Evolution of a name server

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Overview

- General ideas
- Main features of NSD Versions
  - Version numbering 1.2.3
- NSD 4 design
- Vaporware example

NSD Characteristics

- Authoritative only
  - Geared towards root servers and TLDs
- Just enough Documentation
  - Users technical competent
- Simplicity
  - No creeping features
  - Only Class IN
- Resilience against high load

Characteristics (2)

- Build from Scratch
  - Independent code
- Resilience against high loads
  - Compiled answers
  - Static data to serve
  - Memory for Speed

NSD 1.0

- Just a server
  - Answers in pre-recompiled database
  - Server Ignorant about the servings
- Spartan User Interface
  - No configuration
- Little to no XFR support
- RFC 103[345], 2181, 2308

NSD 2.0

- DNSSEC ready
  - RFC 403[345]
  - Internal database structure changed
    - Less compilation possible, less ignorant
- NSD AXFR module
- Configuration file

NSD 2.0 ++

- More dynamic behaviour
  - AXFR (in & out), TSIG
- NSD Control
  - Less spartan UI required
  - More complexity internal
- Still a memory hog

NSD 3.0

- AXFR & IXFR (in) support
  - Notify
  - Use timers in SOA
- Full DNSSEC
  - NSEC3
- More DNS meta support
  - RFC 4635 (HMAC SHA TSIG)
  - DNAME

NSD 3.0++

- Internal complexity++
  - For XFR processes
  - IPC Introduced
- Still the same serving Speed
  - No internal (static) database change

- Vaporware logo!
- Lots of zones (x00K)
- Zone Configuration templates
- Internal database change
  - Speed-up server
- More preprocessing
  - NSEC3 hashes stored

- Internal complexity grows
  - Complexity moves to compiler subsystem
- NSD control (via port [TBD])
  - hides complexity
- More dynamic behavior
  - Reconfiguration
  - Reloading zones
  - (Slow) dynamic update

- Improved TCP support
- Added features should not hamper original target audience
- NSD 3.0 might need longer support
- Non vaporware: end 2011
- Wishes: speak to me

