

# Transition to IPv6

Status and initial assessment of the situation for  
ALICE

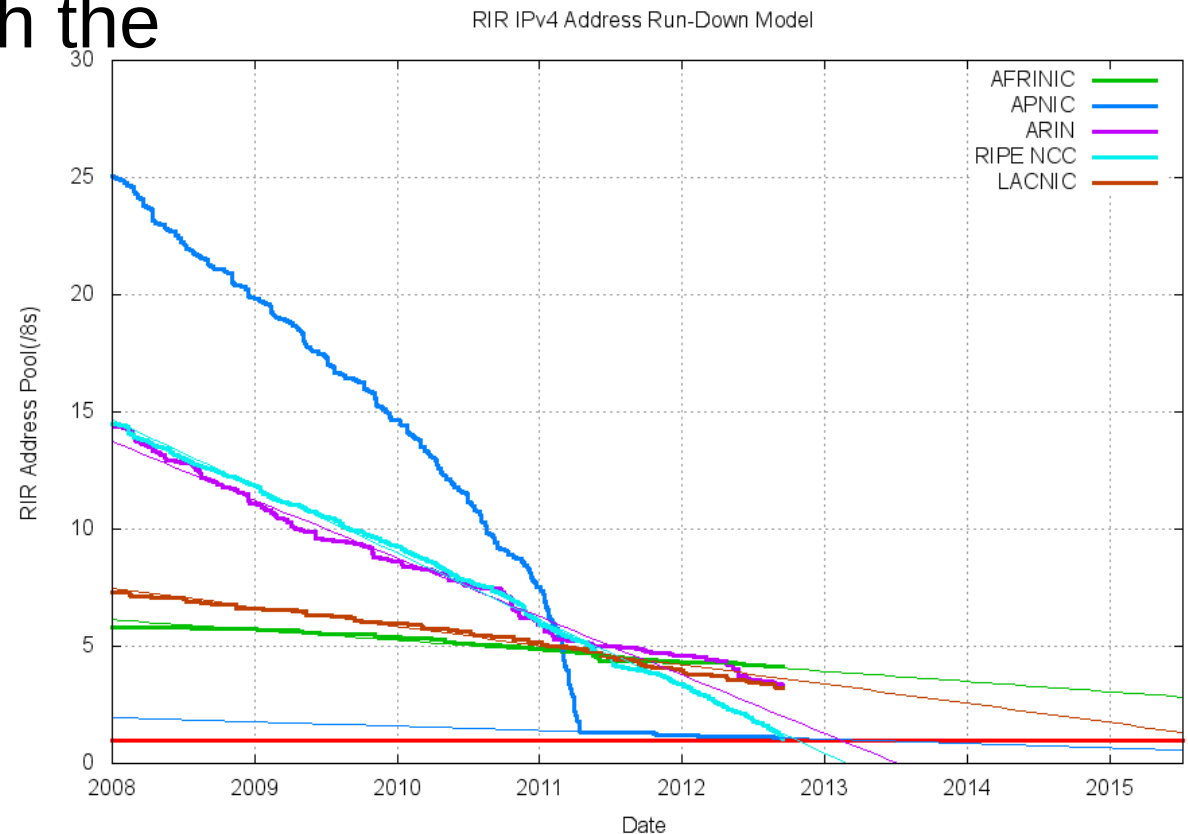
# Outline

- IPv4 shortage
- Situation at CERN
- Migration options
- Software readiness & deployment status
- Plans
- ALICE-specific issues
- Other networking business

# IPv4 shortage

Europe has already ran out of addresses

Now institutions can only get a single /22 (1024-address) block, once (to help with the IPv6 transition ...)



