

Interim Report on DNAME Technical Evaluation

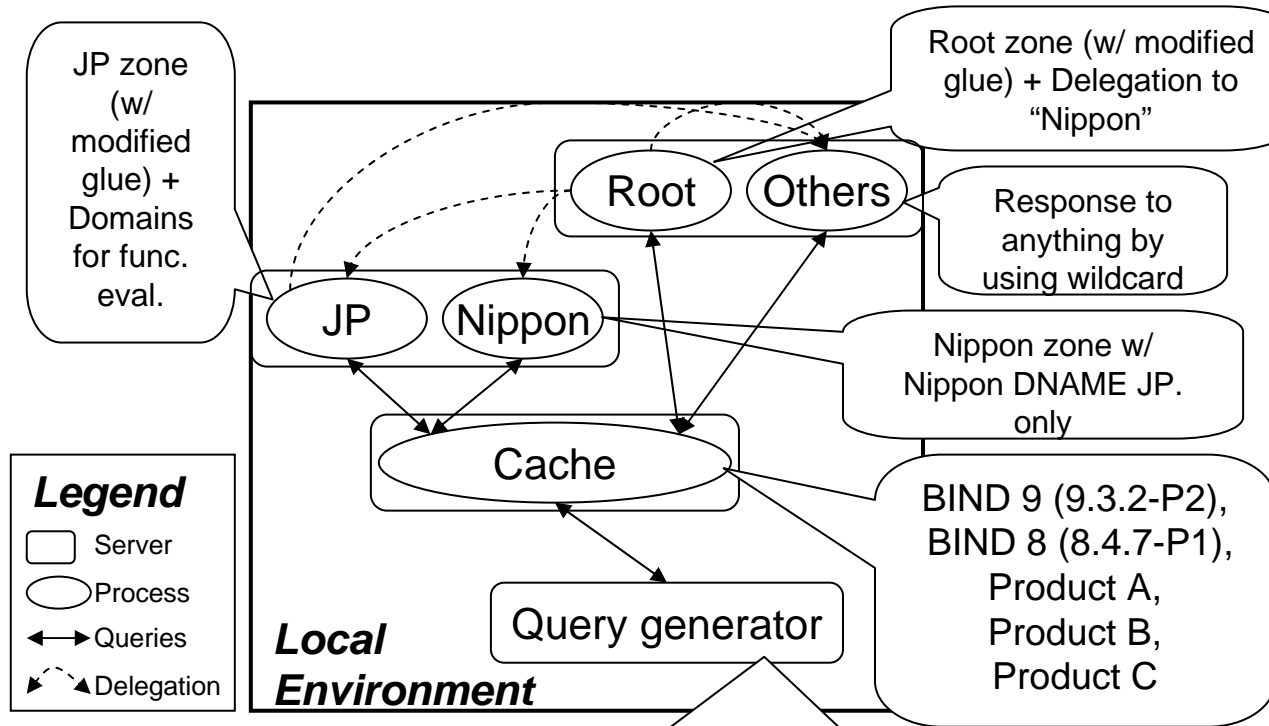
29 Sep 2008

JPRS

Overview

- Prepared DNS emulation environment locally – the environment includes:
 - Root DNS server, JP DNS server, “Nippon” DNS server, other authoritative DNS server and Cache DNS server
- Evaluated the followings:
 - (1) Functionality: Verification of name resolution of “Nippon” TLD
 - (2) Performance: Measurement of impact on Root/JP/Cache DNS servers caused by name resolution of “Nippon” TLD
- Evaluation was performed on June 2008

Evaluation overview



(1) Functionality eval.

Resolve names
“xx.jp” and “xx.Nippon”
 (“xx” represents the same string), and compare/confirm results

(2) Performance eval.

