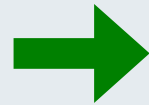


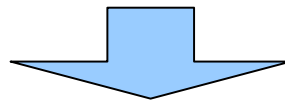
# FREE's native IPv6 Deployment with 6rd (draft-despres-6rd-02)

Activer le support IPV6. Cette option ne fonctionne qu'en zone dégroupée.

**Support IPV6:**



Activer

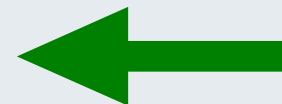


Votre adresse IP

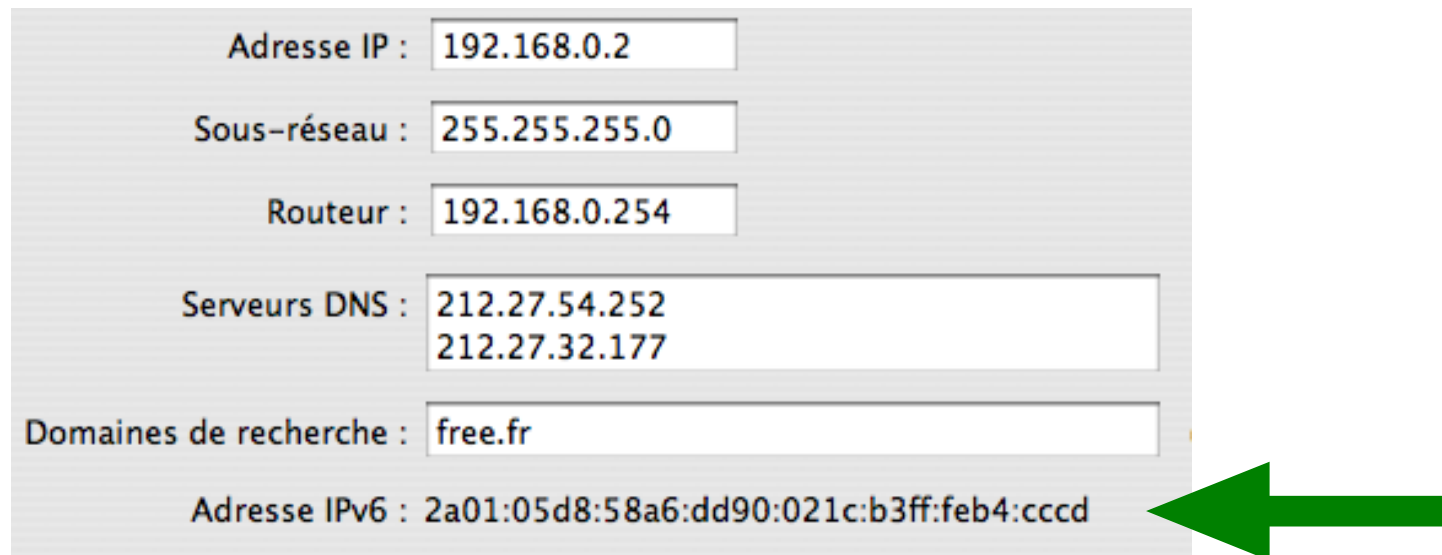
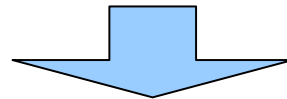
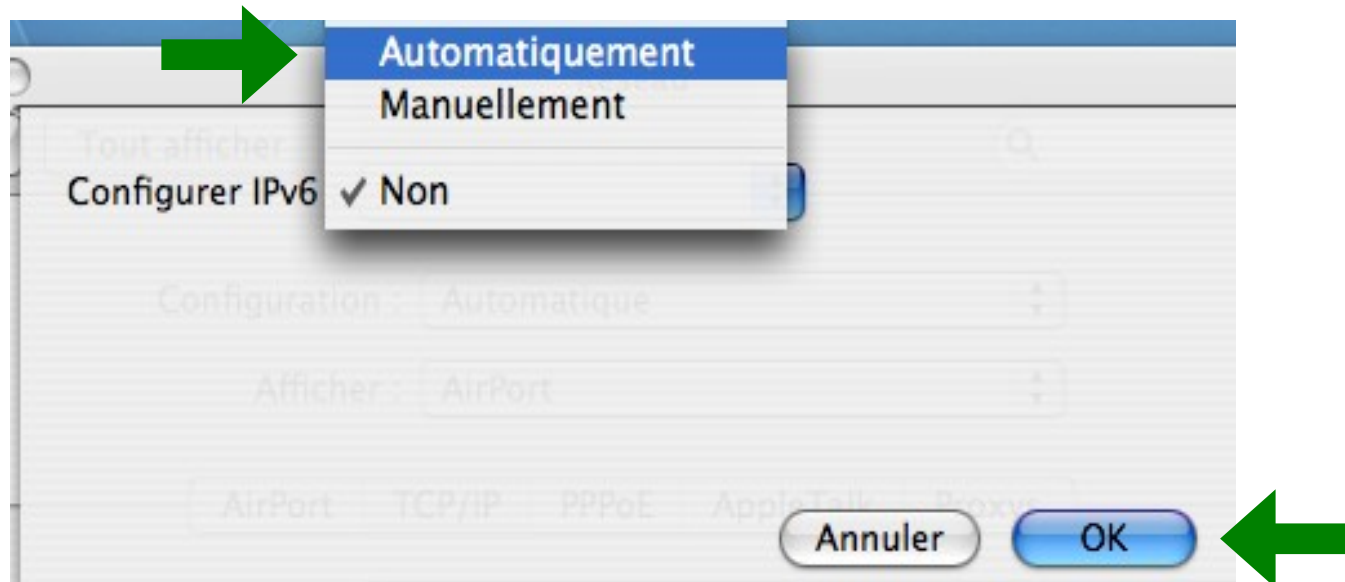
**88.166.221.144**