# Situation at CERN

- Allocated space (beginning of 2013)
  - 128.141.0.0/16 (64K) - GPN dynamic addresses (~65% used)
  - 128.142.0.0/16 (64K) - LCG servers in the CC (~40% used)
  - 137.138.0.0/16 (64K) - GPN static addresses (~92% used)
  - 188.184.0.0/16 (64K) - GPN static addresses (~5% used)
  - 188.185.0.0/16 (64K) - Wigner datacentre
    - For the first room to be ready, no provisions for the rest
  - 194.12.128.0/18 (16K) - Network infrastructure (~35% used)
- Allocation of 188.184.0.0/16 started in October 2012: 5% allocated in only 2 months

# Migration options

- There are options that allow for partial deployment, like NAT64, SIIT, DS-Lite, 6to4, 6rd, 4rd, Teredo, MAP ...
- But all have shortcomings and best is to simply(?) run in dual-stack mode
  - Services listening on both IPv4 and IPv6 and clients can use either
  - Requires all services and clients to support (and prefer) IPv6, which today is by large not the case

# Software readiness

- HEPiX group concentrated on the WLCG software and is currently compiling a list of applications, versions and level of IPv6 support
  - <http://hepix-ipv6.web.cern.ch/>
- So far gridftp and FTS work in the test environment
- Showed problems in OpenAFS, dCache, UberFTP
- Now we need to compile the experiment-specific list of applications and their status

# Deployment status

- CERN has largely deployed IPv6 in the campus, ALICE central services cluster included
  - Also LCG routers
- All machines have an IPv6 address assigned, but will not get it automatically
  - Will have to ask for it and choose whether
    - To be registered with both addresses in DNS
    - Or to have a separate <machine>.ipv6.cern.ch name
  - DHCPv6 available on demand
  - The user interface (network.cern.ch) not showing the IPv6 yet (feature ready but hidden for a short while more)
    - Consequently we cannot easily request firewall openings

# Deployment status – 2

- Central services
  - All machines are dual stack already
    - But services are not accessible from outside CERN
      - DNS still points to the IPv4 addresses only
- Sites
  - 3 sites have enabled dual-stack on the VoBoxes already: Cagliari, CSC, DCSC\_KU
  - Several others have replied that will support it by the end of 2013 (RDIG, Nordic, Prague)
  - Unfortunately most sites either didn't reply or have no plans of deploying it any time soon



# Plans

- Target for CERN is to have IPv6 fully deployed by end of LS1
  - IT estimates that the IPv4 pool will be **depleted during 2014**
- Current assumption is that IPv4 will be available on LANs for the foreseeable future
  - So WN to VoBox and other site-local services are not on the critical path
    - If the applications run OK behind NAT

# ALICE-specific issues

- Two main categories of central services run either on top of Apache (AliEn) or Xrootd (apiservice)
  - Apache is ready for IPv6
  - Xrootd will implement it in v4.0 scheduled for mid-2013
    - With EOS and Castor to deploy it as soon as it is available
  - At least dual-stack didn't break anything so deployment can proceed in parallel with any developments on the services side

# ALICE-specific issues – 2

- To check also: LDAP, other web services, configuration, ROOT, database schema, torrent, SE discovery, logging, DNS-based load balancing and many other places that might assume x.y.z.t
- To be ready for IPv6-only clients (or jobs) all publicly-facing services (VoBoxes, SEs etc) should also be accessible by IPv6
  - Please start deploying it as early as possible