- Replay a.dns.jp queries in 4 patterns (left)
- Measure at each server
+ number of queries
+ CPU/memory consumption
- Confirm impact to DNAME

Query pattern (test case)	“Nippon” ratio
1. “JP” only	0%
2. “Nippon” is very few	<1%
3. “Nippon” is significant	~30%
4. “Nippon” only	100%

Use query log of JP DNS


Summary of the results

Cache DNS server	Func. eval.	Performance evaluation				
		Cache	Root	JP	Nippon	Other TLD's
BIND 8	△	Response:↓↓ Memory usage:↑↑	No impact	No impact	Query #:↑↑ CPU usage: ↑↑	Query #:↑
BIND 9	○	Response:↓ CPU usage: ↑	No impact	No impact	No impact	No impact
Product A	×	Not conducted				
Product B	△	Response:↓↓	No impact	No impact	Query #:↑↑ CPU usage: ↑↑	No impact
Product C	○	Response:↓ CPU usage:↑	No impact	No impact	No impact	No impact

○ : DNAME supported; name resolution - OK

△ : DNAME not supported; name resolution - OK
(using synthesized CNAME that is not cached)

× : DNAME not supported, name resolution - NG

 : no impact

 : small impact

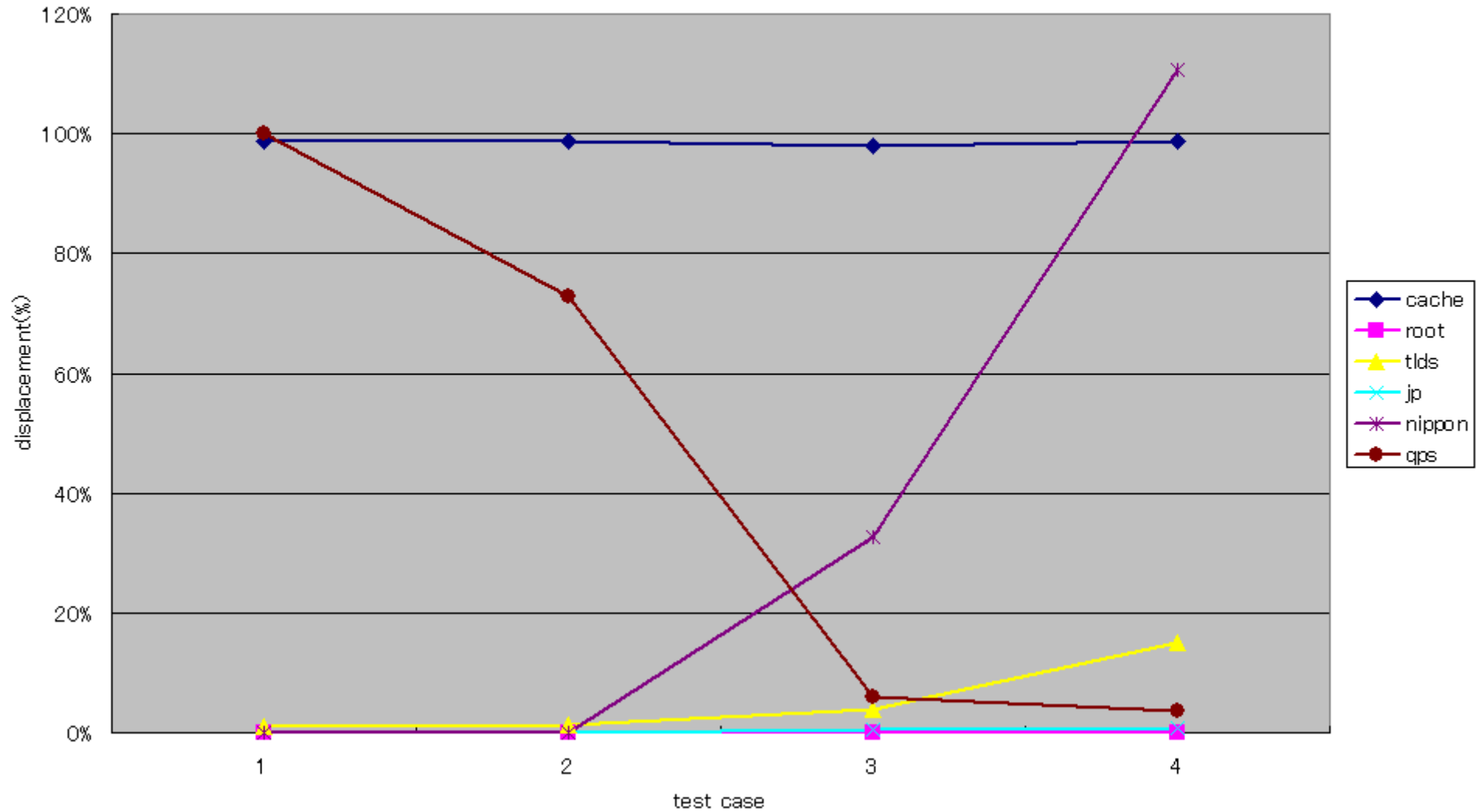
 : large impact

Conclusions

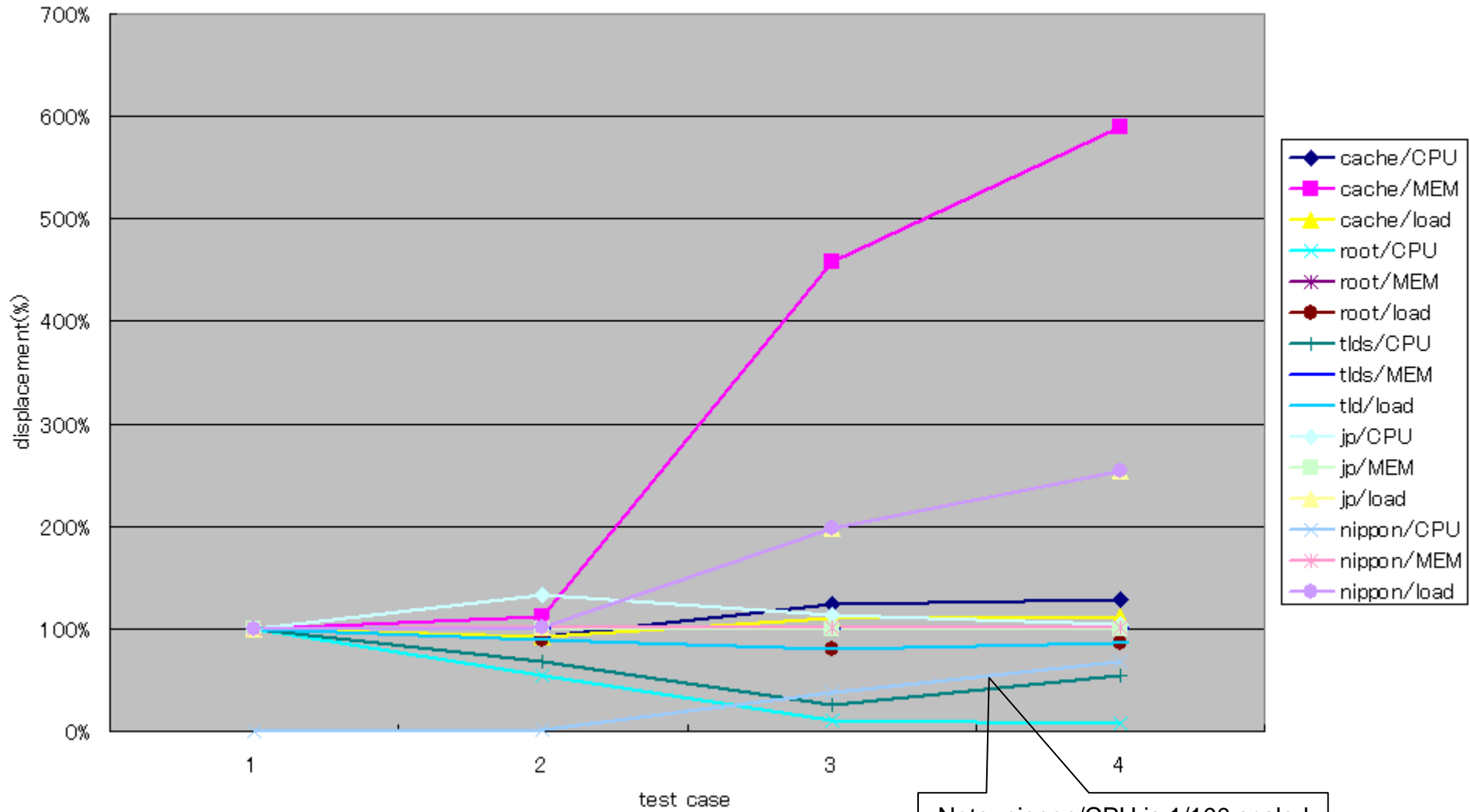
- Functionality
 - With one cache server implementation (Product A), names cannot be resolved with DNAME
- Performance
 - No impact on Root server nor JP DNS server
 - No major impact on cache servers supporting DNAME (BIND 9 and Product C)
 - cache server itself
 - "Nippon" DNS server
 - Impact on cache servers not supporting DNAME (BIND 8 and Product B)
 - cache server: response performance decreased; resource consumption increased in proportion to increase of ".Nippon" domain name queries
 - "Nippon" DNS server: increase of queries and resource consumption

