6	Rel Max Throughput (%) 10% IPv4 / 90% IPv6	Rel Max Throughput (%) 0% IPv4 / 100% IPv6
86	90.47619048	76.19047619	66.66666667	66.66666667
128	93.10344828	79.31034483	68.96551724	65.51724138
256	94.44444444	79.62962963	70.37037037	66.66666667
512	98.98989899	84.84848485	73.73737374	71.71717172

Performance-Comparison

- **Cisco 6500/7600 Series**
- **No performance degradation**

Frame Size (bytes)	Rel Max Throughput (%) 90% IPv4 / 10% IPv6	Rel Max Throughput (%) 50% IPv4 / 50% IPv6	Rel Max Throughput (%) 10% IPv4 / 90% IPv6	Rel Max Throughput (%) 0% IPv4 / 100% IPv6
86	100	100	100	100
128	100	100	100	100
256	100	100	100	100
512	100	100	100	100

What we have done

- To ensure that all of our domain name servers (DNS) are IPv6 compatible.
  - The most important step on pushing IPv6 as IPv4 replacement.
  - Domain pointed to IPv6 address must be resolvable in IPv6 network.

What we have done

```
; <<>> DiG 9.3.6-P1-RedHat-9.3.6-4.P1.el5_4.2 <<>> speedtest.com.sg A
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 9109
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;speedtest.com.sg.              IN      A

;; ANSWER SECTION:
speedtest.com.sg.       1800    IN      A       202.150.221.170

;; Query time: 3 msec
;; SERVER: 203.116.178.4#53(203.116.178.4)
;; WHEN: Fri Nov 11 12:39:51 2011
;; MSG SIZE  rcvd: 50
```

IPv4 DNS resolution

```
; <<>> DiG 9.3.6-P1-RedHat-9.3.6-4.P1.el5_4.2 <<>> ipv6.speedtest.com.sg AAAA
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 65403
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;ipv6.speedtest.com.sg.         IN      AAAA

;; ANSWER SECTION:
ipv6.speedtest.com.sg.  1800    IN      AAAA    2406:f400:8:8::2

;; Query time: 3 msec
;; SERVER: 203.116.178.4#53(203.116.178.4)
;; WHEN: Fri Nov 11 12:37:38 2011
;; MSG SIZE  rcvd: 67
```

IPv6 DNS resolution

What we have done

- Ensure upstream is IPv6 Ready.
- Peers with
  - SGIX
  - HURRICANE ELECTRIC
  - GLOBAL TRANSIT
  - SOFTLAYER
  - STARHUB

IPv6 – Difficulties

- Operating System Compatibility
  - Most of the Operating Systems after 2003 are supported, especially LINUX.
  - Managing and configuring IPv6 on Windows Server 2003 is complicated.
- Application and Services
  - Cpanel & WHM as our primary cloud hosting platform.
  - Cpanel is commonly used in the hosting market today.
    - Version with IPv6 supported still under implementation.
    - According to the document of implementation update, they are trying to complete IPv6 support by version 11.36. (current version is 11.30)

IPv6 - Benefits to our services

- What will IPv6 benefit to our cloud hosting business?
  - IPv4 - All accounts are sharing one IP address for web and email services.
  - IPv6 – We can allocate dedicated IP for individual account, even dedicated IP for web and email services.
    - Easier for managing and controlling individual service.
    - Better service isolation.

IPv6 - Benefit to our service

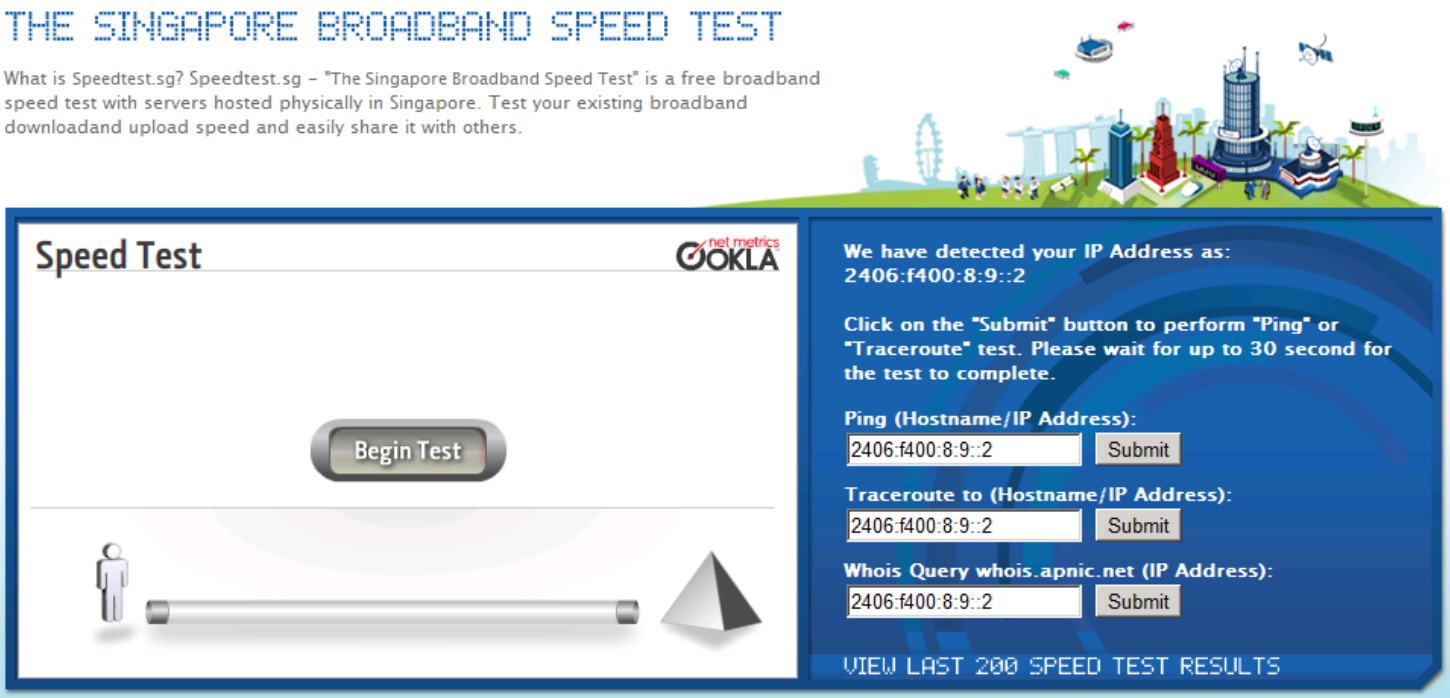
- Dedicated Server , Cloud Server and Colocation Services?
  - Vast of IPv6 address
  - Cost saving – You can get more IP addresses with much lower price.
  - Dedicated IP for individual website and service running on the same server.
  - Accessible to all of the services available in IPv6 network around the world.

