



RedIRIS

# RedIRIS IPng Probe Network



ipv6@rediris.es

## Madrid Global IPv6 Summit

# Agenda

- What is RedIRIS?
- RedIRIS IPv6
  - Addressing
  - Equipment
  - IPv6 network
  - External Links
  - Network Stability
  - Routing
  - Network Services
- To be continued...



# What is RedIRIS?

- Spanish Academic and Research Network
- Working since 1991
- More than 250 research organizations
  - Universities
  - Research institutes
- Star topology and ATM backbones
- External links:
  - USA (with SONET)
  - TEN-155
  - Spanish Commercial Internet



# RedIRIS IPv6

- Main objective: IPv6 network similar to IPv4 network
- The same topology
- It's going to be an heterogeneous network
  - Core and access routers:
    - CISCO
    - Telebit
    - Linux-router
  - users stations:
    - Linux-Windows
    - Sun

# RedIRIS IPv6 II

## ■ ATM?

- There will not be equipment
- It's not the best solution

## ■ tunnels?

- Good for heterogeneity
- In the backbones, each tunnel have as much as three links
- All Autonomous regions in Spain are covered
- Useful in this transitional phase
- Main problem: Routing with BGP4+ in the external links

## ■ Almost all research centres can be connected to IPv6 with tunnels

# RedIRIS IPv6 III

- First steps:
  - used 5F02:FE00::/32 allocated by SURFNET
  - protocol used with SURFNET: RIPng
- Now: 6bone pTLA
  - 3FFE:3300::/24 allocated
  - protocol: BGP4+
- Approximately 70% of Spain is connected to RedIRIS IPv6
- The IPv6 network is running stable for one year and a half

# Addressing

- We are using 3FFE:3300::/24 this way:
- for each autonomous region of Spain:  
/32
- for each centre: /48
  - Mainly Universities.

# Equipment

## ■ Core router:

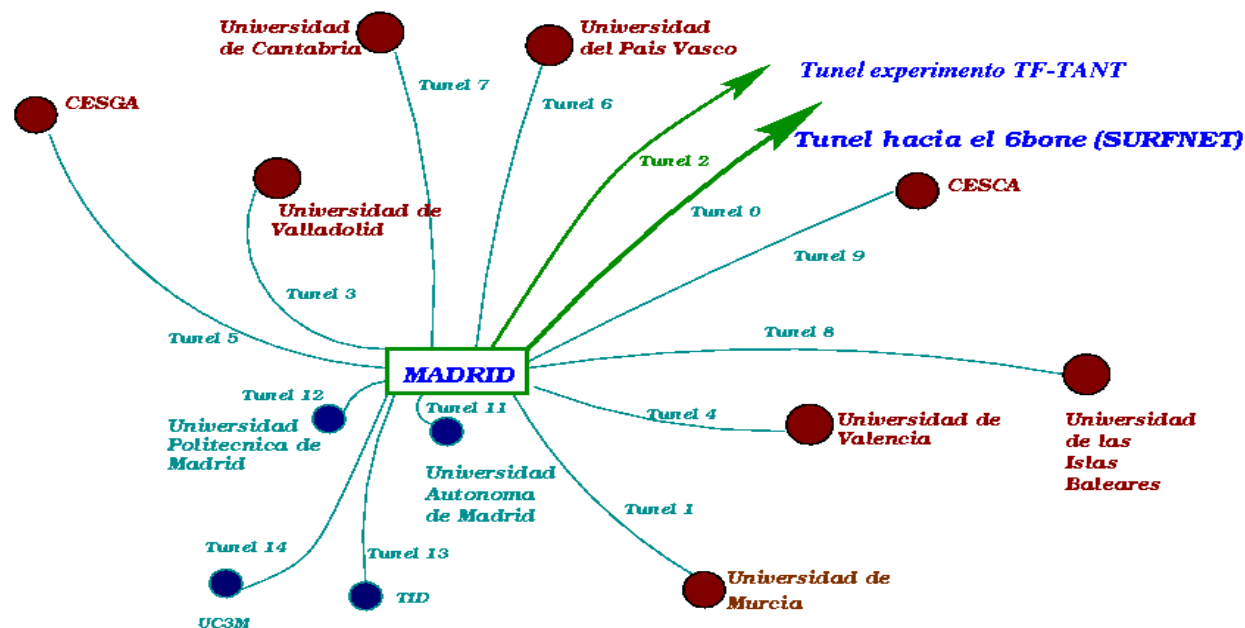
- CISCO 2500
- IOS 12.0T experimental version
- 2 Serial
- 1 Ethernet
- 16 MB RAM
- 4MB Flash