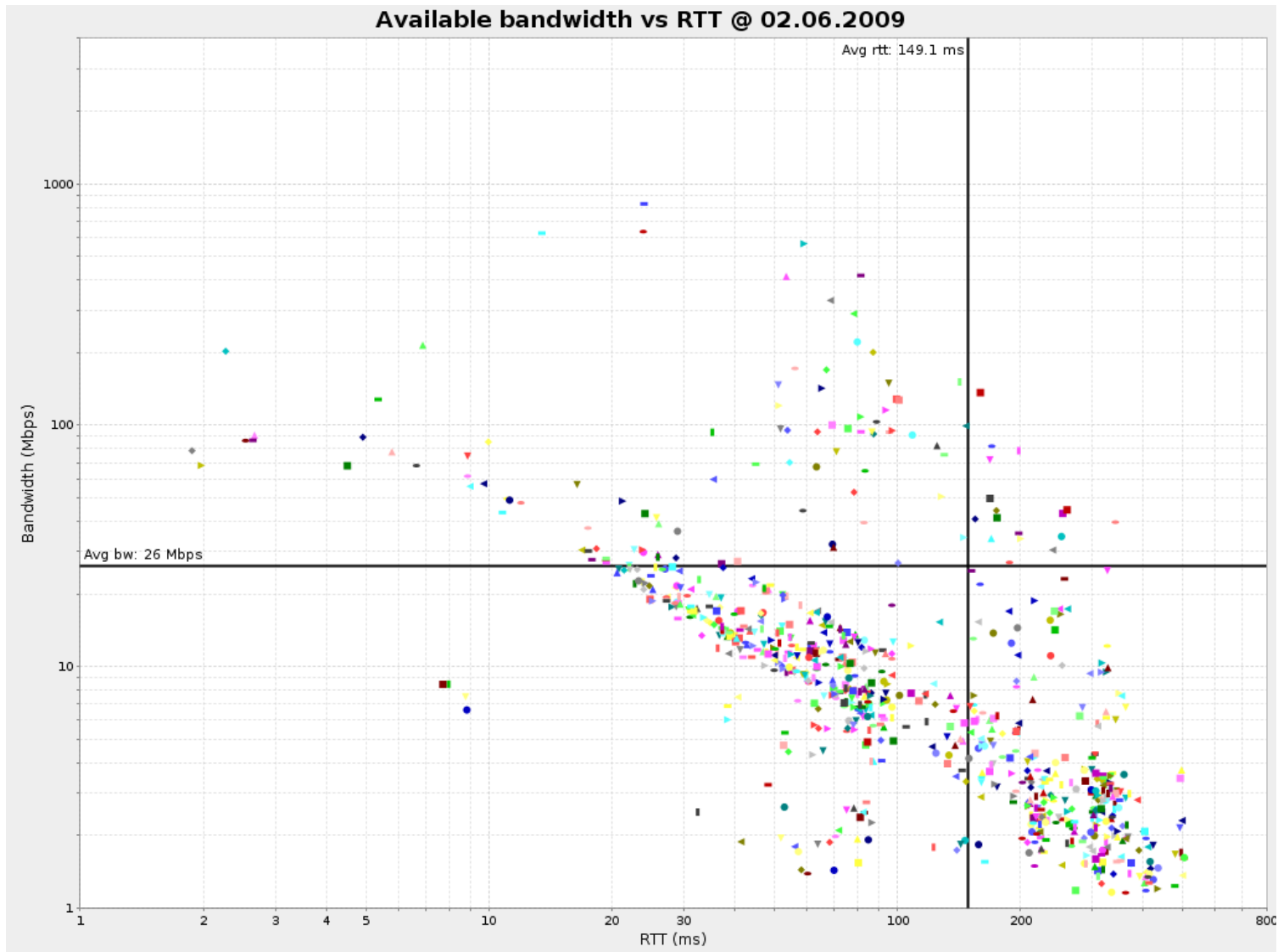
# For more details

- <http://ipv6.web.cern.ch/>
- In other news
  - [Switzerland overtook Romania in terms of IPv6 deployment](#)
    - CH: 10.3%
    - RO: 9.1%
    - FR: 5.2%
    - US, DE: 2.8%

