

# IPv6 at RIPE Meetings

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(with help from our IT staff)



It works!



# It Took a While

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- Visited the archives
- Closing plenary: Technical Report
- Online since RIPE 52 in April 2006
  - We were already running IPv6

# Do It Yourself

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- AS 2121: RIPE Meeting Network
- We bring everything ourselves:
  - 2 Juniper routers
  - Some servers
  - 50 wifi base stations
  - **8 highly skilled colleagues**
- Makes it easier to do IPv6
  - We have full control



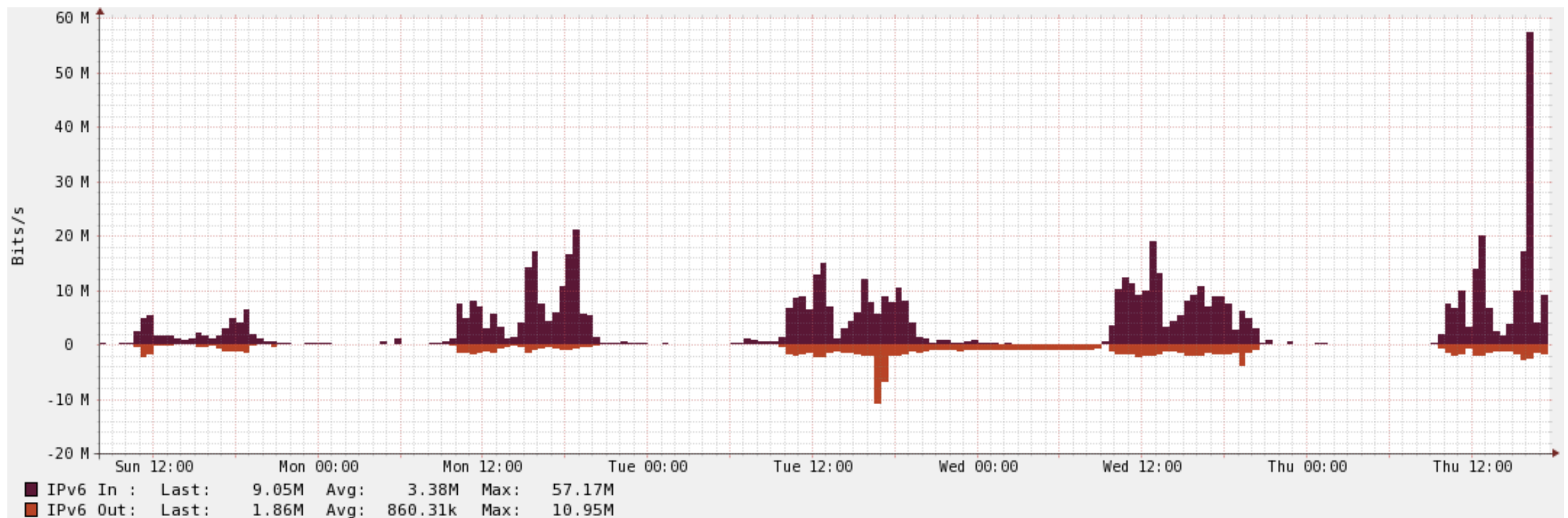
# Everything is Dual Stack

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- All network connections have public IPv4 and IPv6 addresses available
- All services offered over IPv6:
  - Webcast
  - Meeting webpages
  - Remote participation
  - Public terminals
  - Staff workstations

# RIPE 66: Dublin

- No IPv6 related incidents



(IPv6 traffic)



# Historic Events

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# When Did We Start?

