

# Connecting enterprise network to V6 backbone over a tunnel

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# V4 and V6

🔵 Welcome and Happy new year 2006, IPV6

🔵 And you IPV4, I still love you

-I trust Geoff Huston and other experts who have projected that at today's consumption rates you could last another 15 to 20 years.

-I run my IPV6 over you until i have a local V6 provider

-Thanks for serving us for so long

-Happy new year 2006



# Who are we ?

- Technologies Réseaux & Solutions is a trainings and services company, based in TOGO, very active in networking and open source.

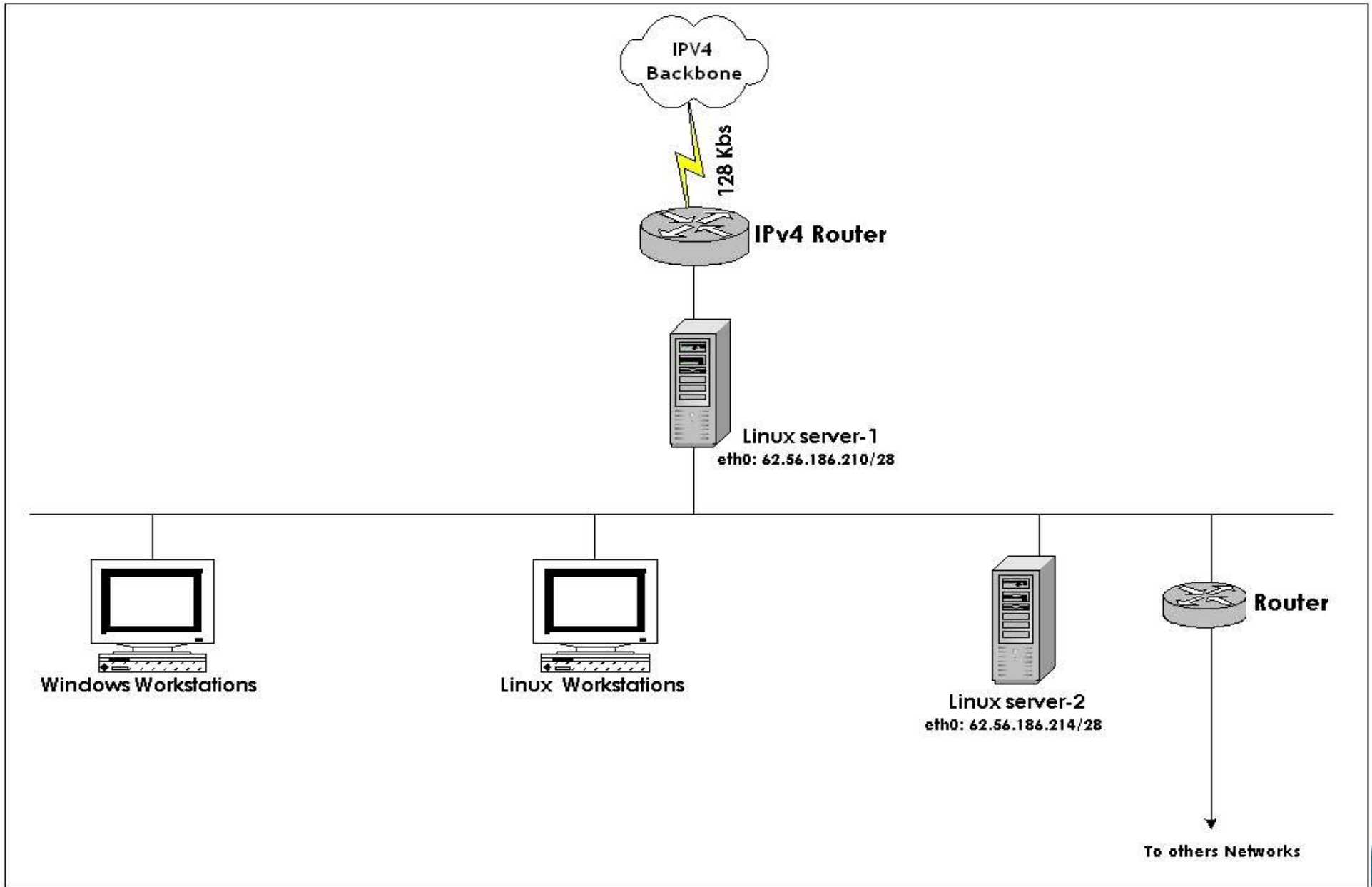
  - <http://www.trstech.net>

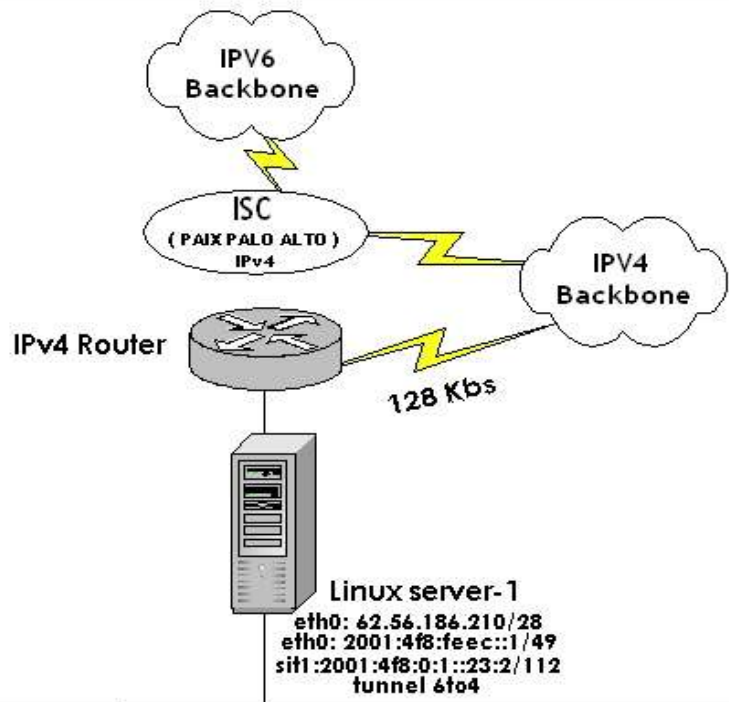
    - Be prepared to read french

- Since february 2005, we are connected to IPV6 backbone through a tunnel over V4 to ISC in USA

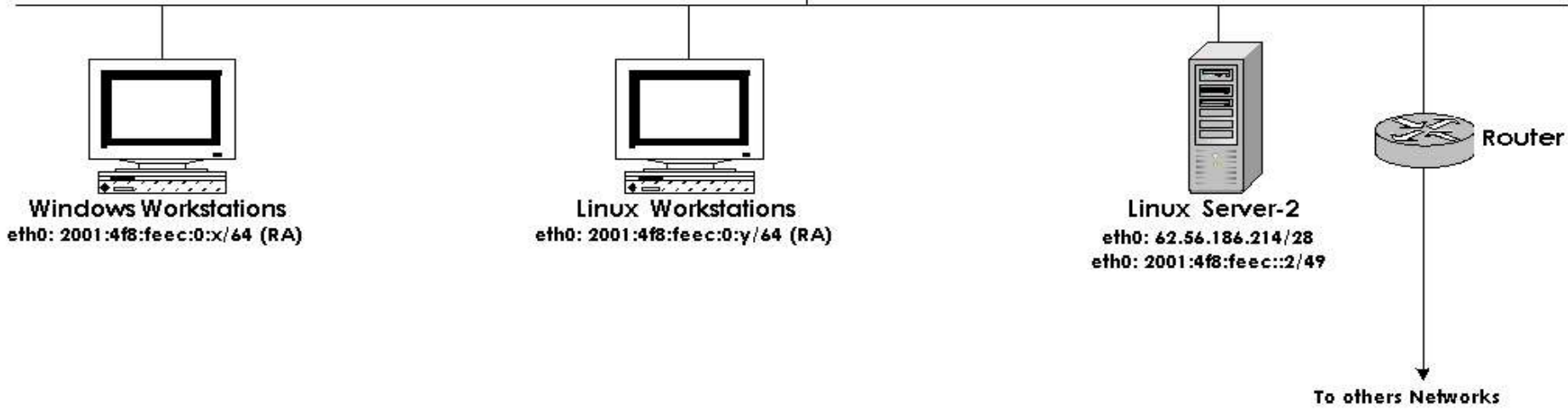
  - <http://www.trstech.net/connexionIPV6.htm>