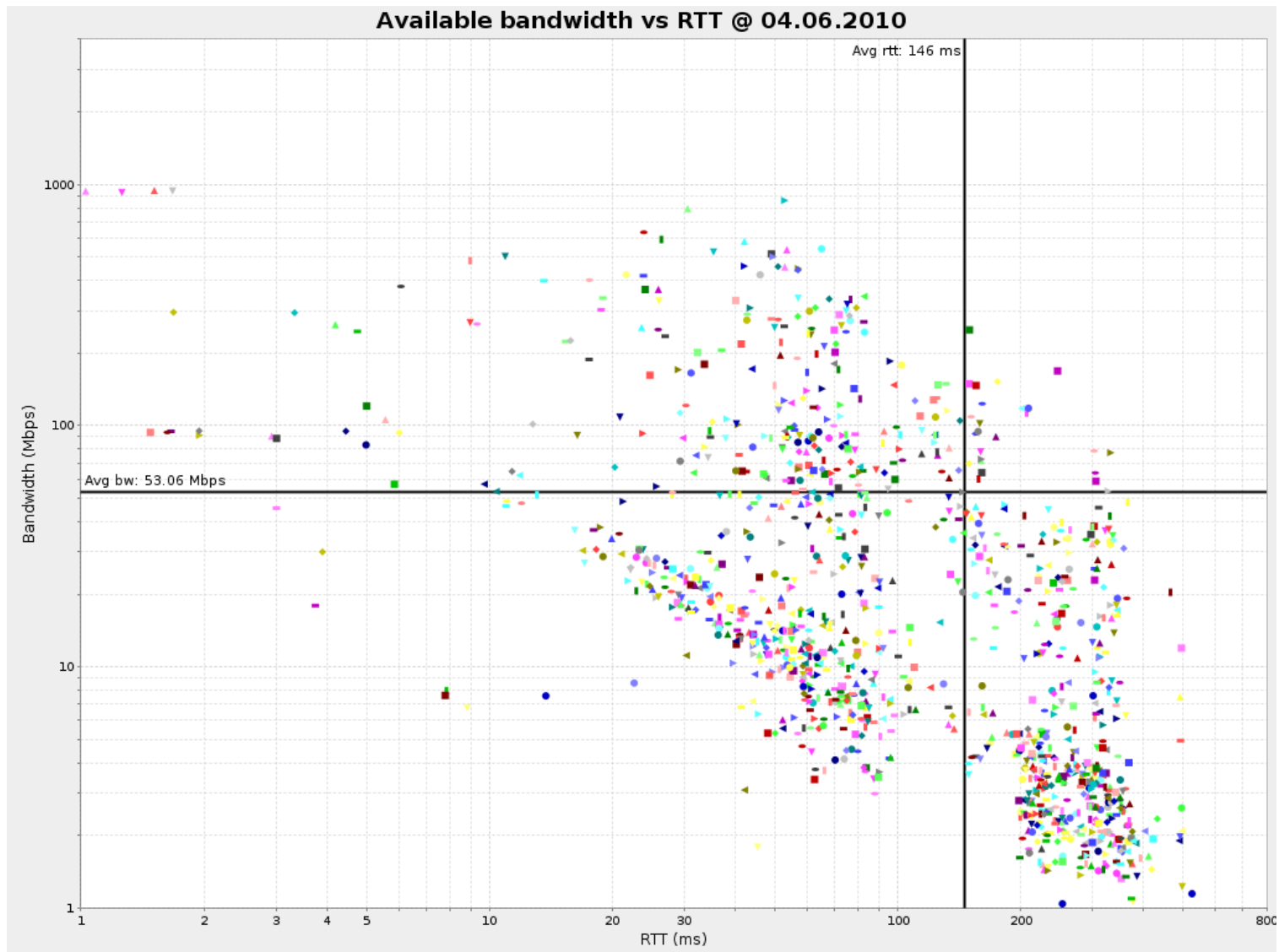
# Network throughput tests

- <http://alimonitor.cern.ch/speed/>
- Please remember to also open TCP/1093 on the VoBox from the world, ICMP too
  - Or let us know what other port we can use
- And tune the TCP buffers on ALL machines for large RTTs (instructions in the link above)

