

Adding IPv6 to the application layer

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Background



www.livedoor.com

(*)

2.3 billion PV/month

23 million UU/month

* autumn 2008



www.data-hotel.net

LIVEDOOR/AS17707

APNIC member

EDGE Co.Lab v6
provides IPv6 testing environment.

Problems at the beginning

- A lot of problems.
- What I need to do?
- How can I develop web applications on IPv6?
- Not found any useful tips, hints.

Research and development

- I researched and developed.
- Blogged it.
- "8 tips how to add IPv6 to your application if you don't have enough knowledge about it"
- <http://tinyurl.com/IPv6-dev-ja>
- English version is brought to you now!

#1 You need IPv6 connectivity

- Each gateways should handle IPv6.
- Each OS should handle IPv6.
 - ... or IPv4 client -> IPv6 HTTP proxy
- Some of enterprise load balancer often don't support IPv6.

#2 SSL server ID is same as before

- Using SSL
 - IPv4 server ID $\Leftrightarrow$ IPv6 server ID (same!)
 - Established $\rightarrow$ SSL server key exchange (immediately)
- It doesn't matter which version of IP you're using.

#3 Easy Apache configuration

- Apache 2.x (or later) + APR (Apache Portable Runtime) are IPv6 ready!
- There are few differences.

#3 Easy Apache configuration

- IPv4

```
Listen 192.0.2.36
NameVirtualHost 192.0.2.36
<VirtualHost 192.0.2.36>
:
</VirtualHost>
```

#3 Easy Apache configuration

- IPv6

```
Listen [2001:db8::dead:beef]:80
NameVirtualHost [2001:db8::dead:beef]:80
<VirtualHost [2001:db8::dead:beef]:80 >
:
</VirtualHost>
```

#3 Easy Apache configuration

- Exceptional case

```
Allow from 192.0.2.8/29  
Deny from 192.0.2.16/29  
Allow from 2001:db8::c0:ffee/10
```

#4 ping and traceroute aren't able to use on IPv6

- We usually use ping and traceroute command.
- Most of connecting commands are suffixed with “6”.

```
C:\WINDOWS>tracert6 2001:db8:bad:face::dead
```

#5 Use AAAA record in DNS

- We use A record.
 - Names won't be resolved to IPv6 address.
- Add IPv6 entries to the AAAA (quad-A) record.

#6 Which version of IP is the client using?

- Dual-stack and same hostname.
- Vary based on the version.
- **REMOTE_ADDR** environment variable.
- You don't need to check the format of addresses strictly.

#6 Which version of IP is the client using?

- Listening to proxied requests from reverse proxy.
- Add extra header on reverse proxy with using mod_headers.

#6 Which version of IP is the client using?

```
Listen 80

# IP-based virtual hosting
<VirtualHost [2001:db8::babe::face]:80>
    ServerName babeface.example.com
    RewriteEngine On
    :
    RequestHeader set X-IP-Version 6
</VirtualHost>

<VirtualHost 192.0.2.1:80>
    ServerName babeface.example.com
    RewriteEngine On
    :
    RequestHeader set X-IP-Version 4
</VirtualHost>
```

#6 Which version of IP is the client using?

- Getting IP version.
- **HTTP_X_IP_VERSION** environment variable is 4 or 6.

#7 Expand the column length

- To save remote addresses into the DB.
 - IPv4 **255 . 255 . 255 . 255**
 - IPv6 **FFFF : FFFF : FFFF : FFFF : FFFF : FFFF : 255 . 255 . 255 . 255**
 - **INET_ADDRSTRLEN (16) - 1 (nul)**
 -> INET6_ADDRSTRLEN (46) - 1 (nul)
 - 15 bytes -> 45 bytes

#8 Check the access log parser

- Many access log parsers.
- Some of them are failed to parse some lines (including IPv6 address).
- Check your parser.

Critical issues

- Web application developers:
 - are poorly informed about IPv6.
 - have misunderstandings of IPv6.
 - know that IPv4 will be exhausted.
 - aren't sure when it will be exhausted.
 - hope that some new technology will appear to avoid IPv4 exhaustion.
 - aren't motivated to add IPv6.
 - think that IPv6 doesn't have any advantages.
 - don't think that IPv4 has some serious disadvantage.

Critical issues

Imagine

The all of interesting websites
will be phased out in **2011**.

Conclusion

- Please call out and introduce the fact to some L7 developer you know.
- I wish this slides will be Bible for web application developers.

Bridging the layers is our task.

Thank you

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