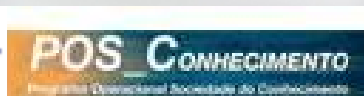




Fundação para a Computação Científica Nacional  
*Foundation for National Scientific Computing*

# IPv6 in the Citizens with Special Needs' Network

Carlos Friaças



[cfriacas@fccn.pt](mailto:cfriacas@fccn.pt)

October 5<sup>th</sup>, 2009


- What is FCCN?
- What is RCTS?
- What is the Citizens with Special Needs' Network?
- What is the Network Architecture?
- How was IPv6 possible in this Network?
- How was IPv6 deployed?
- Some usage stats (both address families)
- Is it really native IPv6?
- Questions

- FCCN: National Foundation for Scientific Computing
- Established in 1987
- Manages:
  - ccTLD .PT
  - The Portuguese Research & Education Network (RCTS)
  - The Portuguese Internet Exchange (GigaPix)
- ...and, is involved in many other projects!



ARQUIVO DA WEB  
PORTUGUESA



- RCTS: Science, Technology and Society Network
- Universities, Polytechnic Institutes & National Labs
- AS1930
- Connects to 
- Bandwidth: from 1Mbps to 10Gbps
- Partly built over self-owned fiber
  - DWDM/ROADM network
  - Ethernet network
  - IP network





- Also known as the «Solidarity Network»
- Roughly around 250 nodes, across the country
- Nodes installed on:
  - Youth associations
  - Associations for the handicapped
  - Rehabilitation centers
  - Senior Universities
  - Orphanages and Parish social centers
  - ...and many more!




- Each node is DSL based:
  - 8Mbps Downstream/1Mbps Upstream
- All traffic is delivered in Lisbon on a GE trunk
  - FCCN is not a DSL operator
- 1 public IPv4 address per node
- 1 Cisco 877W Router per node
  - This means Wireless is available
  - Plus 4 wired ports





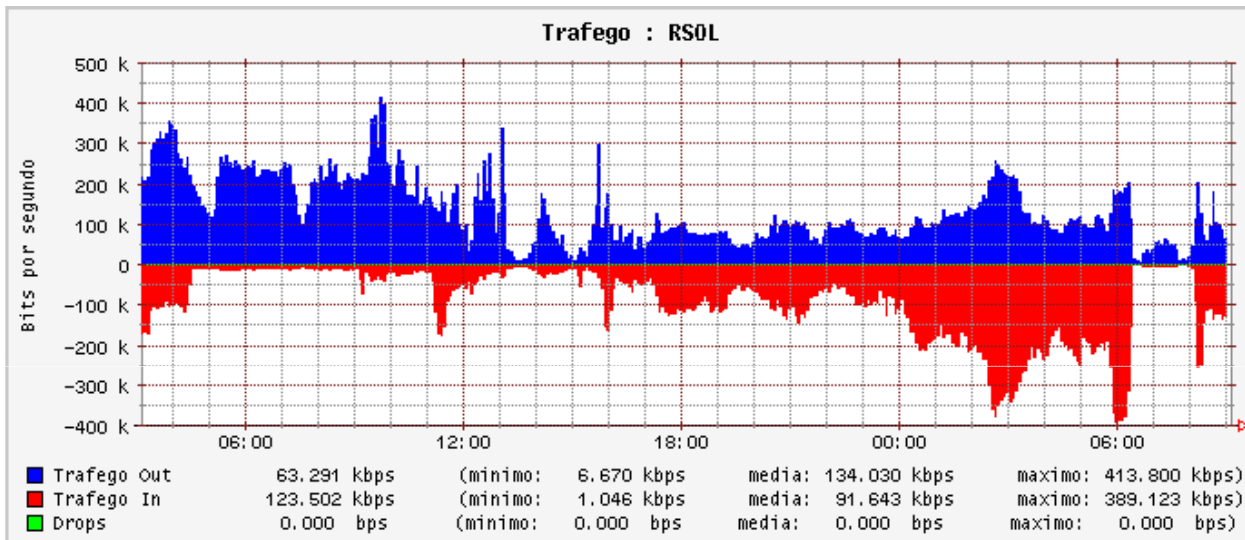
- The **tender process** was the key!
  - We used the word «**Mandatory**» instead of «desirable», or adding extra optional points in any proposal's evaluation containing IPv6
- Each site's installation was only accepted **after** FCCN verified that IPv6 was working
- The chosen CPE had IPv6 support
- RCTS was already running IPv6
  - Addressing and transit was easy