Appendix

BIND 8 queries

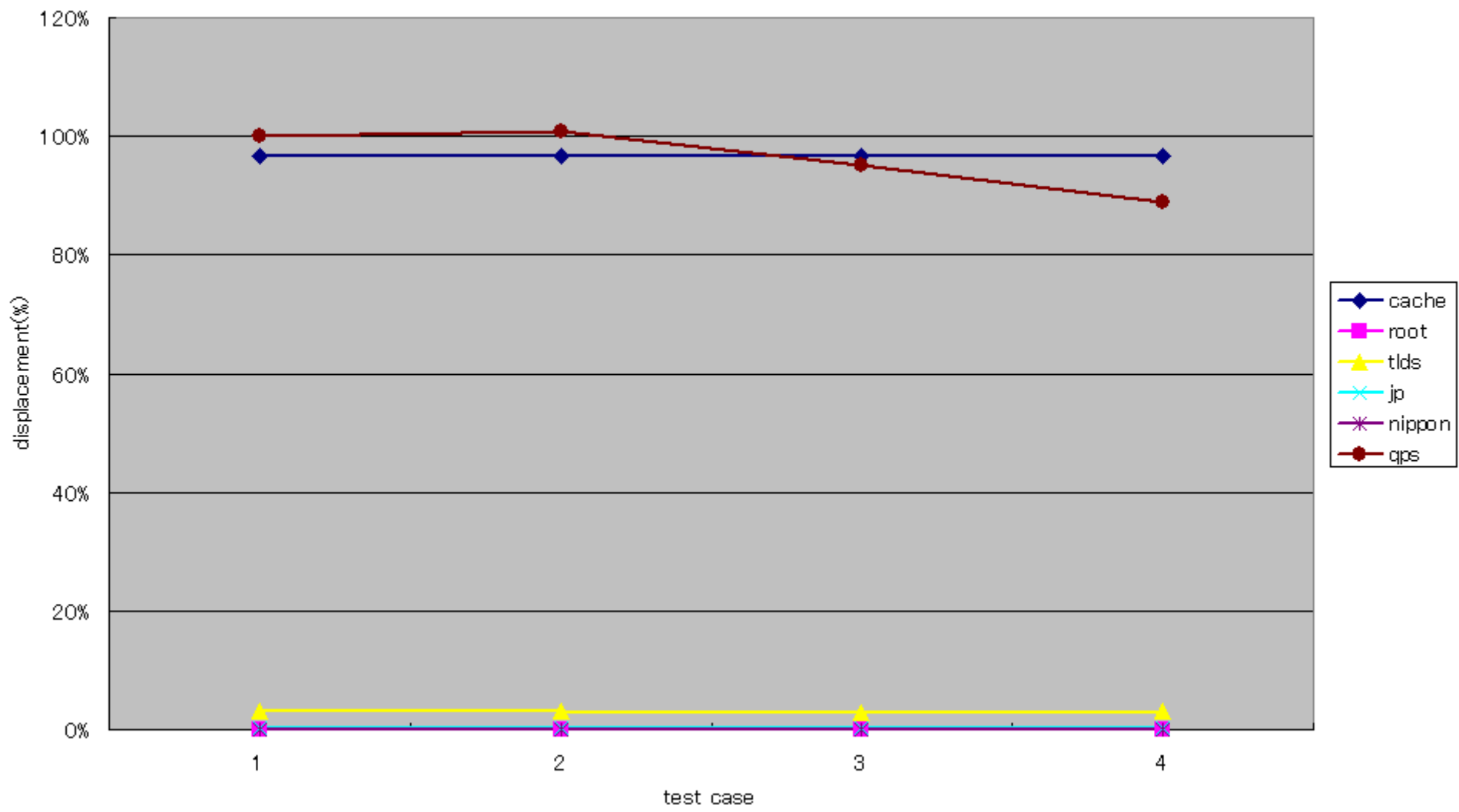


BIND 8 load displacement