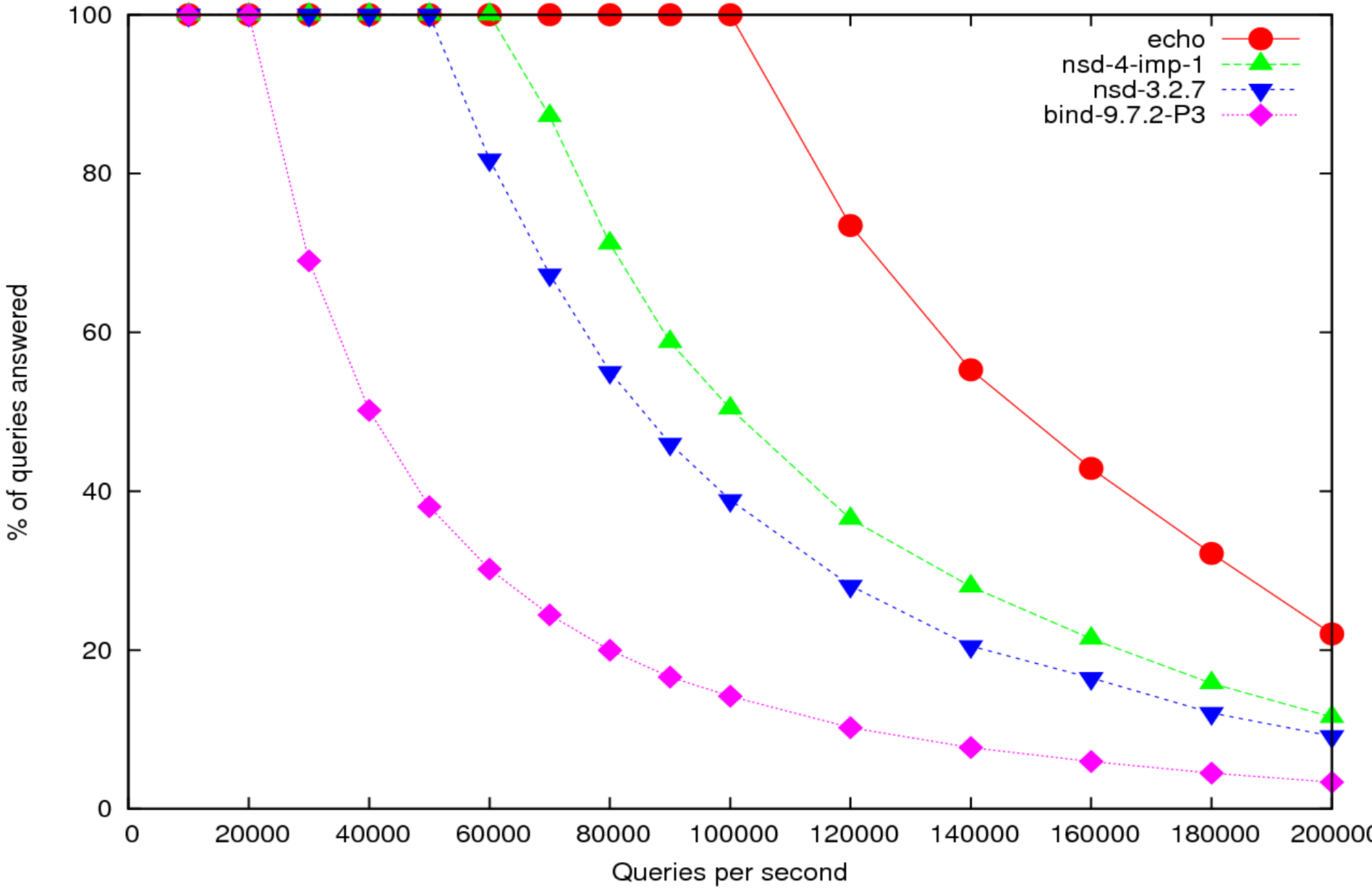
Speed tests

- Part of new memory layout put in NSD 3.2.7
- Three scenarios
  - L0: root: 1 zone, 500 delegations
  - L1: TLD: 1 zone, 1M delegations
  - L2: SLD: 100K zones, 10 delegations/zone