Votre Préfixe IPv6

**2a01:5d8:58A6:DD90::/64**



# HOST ACTIVATION (Mac OS X Tiger)

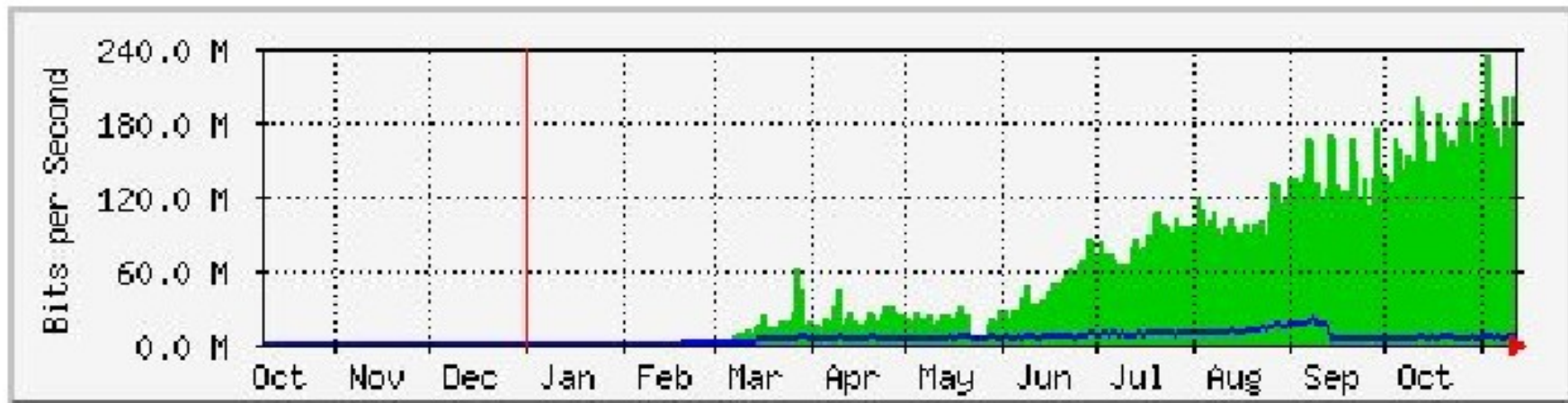


# In less than 5 weeks !

- **Before nov 2007:** at FREE, **"no short term need for IPv6"**
- **Nov 7<sup>th</sup>:** 6rd principle presented by RD to FREE
- **Nov 7<sup>th</sup> at night:** FREE asks for an IPv6 prefix => /32
- **Nov 18<sup>th</sup>:** "Done!" IPv6 prefixes confidentially available
- **Dec 4<sup>th</sup>:** Evaluation after early trials
- **Dec 11<sup>th</sup>:** Press release – **"IPv6 unicast available"** (/64)  
**Opt-in service to > 1.5 million customer sites**
- **Feb 2008:** FREE obtains a /26 (=> /58 to customers)
- **March 2008:** FREE's site-to-site Teleservice based on IPv6

