

# 2 jokes, 1 and half proposal (IPv6 and the broadband)

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  - Are you looking for something under the light?
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# The joking session

My father told me a joke if he could not explain something otherwise

1, Are you looking for something under the light?

2, What makes the difference between a physicist and a mathematician?

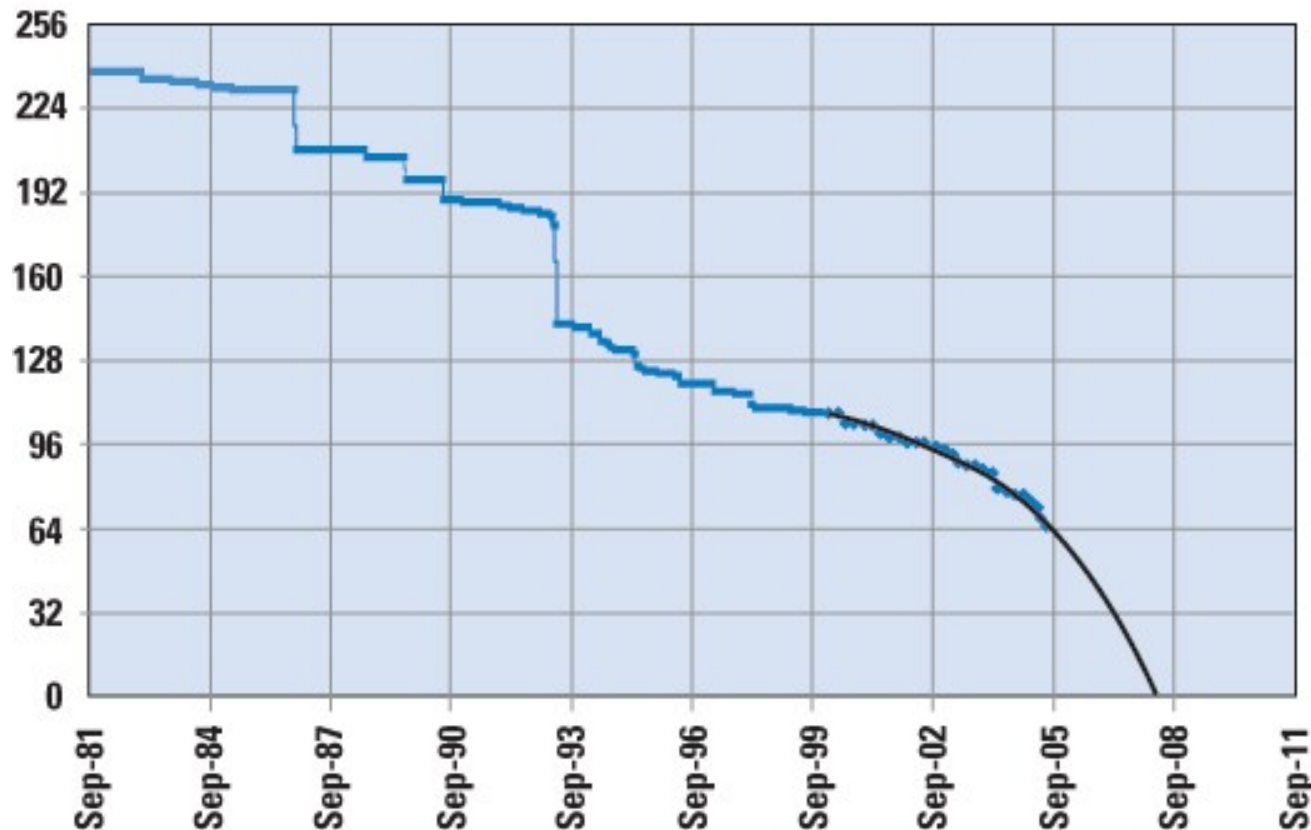
How to make tee?

- Tap, water, kettle
- Empty kettle
- Water in the kettle, hot water in the kettle
- Hot milk in the kettle!

# Why broadband is a problem for IPv4 address space? IPv4 address space exhaustion: cautious scenario

Cautious: not to underestimate the problem Tony Hain:  
(Internet Protocol Journal, Sept. 2005.)