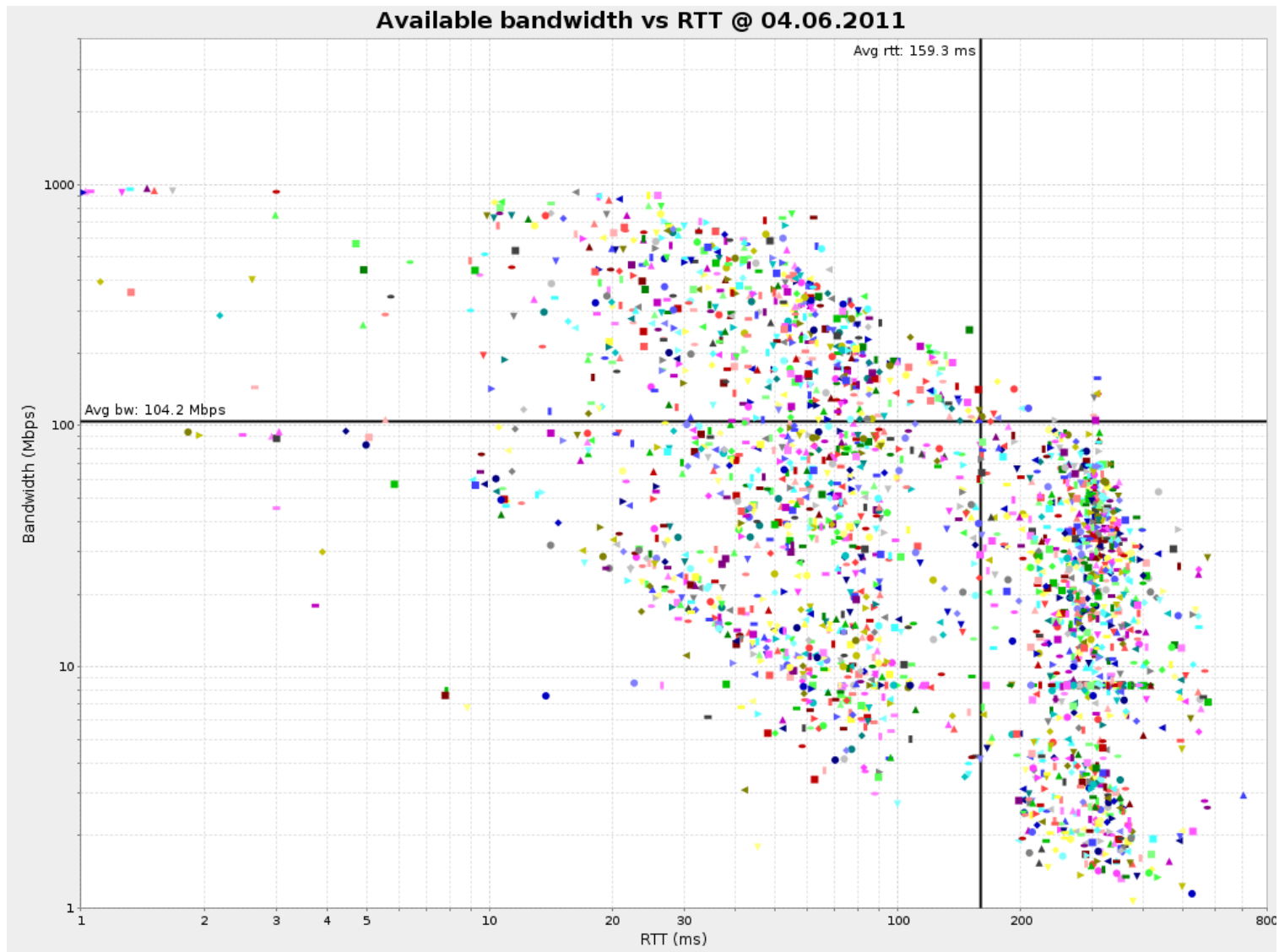
# Some history



# Some history