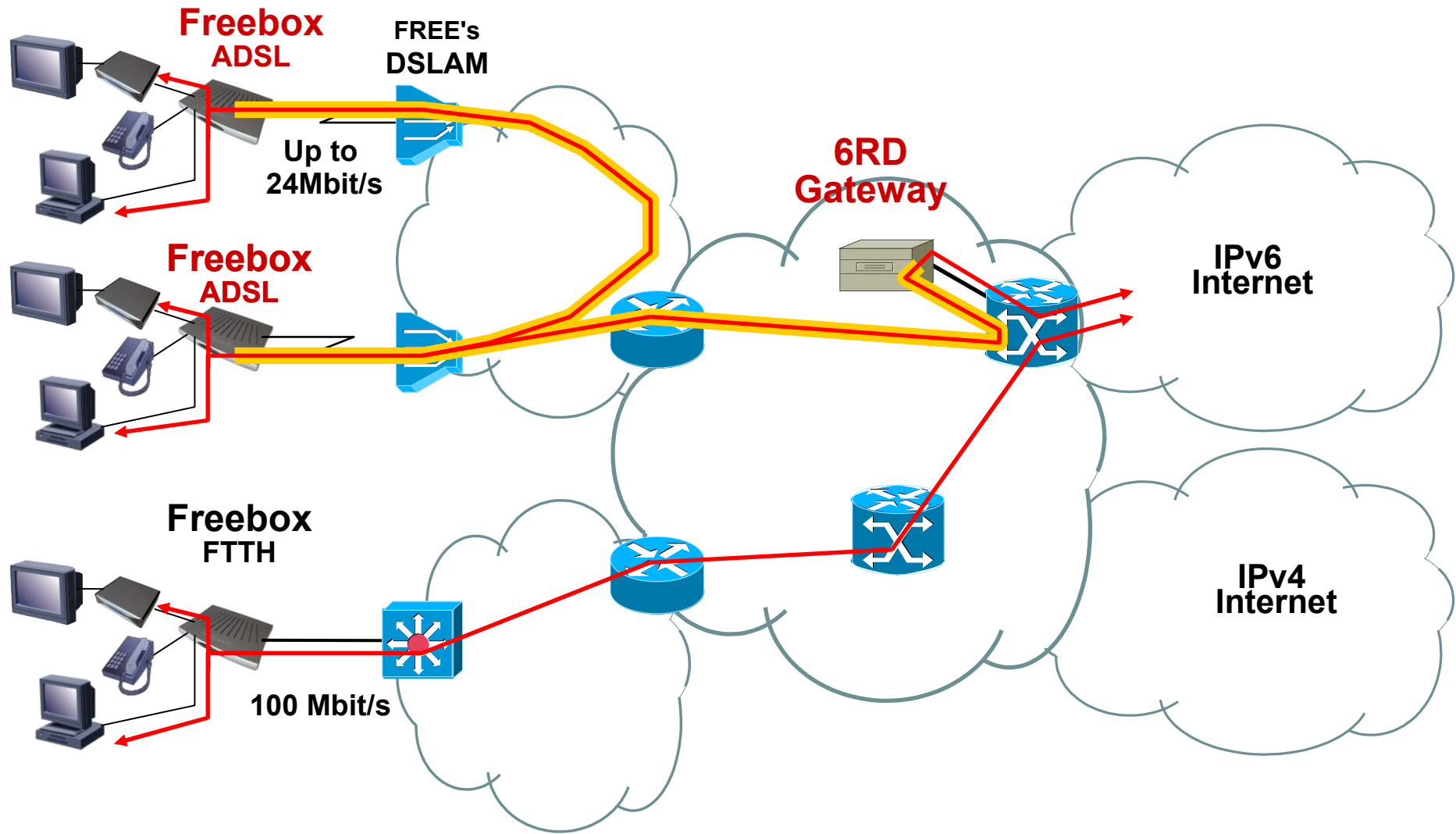
# 2008 IPv6 steady growth (Peering Only)

'Yearly' Graph (1 Day Average)



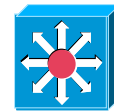
	<b>Max</b>	<b>Average</b>	<b>Current</b>
<b>In</b>	233.9 Mb/s (2.3%)	72.6 Mb/s (0.7%)	199.7 Mb/s (2.0%)
<b>Out</b>	19.3 Mb/s (0.2%)	5713.0 kb/s (0.1%)	5593.4 kb/s (0.1%)