A Pragmatic Report on IPv4 Address Space Consumption



# Why broadband is a problem for IPv4 address space? IPv4 address space exhaustion: optimistic scenario

Optimistic: not to overestimate the problem

Geoff Huston: [www.potaroo.net/tools/ipv4/](http://www.potaroo.net/tools/ipv4/)

Various mathematical methods in use

Updated daily, on 31. July 2007:

**Projected IANA Unallocated Address Pool Exhaustion: 16-Apr-2010**

**Projected RIR Unallocated Address Pool Exhaustion: 15-Feb-2011**

**Two years ago, the estimated time was much longer!**

# What is the reason of the change? The hunger of the broadband increases

Broadband: Dynamic IP(v4) address allocation

Good old days: dial in 5 - 10%

Good old days: Broadband - 50%

VOIP: (will) provoke semi-always-on! ->100%

There is not enough address space left for massive always-on  
**even today!!**

# Why broadband is a problem in case of using IPv6?

Where are the standards?

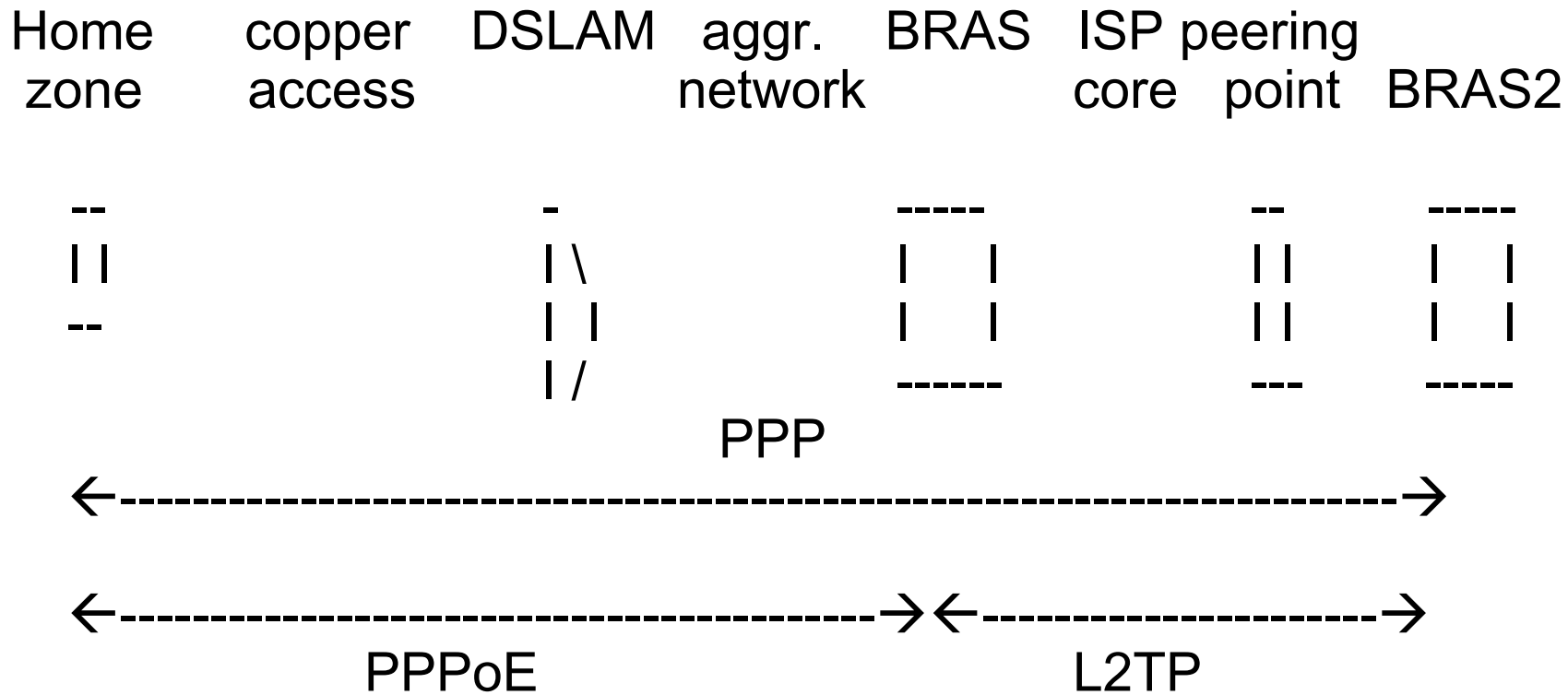
- Cable TV: DOCSIS 3.0 (May 2007)
- DSL ??? DSL-FORUM ???