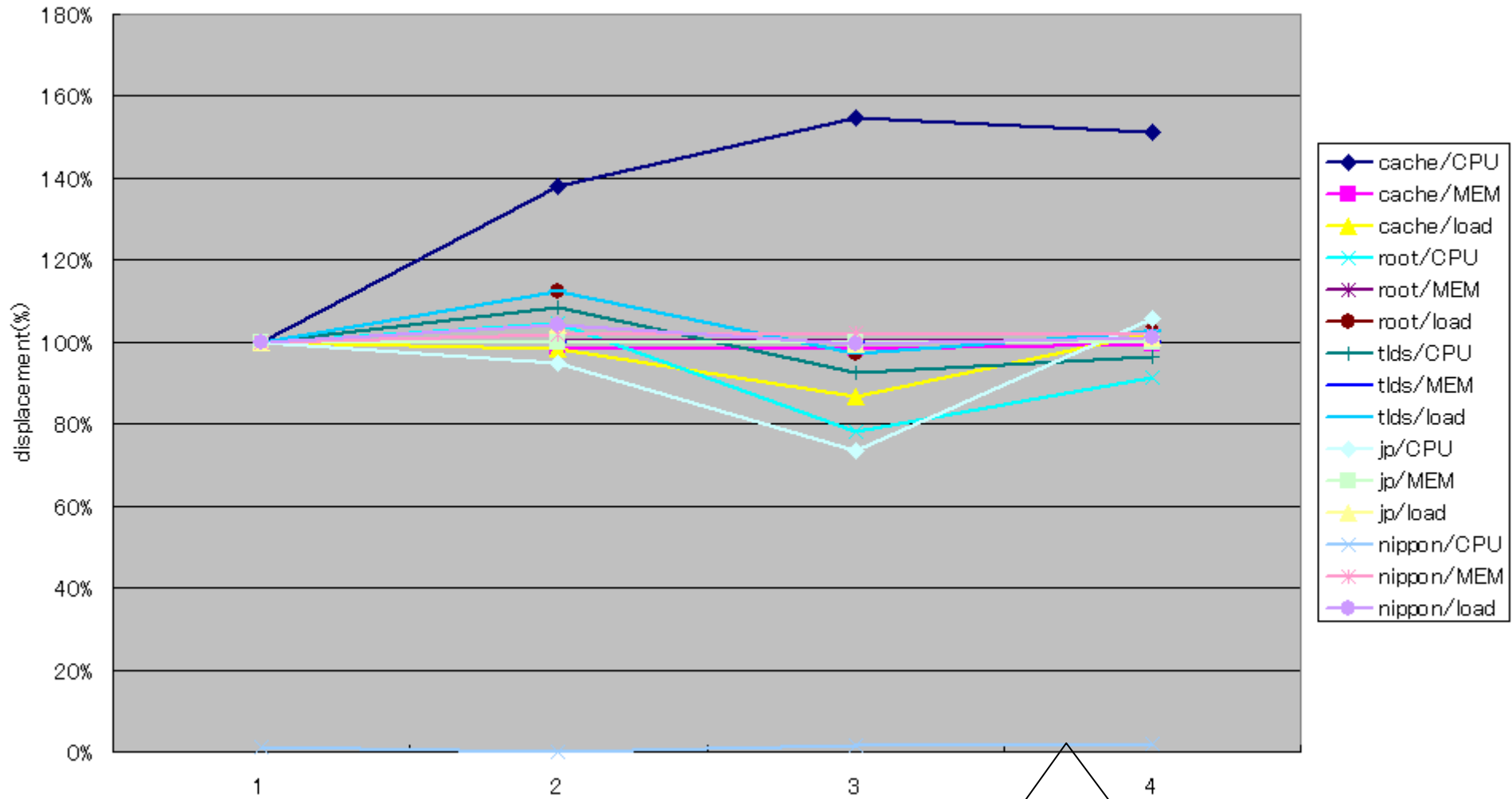


Note: nippon/CPU is 1/100 scaled