**Linux server-1**  
eth0: 62.56.186.210/28  
eth0: 2001:4f8:feec::1/49  
sit1:2001:4f8:0:1::23:2/112  
tunnel 6to4



# The tunnel (RFC 2893, now RFC 4213)

## Linux box at TRSTECH

### /etc/sysconfig/network

NETWORKING\_IPV6=yes

IPV6\_GATEWAYDEV=sit1

### /etc/sysconfig/network-scripts/ifcfg-v6bone

#ipv6 tunnel interface

DEVICE=sit1

ONBOOT=yes

BOOTPROTO=none

IPV6INIT=yes

IPV6TUNNELIPV4=192.5.4.244

IPV6ADDR=2001:4f8:0:1::23:2/112

### /usr/sbin/ipv6

#!/bin/bash

ip -6 addr add 2001:4f8:feec::1/49 dev eth0

ip -6 route add ::/0 dev sit1 metric 2

echo 1 > /proc/sys/net/ipv6/conf/all/forwarding

## Juniper router at ISC

```
description "ipv6 tunnel to trstech.net  
(alain@trstech.net)";
```

```
tunnel {  
    source 192.5.4.244;  
    destination 62.56.186.210;
```

```
}
```

```
family inet6 {  
    mtu 1280;  
    address 2001:4f8:0:1::23:1/112;
```

```
}
```

**2001:4F8/FEEC::/48 assigned to TRSTECH by ISC**



# A traceroute

## traceroute6 www.kame.net

traceroute to www.kame.net (2001:200:0:8002:203:47ff:fea5:3085) from 2001:4f8:0:1::23:2, 30 hops max, 16 byte packets

- 1 **trstech.r8.pao1.isc.org (2001:4f8:0:1::23:1) 770.685 ms 766.744 ms 762.452 ms**
- 2 r8-2.r7.pao1.isc.org (2001:4f8:0:1::3:1) 765.008 ms 765.652 ms 780.787 ms
- 3 \* 3ffe:80a::b2 (3ffe:80a::b2) 775.852 ms 801.068 ms
- 4 hitachi1.otemachi.wide.ad.jp (2001:200:0:4401::3) 913.948 ms 906.63 ms 935.027 ms
- 5 2001:200:0:1c04:230:13ff:feae:5b (2001:200:0:1c04:230:13ff:feae:5b) 948.203 ms \* 890.938 ms
- 6 2001:200:0:4800::7800:1 (2001:200:0:4800::7800:1) 958.781 ms 898.438 ms 910.792 ms
- 7 **orange.kame.net (2001:200:0:8002:203:47ff:fea5:3085) 913.847 ms 888.127 ms 900.27 ms**



# AAAA glue in net zone for ns.trstech.net

```
; <<>> DiG 9.3.2b2 <<>> @a.gtld-servers.net trstech.net ns
; (2 servers found)
;; global options: printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 32047
;; flags: qr rd; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 3

;; QUESTION SECTION:
;trstech.net.          IN      NS

;; ANSWER SECTION:
trstech.net.          172800 IN     NS     ns.trstech.net.
trstech.net.          172800 IN     NS     rip.psg.com.

;; ADDITIONAL SECTION:
ns.trstech.net.       172800 IN     A      81.199.105.10
ns.trstech.net.       172800 IN     AAAA   2001:4f8:feec::1
rip.psg.com.          172800 IN     A      147.28.0.39
```