The bottleneck of IPv4->IPv6 transition is in the DSLAMs and around.

Regulatory issues

DSL is still dial-in like service, and regulators seems not to be ready to accept something else

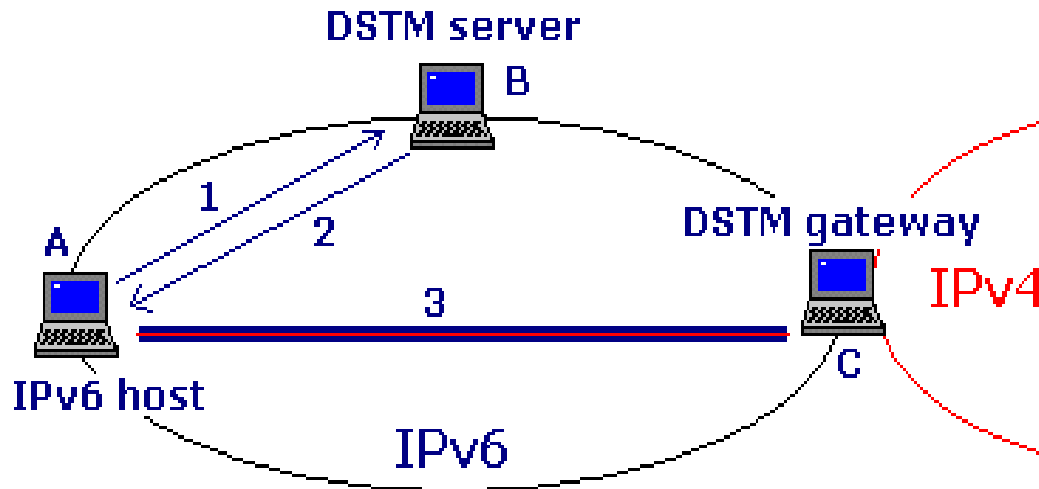
# How the DSL based IP(v4) service works user@anotherISP.net



IP(v4) address allocation starts at BRAS2, a RADIUS server in the background



# How the DSL based IP(v6) service might work (1) (DSTM-like)



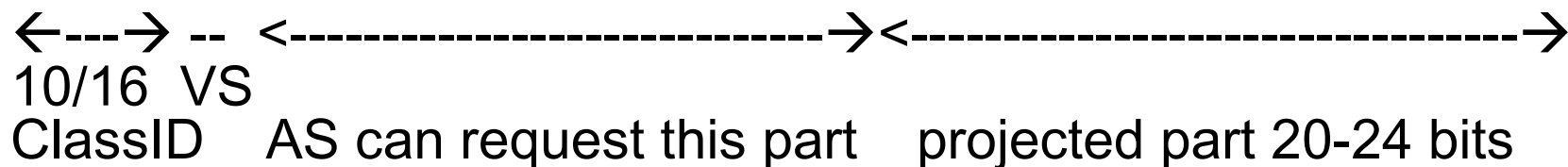
How to replace RADIUS based accounting / invoicing?

# IPv6 addresses calculated from IPv4 dynamic addresses

Some similarities with 6to4

However:

- Reusable addresses included
- Additional, AS specific prefix part
  - Variable length: one class for /8s (IPv4), other for /12s
- IPv4 address not mapped, but projected