## ■ Access:

- PC-Linux
- Sun-Solaris
- CISCO 2500



# IPv6 Network



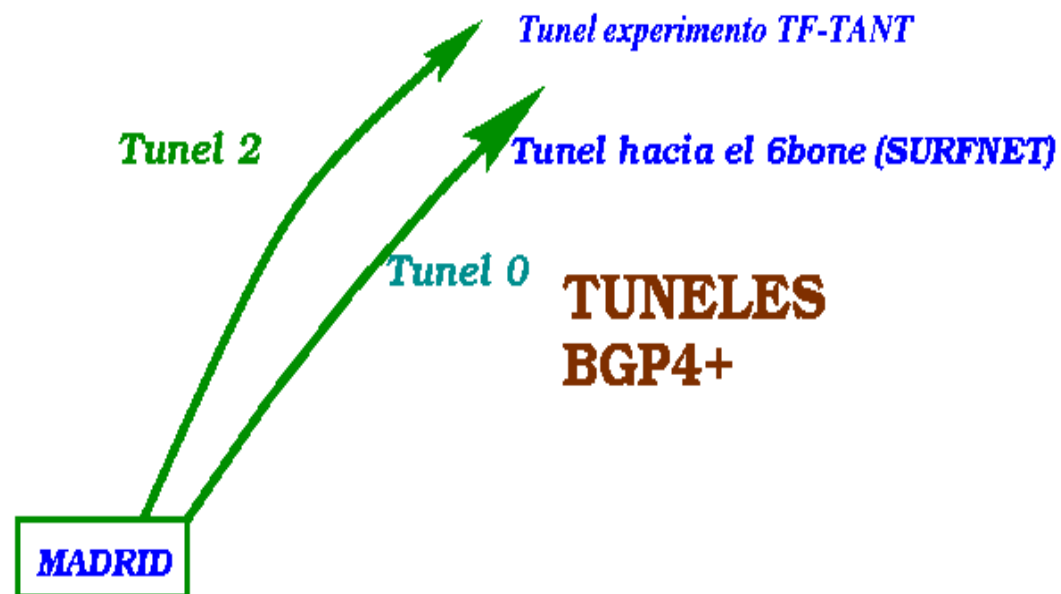
## TUNELES CON:

CATALUÑA  
PAIS VASCO  
CANTABRIA  
GALICIA  
CASTILLA-LEON  
MURCIA  
VALENCIA  
BALEARES  
MADRID UPM  
UC3M  
UAM  
TTD