# FREE's IPv6 paths



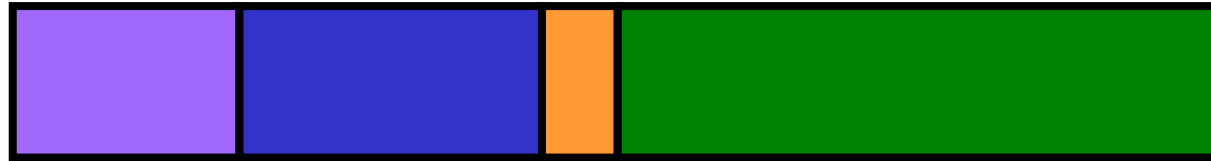
↔ Native IPv6

↔ IPv6 encapsulated in 6RD



Cisco routers

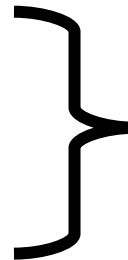
# 6rd general address format



ISP IPv6 prefix

Site IPv4 address

Customer part



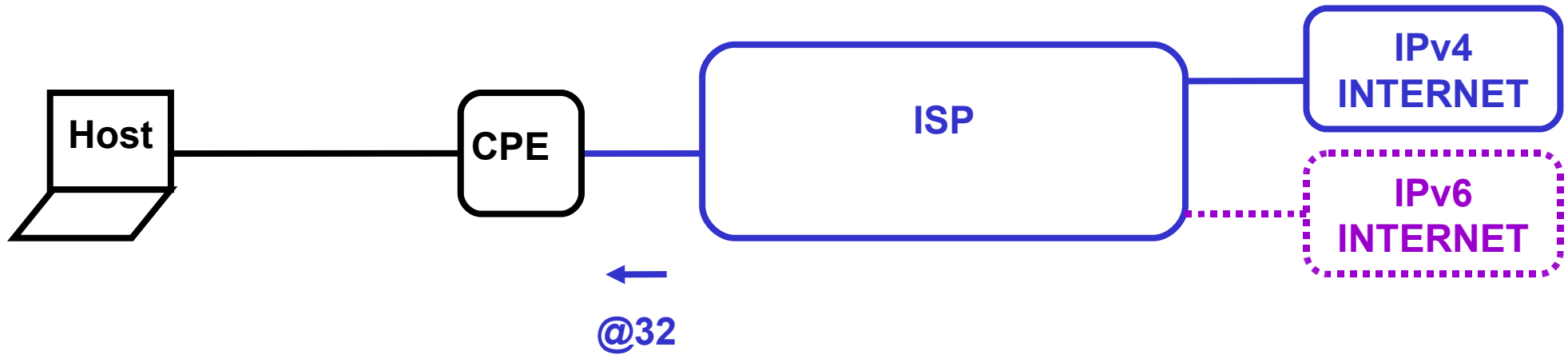
ISP part



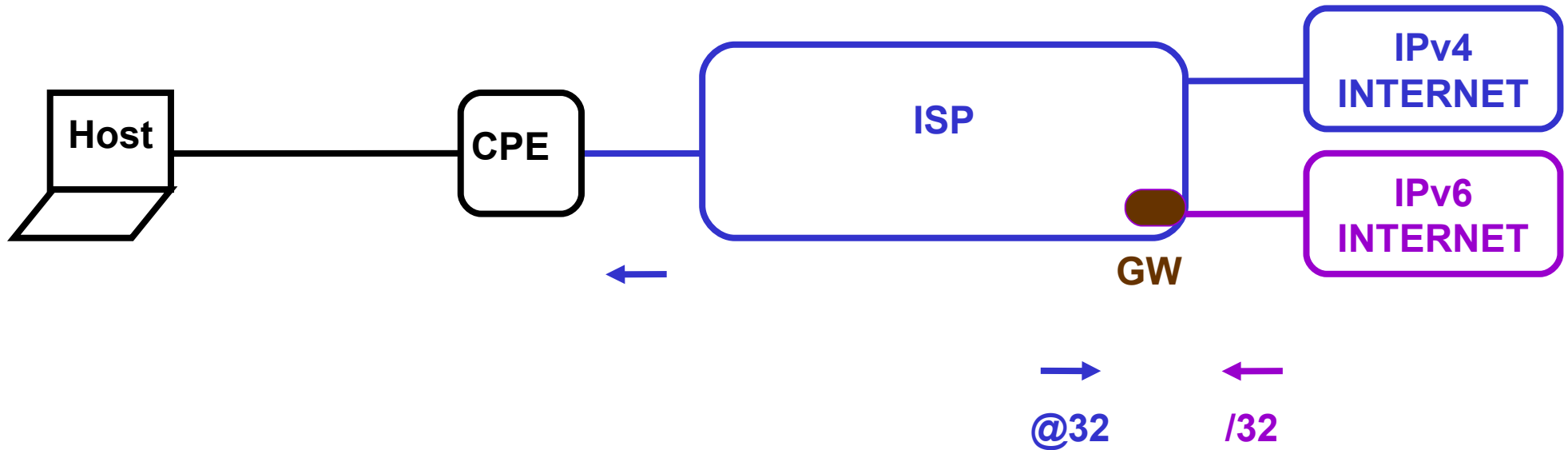
Intra-site subnet ID

Host interface ID

# How it happened (1)

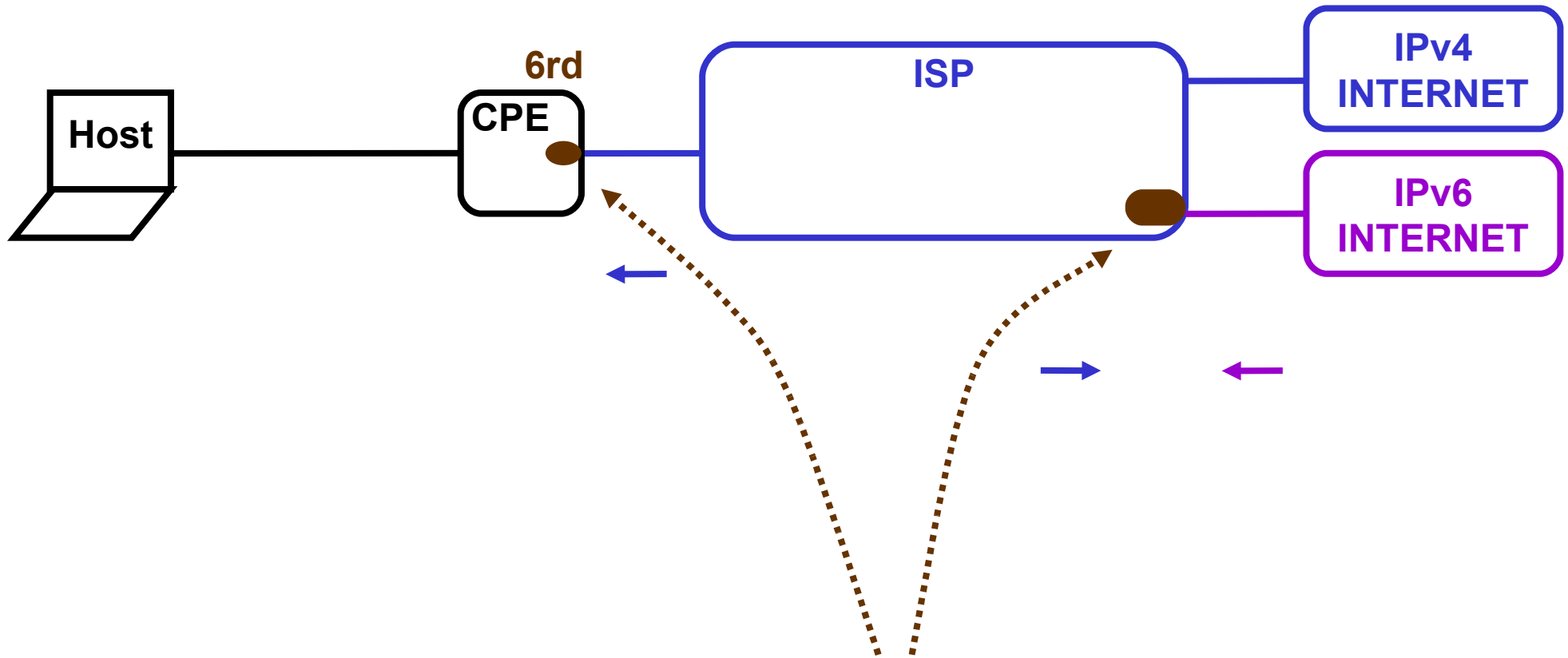


# How it happened (2)



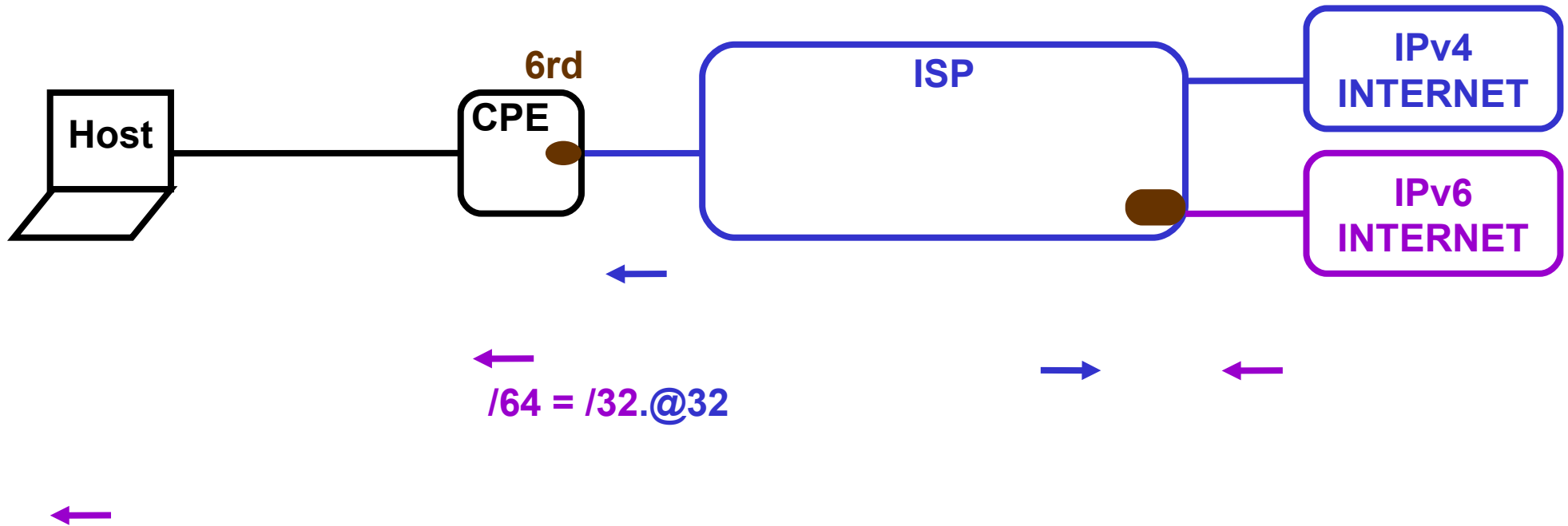