BIND 9 queries

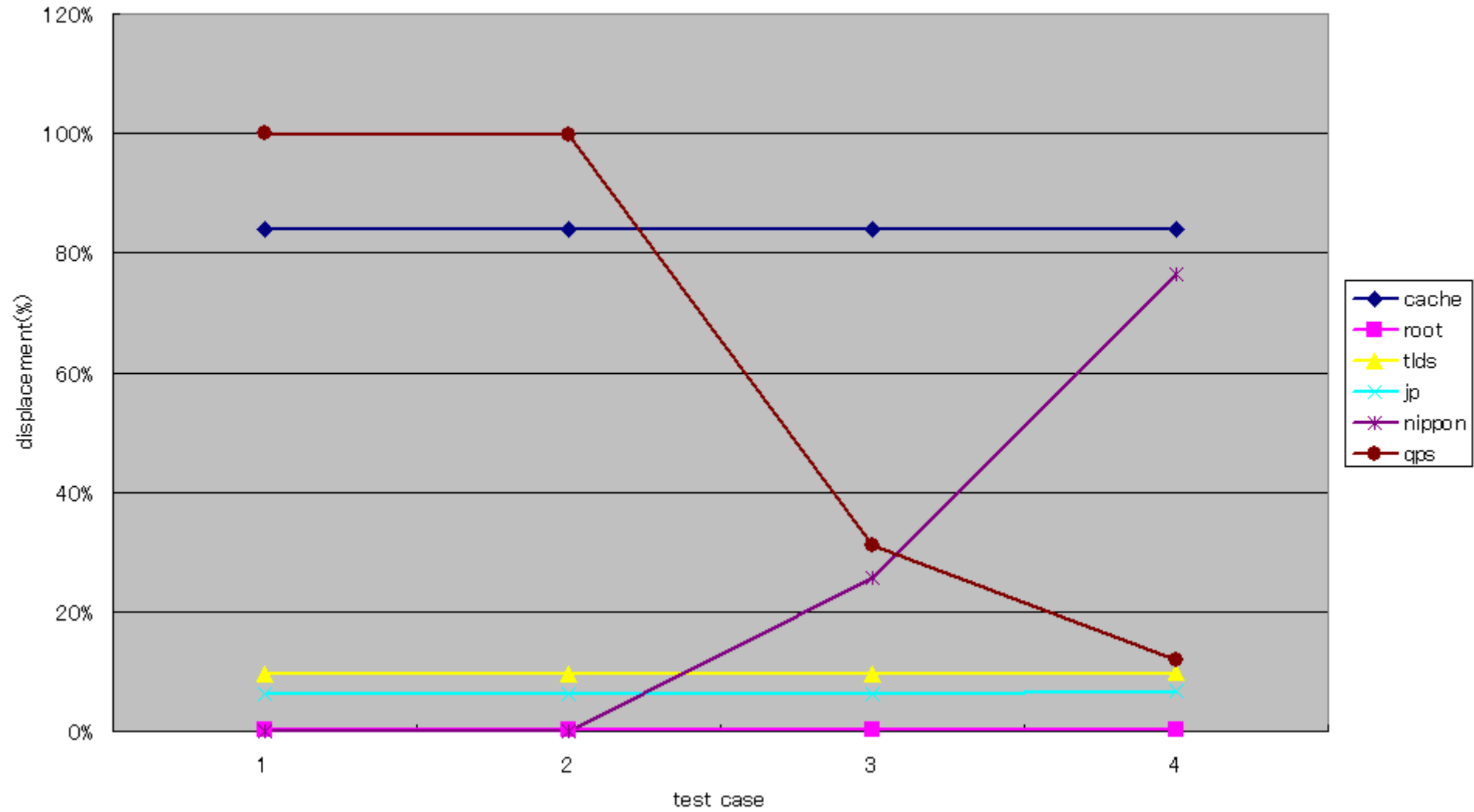


BIND 9 load displacement