## SIN CONEXION:

ANDALUCIA  
CANARIAS  
ARAGON  
ASTURIAS  
NAVARRA  
EXTREMADURA  
CASTILLA-LA-MANCHA  
LA RIOJA

# External Links

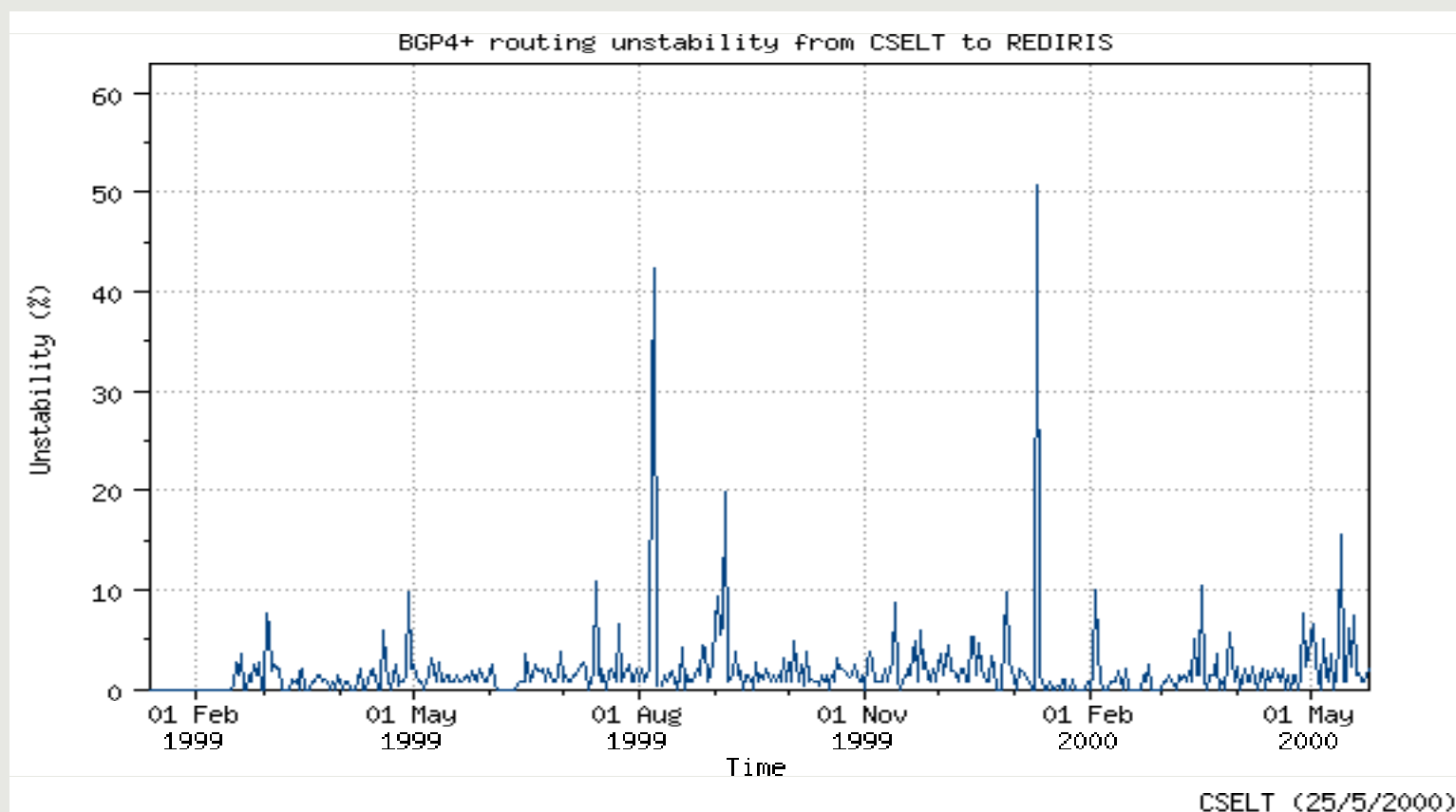


**CONEXIONES  
EXTERNAS**

# Network Stability

## ■ % Unstability

■ (from CSELT: [carmen.csel.it/ipv6/bgp/index.html](http://carmen.csel.it/ipv6/bgp/index.html))



# Routing

- Static routes within Spain
- External links: BGP4 +
- We are running BGP with:
  - 6bone
  - TF-NGN link
  - It's working properly:

```
6bone-gw#sh ip bgp ipv6 unicast
```

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal  
 Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
* 2001:200::/35	3FFE:8038:80:7::1				0 8933 559 1273 4697 2500 i
*>	3FFE:600:8000:4::1				0 1103 1849 10109 2500 i
*> 2001:208::/35	3FFE:600:8000:4::1				0 1103 7610 i
* 2001:218::/35	3FFE:8038:80:7::1				0 8933 559 1273 4697 i
*>	3FFE:600:8000:4::1				0 1103 1849 4697 i

# Network Services

- RedIRIS is the Spanish NRN, so is offering IPv6 connection to the research world
- DNS: we are using in production Bind 8
  - IPv6+IPv4
  - Testing Bind 9 in a experimental way
- LAN IPv6
  - testing IPv6 Ethernet
  - testing IPv6+IPv4 Ethernet
  - Basic utilities:
    - ping
    - traceroute
    - telnet
    - ftp
    - ...

- RedIRIS has started to work closely with the ES-NIC to reach these main objectives:
  - start registering .es to use with IPv6 addresses
  - Build a Spanish DNS hierarchy exclusively for IPv6

## to be continued...

- ATM migration:
  - near future: native IPv6 with low capacity PVCs to each Spanish Autonomous region
  - long future: 155 Mbps with each region
- External link with ATM
- RIPE addressing
- Bind 9
- Software testing
- LAN migration to IPv6+IPv4