# How it happened (3)

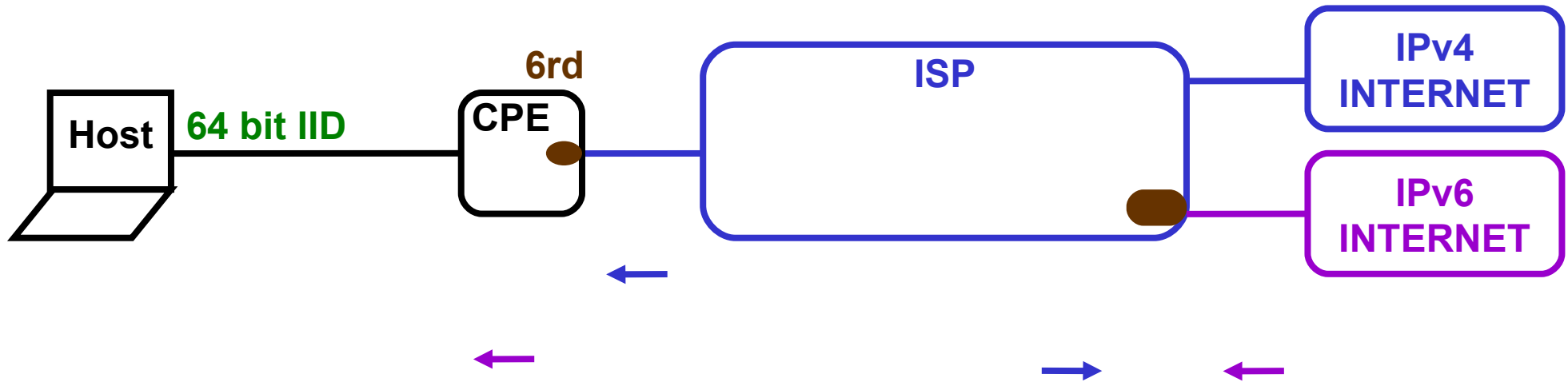


**ENCAPSULATION of IPv6 in IPv4  
with 6to4 prefix replaced by 6rd ISP prefix**

# How it happened (4)



# How it happened (5)



@128 = /32.@32.IID-64

(Native)