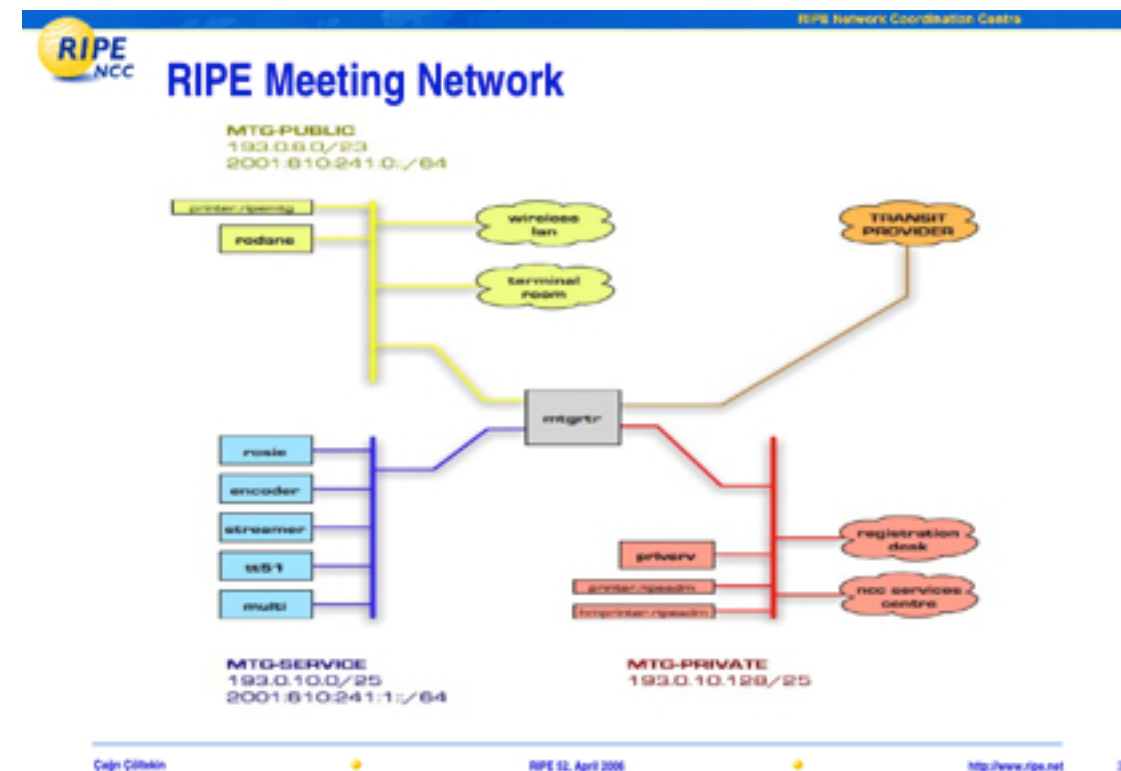
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- RIPE 36 - May 2000 in Budapest
  - “Participants had a chance to try IPv6 demo in terminal room”
- RIPE 37 - September 2000 in Amsterdam
  - Monica Cortes: “If you have IPv6 configured on your laptop, and are connected to LAN here, you can use IPv6”



# RIPE 52

- Istanbul in April 2006
- Network layout has IPv6 addresses
  - 2001:610:241::/64 (Surfnet)
  - Indicates a tunnel to Amsterdam



# “The IPv6 Hour”

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- Experiment during RIPE 56 (Berlin, May 2008) to run an IPv6 only network
- Reconfiguration of base stations caused them to crash and the whole network went down
- Conclusion: do not experiment with a live network

# RIPE 61 (November 2010)

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- Issues with Duplicate Address Detection (DaD)
  - Took a long time to complete
  - Left workstations without working IPv6
- Linked to our switches dropping multicast traffic
  - Intermittent error
  - Hard to troubleshoot or even notice
  - Probably present at several meetings

# Windows and 6to4

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- Laptops configured to do “Internet sharing”
- Also share 6to4 and other tunnels
- Machines broadcast rogue RA
- Less of a problem as native IPv6 is preferred
  
- Disappeared with newer versions?

# Rogue Router Advertisements

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- Common problem on public networks
- Machines pretend to be an IPv6 router
- Active monitoring since RIPE 62
- Block the offender's mac address:
  - Isolate them from the network
  - Make them come to support desk
- Filtering can only be done on our switches

# Equipment Failure

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- All equipment we buy must do IPv6
  - Original argument: We need to be ready!
- Dual stack is the standard on our network
- There are multiple definitions of “ready”

# Printing over IPv6

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- We even bring our own printers to a meeting
- It was time to buy new ones
- We bought HP printers
  - They come with IPv6 support



# Multiple Levels of IPv6 Support

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- The printers advertised themselves on Bonjour using their IPv6 address
  - But didn't accept any print jobs
- Caused clients to wait for a timeout
- We had to switch off IPv6 on the printer
  
- Lesson learned: don't just believe the package

# RIPE 65: Webstream

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- Had some small configuration error
- Not really an IPv6 related problem
- Important to stay on guard with dual stack:
  - Configure it twice
  - Check it twice

# Learning Curve

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- Many problems only occur when others start to implement IPv6:
  - “Internet sharing” and rogue RAs in general
  - Printer with broken IPv6 support
- Drawback of being an early adopter
  - But we do have the advantage of experience

# Progress

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- IPv6 support is less of an “exotic feature”
- Example is Aerohive:
  - We bought new base stations a year ago
  - Management software includes RA monitoring!

# Conclusion

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- If we can do it...
- Implementing IPv6 still needs some dedication:
  - Be ready to encounter a problem
  - Put some effort in debugging it
  - Test your equipment
- We can only test our setup twice a year!

# Acknowledgements

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- Thanks to:
  - Angel, Razvan, Erik, James and Cagri for the reports
  - IT and other dedicated staff for configuring, running and fixing the network
  - All the participants who helped to test and debug
- And Monica, who had the guts to switch it on

Questions?