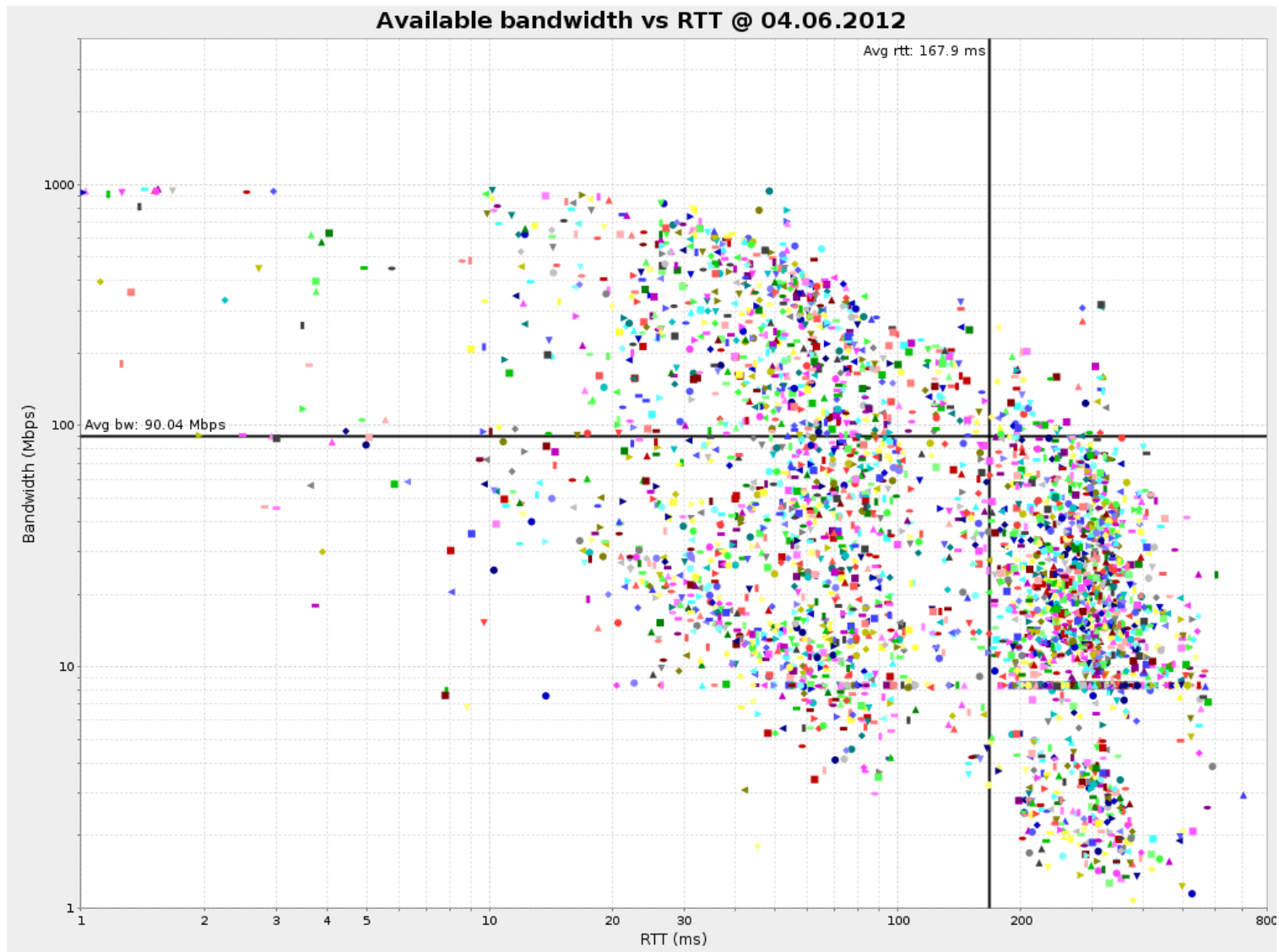


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