$$64 = 16 + 2 + 22 + 24$$

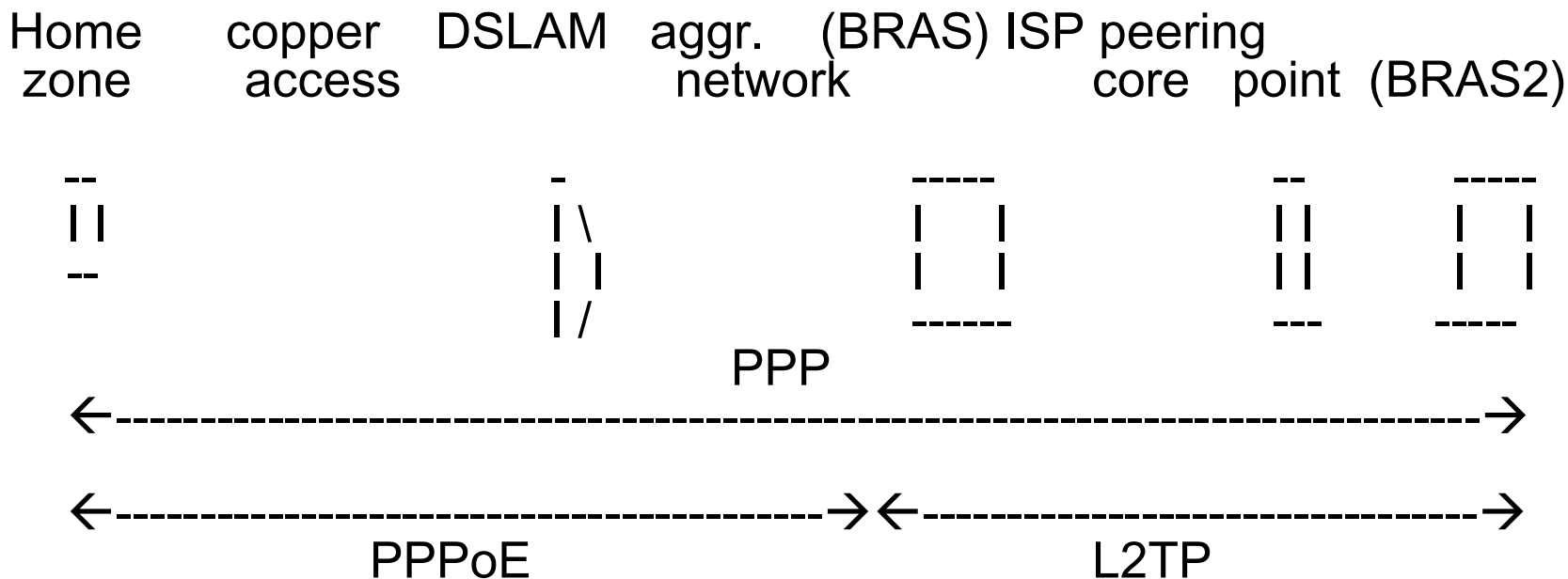
$$64 = 16 + 2 + 26 + 20$$

ClassID: IANA

AS-prefix: RIR

projection: ISP (AS)

# How the DSL based IP(v6) service might work (3) (IPv6 addresses calculated from IPv4 dynamic addresses)



RADIUS accounting, dual IPv4/IPv6 stack can be kept!

How to have IPv4 addresses?  
(new, reusable addr. class: AS-local)

# IPv6 addresses calculated from IPv4 dynamic addresses

Some similarities with 6to4

However:

- Reusable addresses included
- Additional, AS specific prefix part
  - Variable length: one class for /8s (IPv4), other for /12s
- IPv4 address not mapped, but projected



10/16 VS

ClassID AS can request this part projected part 20-24 bits

$$64 = 16 + 2 + 22 + 24$$

$$64 = 16 + 2 + 26 + 20$$

ClassID: IANA

AS-prefix: RIR

projection: ISP (AS)

# New reusable address class: AS-local

Details in Draft-scopedIPv4AS-00

Similarities with private IP addresses, BUT

Scope: AS

Routable within the AS

Allocated by IANA and contributors

For dynamic allocation, might be revoked

Dark address space might be part of it

# Resolution

## What to add?

### Crucial points:

- Content provision over IPv6
- IETF and RIPE working group
  - IPv6 support for broadband
  - New transition scenarios in case of broadband
  
- FP7 special projects (the Commission should do something also)
  - IPv6 awareness for endusers
  - Research support
  
- Regulation?

# Summary

There is a bottleneck of IPv4->IPv6 transition is in the DSLAMs and around.

New protocols and standards needed urgently

Included:

A new, reusable IPv4 address class (AS-local)  
IPv6 address class: calculated from IPv4 dynamic addr.

# Acknowledgement

Janos Mohacsi, Ruediger Volk

Attila Balogh

Many thanks for your attention!

Je Vous remercie votre attention!

Questions?