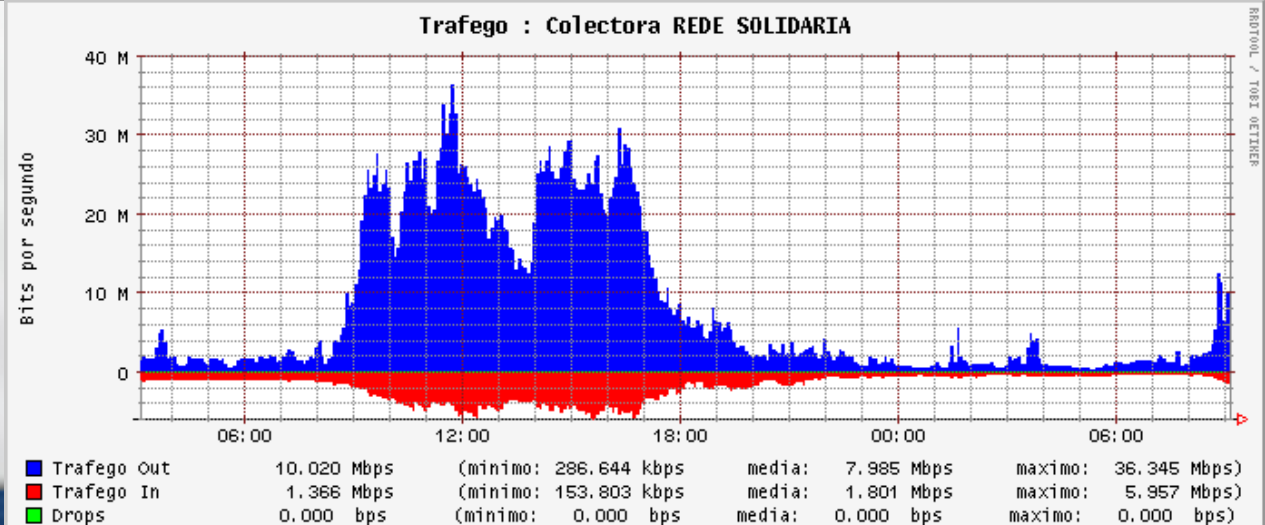
- Addressing (2001:690:2800::/48)
  - Each site gets a /60
  - 3 LANs in use: Wired, Wireless, Roamers 
  - Each site's WAN interface is a /64
- IOS version on the CPEs was updated
- A 2<sup>nd</sup> DSL profile (i.e. radius) for each node
- Minor adjustments to the Dialer Interface
- BGP setup with the DSL provider, using **their** AS and /32 block, on the GE trunk