IPv6 – Contents

- Who are providing contents over IPv6 network?
  - More than 400 companies participated the World IPv6 Day – e.g.: Google , Youtube , Facebook , Yahoo , W3C and etc.
  - On World IPv6 Day - 65% increase in IPv6 traffic seen by Google.
  - Number of IPv6 participants still keep growing rapidly every year.
    - Especially in these 2 years.

IPv6 – Contents

- Our Speedtest website is IPv6 ready



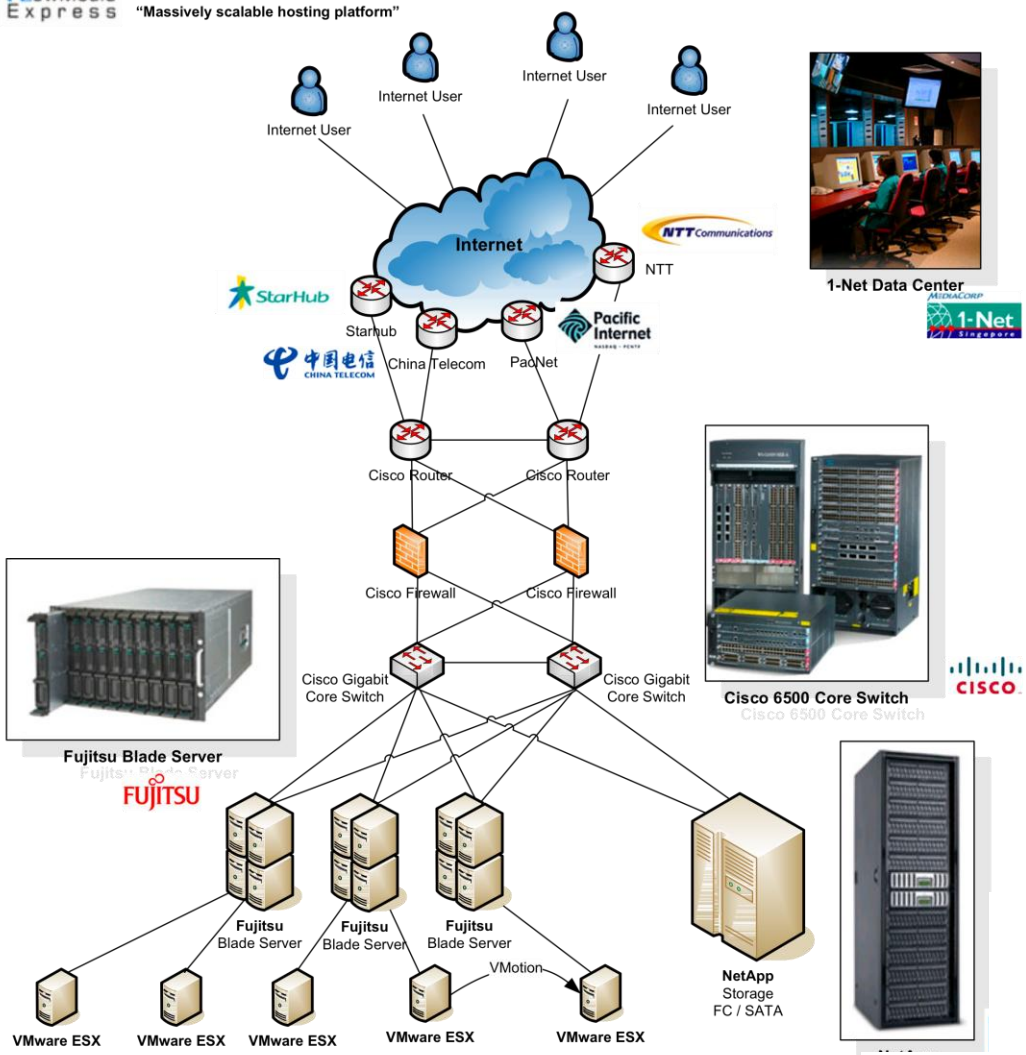
IPv6 - Today or the Future?

- Nowadays, IPv6 is widely adopted.
  - Start growing extremely fast in this year.
  - We have allocated IPv6 address to cloud server, dedicated server and colocation customers.
  - We have 2-5% new customers request for IPv6 since 2011.
- What is your decision ? Staying on IPv4 or moving to IPv6?
  - As a content and service provider , IPv6 is what we are looking for.
  - Since our network is IPv6 Ready , means more contents will be available on IPv6 network once our web servers and Cpanel are fully IPv6 supported.

NewMedia Express

NGrid Infrastructure

"Massively scalable hosting platform"



Thank you!

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