# Recognizing IPv6 with ShowIP

showIP - Recherche Google

http://www.google.fr/search?hl=fr&q=showIP

Web Images Maps Actualités Vidéo Gmail plus

Google

showIP

Rechercher

Recherche avancée Préférences

Rechercher dans :  Web  Pages francophones  Pages : France

Web Résultats 1 - 10 sur un total d'environ 953 000 pour showIP (0,35 secondes)

[www.showip.com](http://www.showip.com) - (ro) - [ Traduire cette page ]  
www.showip.com. Your IP address is 66.249.73.143. Your browser is claiming to be: "Mozilla/5.0 (compatible; Googlebot/2.1; +http://www.google.com/bot.html)" ...  
[www.showip.com/](http://www.showip.com/) - 4k - [En cache](#) - [Pages similaires](#)

[ShowIP :: Firefox Add-ons](#) - [ Traduire cette page ]  
the version available at [http://firefox-showip.googlecode.com/files/showip\\_0.8.17pre2.xpi](http://firefox-showip.googlecode.com/files/showip_0.8.17pre2.xpi)  
where a switch in the preferences dialog has been added to force ...  
<https://addons.mozilla.org/firefox/addon/590> - 32k - [En cache](#) - [Pages similaires](#)

[ShowIP - Geckozone - Extensions en français pour Mozilla, Firefox ...](#)  
Bienvenue sur le portail Geckozone des extensions pour Mozilla en français. Ce portail est une liste des extensions pour les logiciels Firefox, Thunderbird, ...  
[extensions.geckozone.org>ShowIP](http://extensions.geckozone.org>ShowIP) - 16k - [En cache](#) - [Pages similaires](#)

[Show IP - what is my ip address](#) - [ Traduire cette page ]  
Shows what your ip address is, which browser you are using and much more.  
[showip.net/](http://showip.net/) - 19k - [En cache](#) - [Pages similaires](#)

Terminé

2003-4960 x003-68 +4

**IP address :**  
**- Green in IPv6**  
**- Red in IPv4**

# Looking at an IPv4-IPv6 TCP mix

The screenshot shows a 'Utilitaire de réseau' (Network Utility) window with the 'Netstat' tab selected. The window displays a list of active TCP connections. The connections are categorized into three groups by brackets on the left: IPv4, IPv6, and Localhost.

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	(state)
tcp4	0	0	192.168.0.10.49410	ww-in-f136.google.http	CLOSE_WAIT
tcp4	0	0	192.168.0.10.49409	ag-in-f100.google.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49408	ag-in-f100.google.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49407	209.85.227.136.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49405	209.85.227.91.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49403	209.85.227.136.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49401	209.85.227.91.http	ESTABLISHED
tcp4	0	0	192.168.0.10.49399	209.85.227.91.http	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49398	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49397	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49396	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49395	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49394	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49393	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49391	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49390	2001:4860:a003::80	ESTABLISHED
tcp6	0	0	2a01:e35:8a6d:d9.49389	2001:4860:a003::80	ESTABLISHED
tcp4	0	0	localhost.netinfo-loc	localhost.999	ESTABLISHED
tcp4	0	0	localhost.999	localhost.netinfo-loc	ESTABLISHED
tcp4	0	0	localhost.netinfo-loc	localhost.1005	ESTABLISHED
tcp4	0	0	localhost.1005	localhost.netinfo-loc	ESTABLISHED

# What next ?

- **Obtain an RFC (draft-despres-6rd-02)**
- **Other ISPs? Including Mobile Operators?**
- **Support in customer-owned CPEs?**  
**In hosts?**
- **Extend the 6rd model to avoid NATs in IPv6?**  
**(draft-despres-sam-02 at 74th IETF)**

# Thank you

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draft-despres-6rd-02