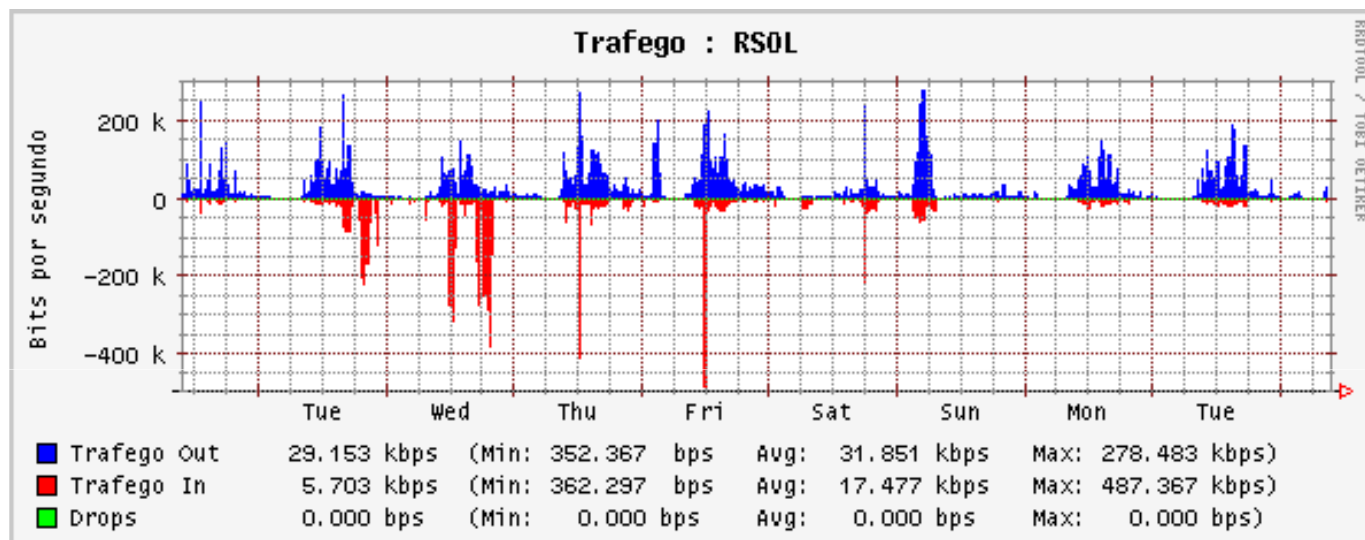
- Daily (5 min avg)



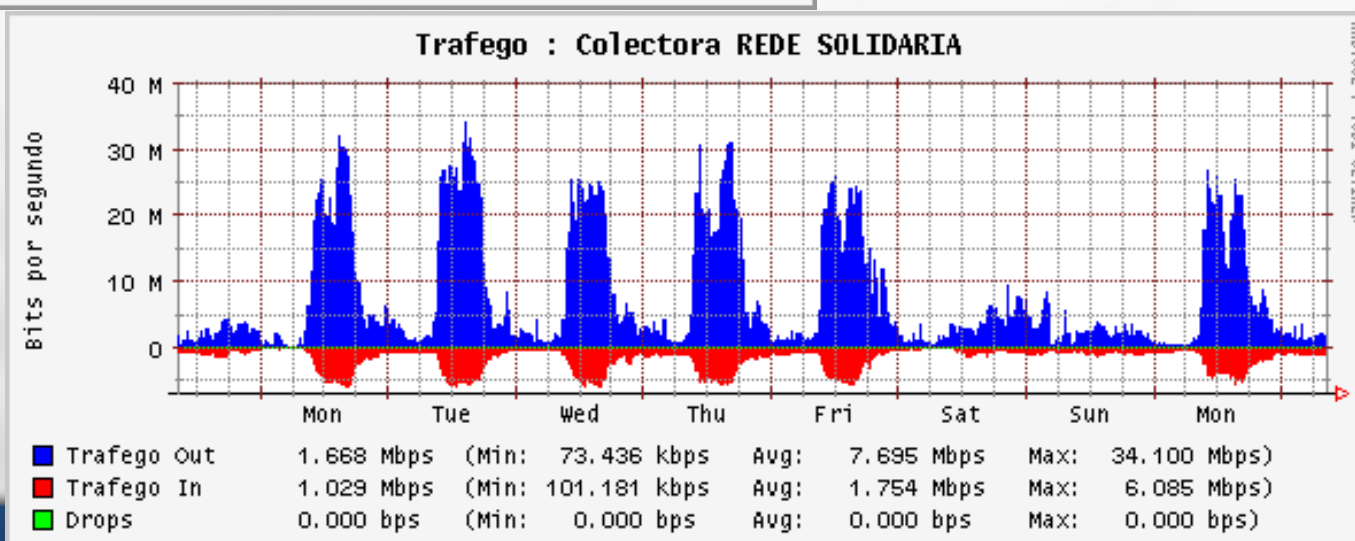
## IPv4



- Weekly (30 min avg)



## IPv4





- 245 nodes scanned (on 30<sup>th</sup> September)
  - «show ipv6 neighbors» on each router
- Found:
  - **119** unique 2001:690:2800:<something> addresses