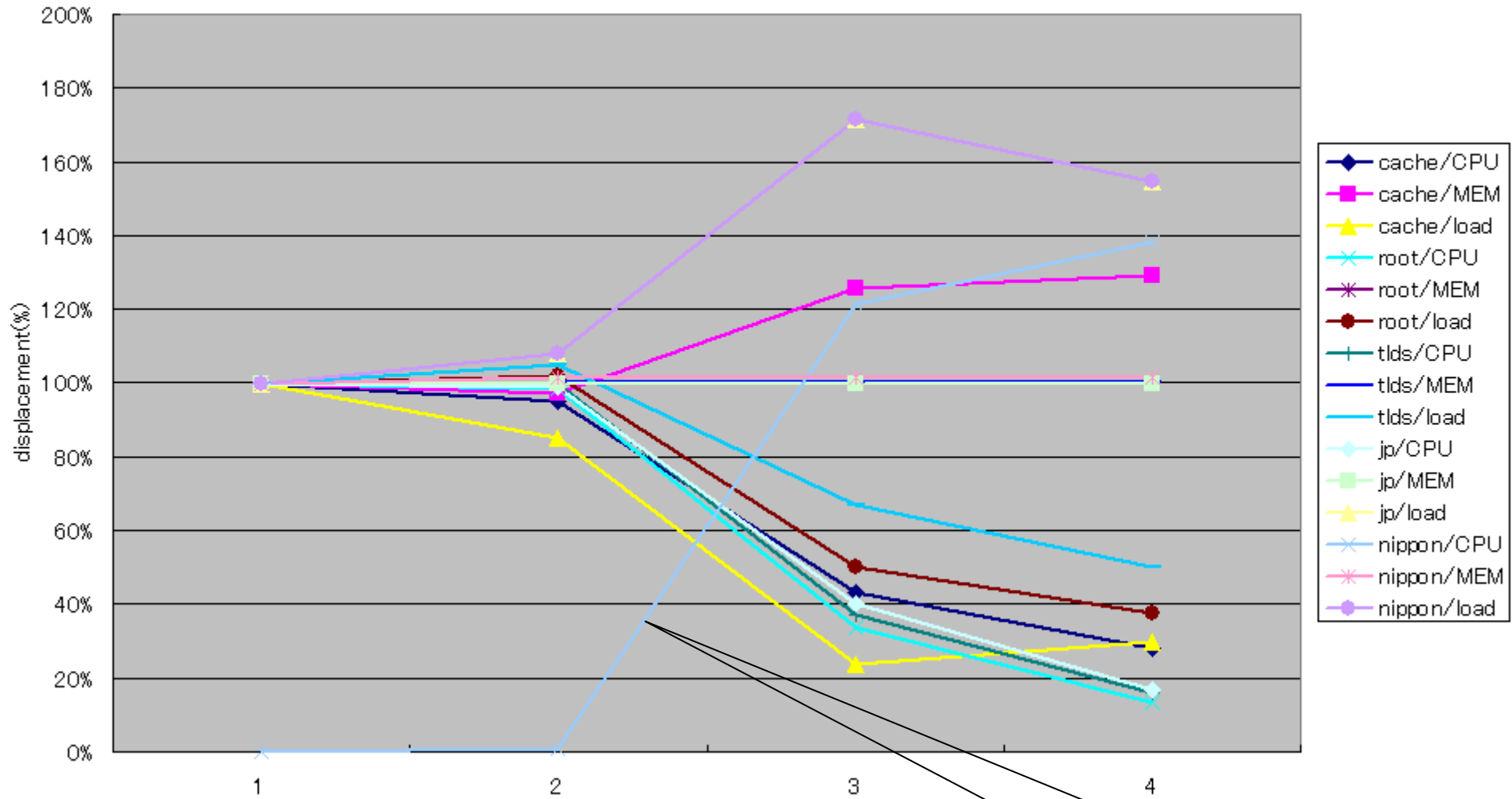


Note: nippon/CPU is 1/100 scaled