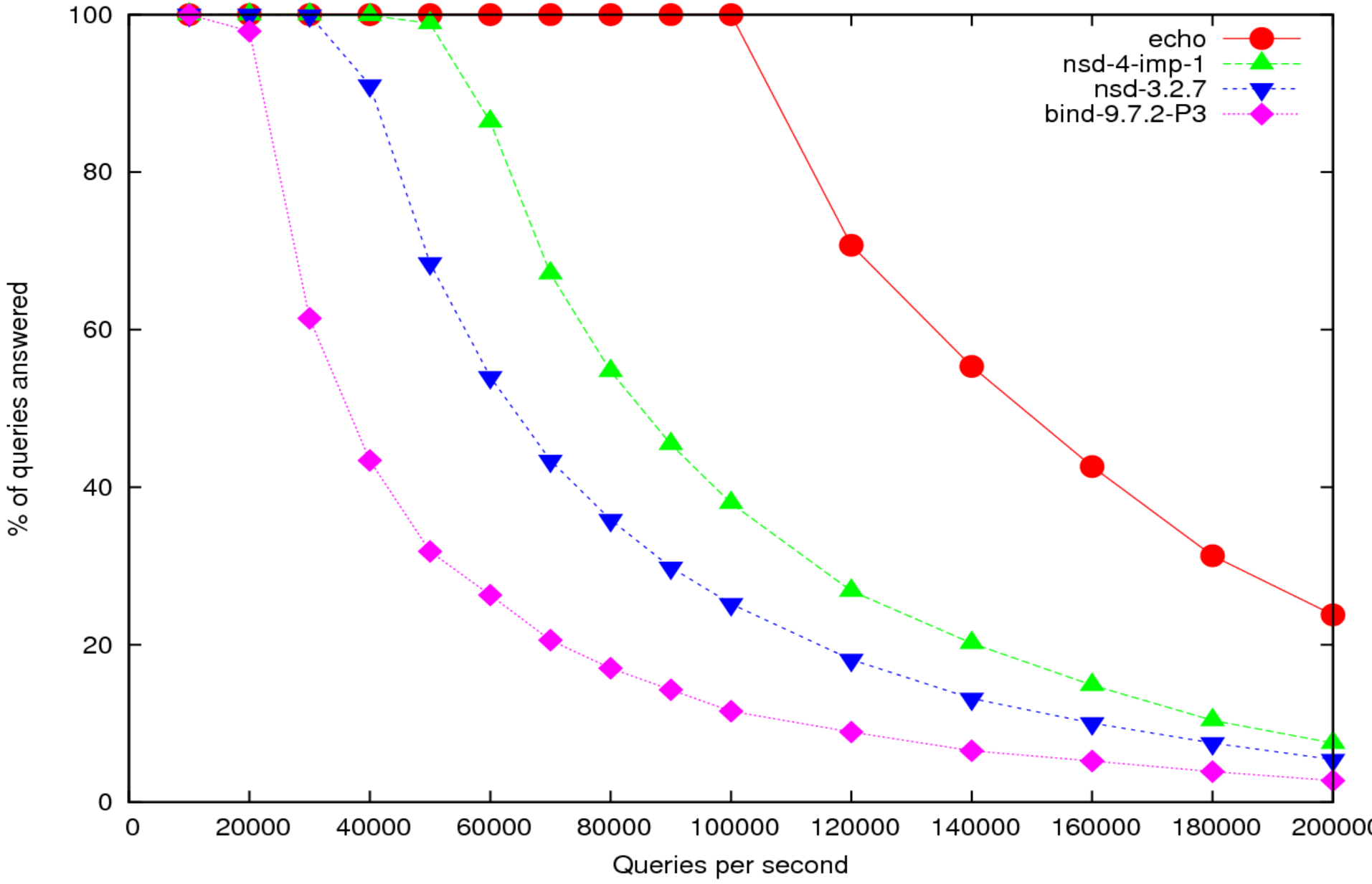
Test Setup

- Use one core of 4x3.2Gz, 12Gb, 1Gbit intel Debian
- 1M queries, randomized.
- 100.000 qps is 64 mbit query stream
- Assumptions
  - Domains called example123.tld
  - No nxdomain
  - No dnssec

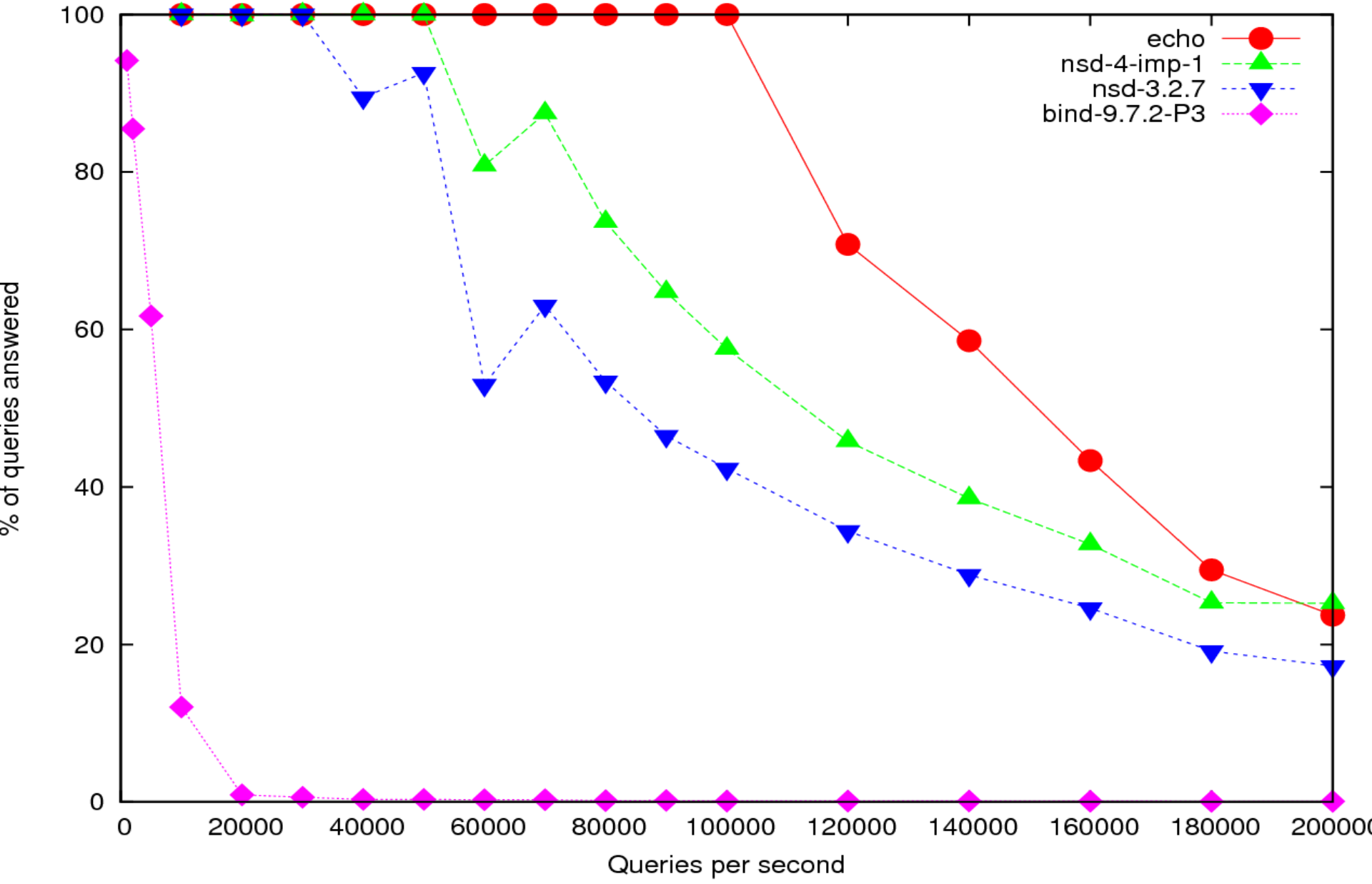
L0-Root


echo
nsd-4-imp-1
nsd-3.2.7
bind-9.7.2-P3
% of queries answered
Queries per second
0
20
40
60
80
100
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000