# c.e.e.f.8.f.4.0.1.0.0.2.ip6.arpa

; <<>> DiG 9.3.2b2 <<>> @62.56.186.210 c.e.e.f.8.f.4.0.1.0.0.2.ip6.arpa. ns +norec

;; QUESTION SECTION:

;c.e.e.f.8.f.4.0.1.0.0.2.ip6.arpa. IN NS

;; ANSWER SECTION:

**c.e.e.f.8.f.4.0.1.0.0.2.ip6.arpa. 86400 IN NS isc.trstech.net.**

**c.e.e.f.8.f.4.0.1.0.0.2.ip6.arpa. 86400 IN NS open.nlnetlabs.nl.**

;; ADDITIONAL SECTION:

**isc.trstech.net. 600 IN AAAA 2001:4f8:0:1::23:2**

;; Query time: 890 msec

;; SERVER: 62.56.186.210#53(62.56.186.210)

;; WHEN: Fri Dec 9 12:37:02 2005

;; MSG SIZE rcvd: 138



# Radvd to configure clients

## radvd.conf

### interface eth0

```
{  
AdvSendAdvert on;  
MinRtrAdvInterval 3;  
MaxRtrAdvInterval 10;  
AdvHomeAgentFlag off;  
prefix 2001:4f8:feec::/64 {  
AdvOnLink on;  
AdvAutonomous on;  
AdvRouterAddr on;  
AdvPreferredLifetime infinity;  
AdvValidLifetime infinity;  
};  
};
```



# Enabling V6 on servers

## EXIM

/tmp/exim-4.XX/Local/Makefile

HAVE\_IPV6=YES

exim.conf

```
hostlist relay_from_hosts = :::1 :  
    2001::4f8::feec:::/48
```

## BIND,courier-imap,openldap

default=autodetect

Named.conf

```
listen-on-v6 { ::1 ; 2001:4f8:feec::1; }; or
```

```
listen-on-v6 { any; };
```

## APACHE

default=autodetect

httpd.conf

```
Listen [2001:4f8:feec::1]:80
```

```
NameVirtualHost [2001:4f8:feec::1]
```

```
<VirtualHost [2001:4f8:feec::1]:80>
```

```
ServerAdmin geek@trstech.net
```

```
DocumentRoot /var/www/html/trs
```

```
ServerName www.trstech.net
```

```
Errorlog logs/trstech.net-error_log
```

```
Customlog logs/trstech.net-access_log
```

```
common
```

```
</VirtualHost>
```



# Clients and V6

## Linux

IPV6 loadable

v6 DNS transport supported

## Windows XP

ipv6 install and netsh utilities

v6 DNS transport not supported

## Applications

-Firefox, IE used as browser

-kmail, Thunderbird worked for as MUA on linux

-Thunderbird as substitute of Microsoft outlook (version 2002 et 2003) and Eudora 6.0.3 on windows

-Windows versions of some utilities failed when linux version worked

-Quagga with a v6 bgp session and looking glass ([lg.trstech.net/lg](http://lg.trstech.net/lg))





## Looking Glass IPv6/IPv4 TRS - show bgp ipv6 summary

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**Host:** annuaire.trstech.net

**Command:** show bgp ipv6 summary

BGP router identifier 10.0.0.1, local AS number 65432

592 BGP AS-PATH entries

4 BGP community entries

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
<a href="#">2001:4f8:0:1::23:1</a>	4	3557	17543	2279	0	0	0	08:34:45	<a href="#">845</a>

Total number of neighbors 1

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*Please email questions or comments to [aalain@trstech.net](mailto:aalain@trstech.net).*

*BGP View from ISC at PAIX PALO ALTO*

Thanks to [ISC](#) who provides the IPv6 tunnel and the BGP sessions

Terminé

# Conclusions and thanks

- We need a local v6 provider or to tunnel not this far
- Open source are more v6 ready than commercial
- Future ???
  - dhcpcd
  - IPSEC on IPV6
  - etc....

Many thanks to Internet Systems Consortium (<http://www.isc.org/>) and Joe Abley for helping us on this



Thanks you for your attention

Merry christmas and happy new year