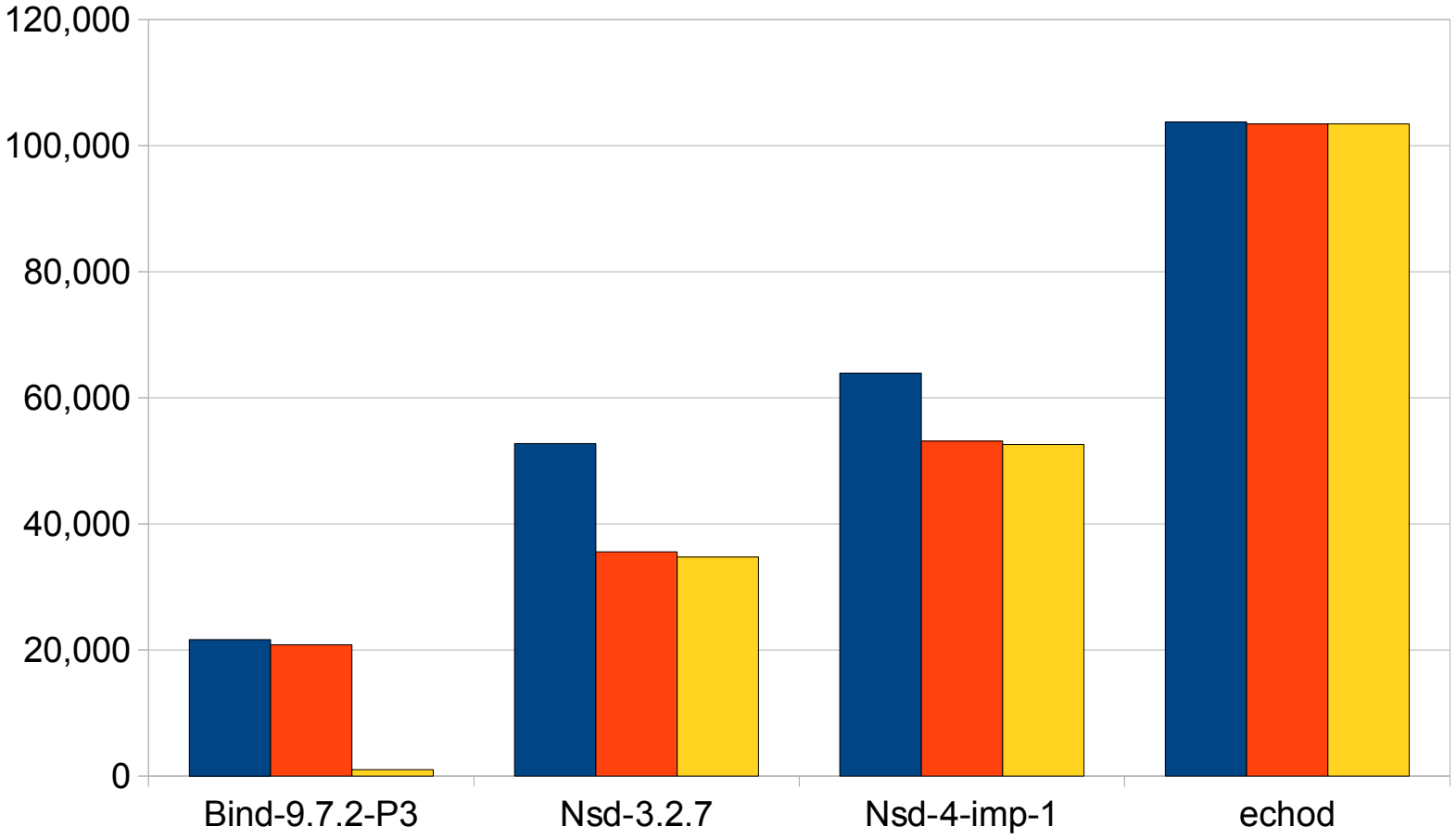
LI-TLD


100
80
60
40
20
0
% of queries answered
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000
Queries per second
echo
nsd-4-imp-1
nsd-3.2.7
bind-9.7.2-P3

L2-SLD


100
80
60
40
20
0
% of queries answered
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000
Queries per second
echo
nsd-4-imp-1
nsd-3.2.7
bind-9.7.2-P3

95% returns


120,000
100,000
80,000
60,000
40,000
20,000
0
Bind-9.7.2-P3
Nsd-3.2.7
Nsd-4-imp-1
echod

Question time

- I'll be around to talk to

???

NLnet Lab is a charity, donations are welcome