Product B queries

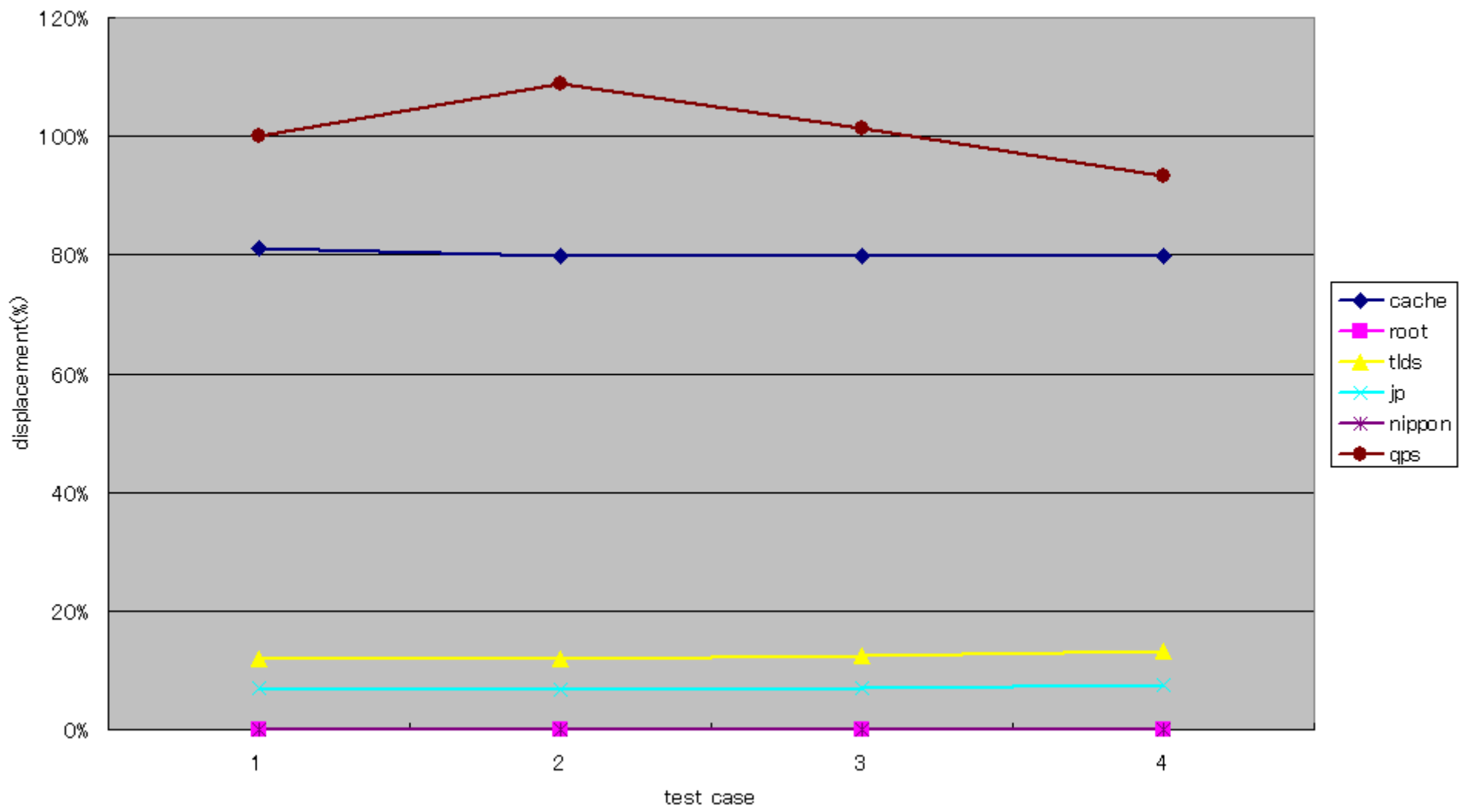


Product B load displacement

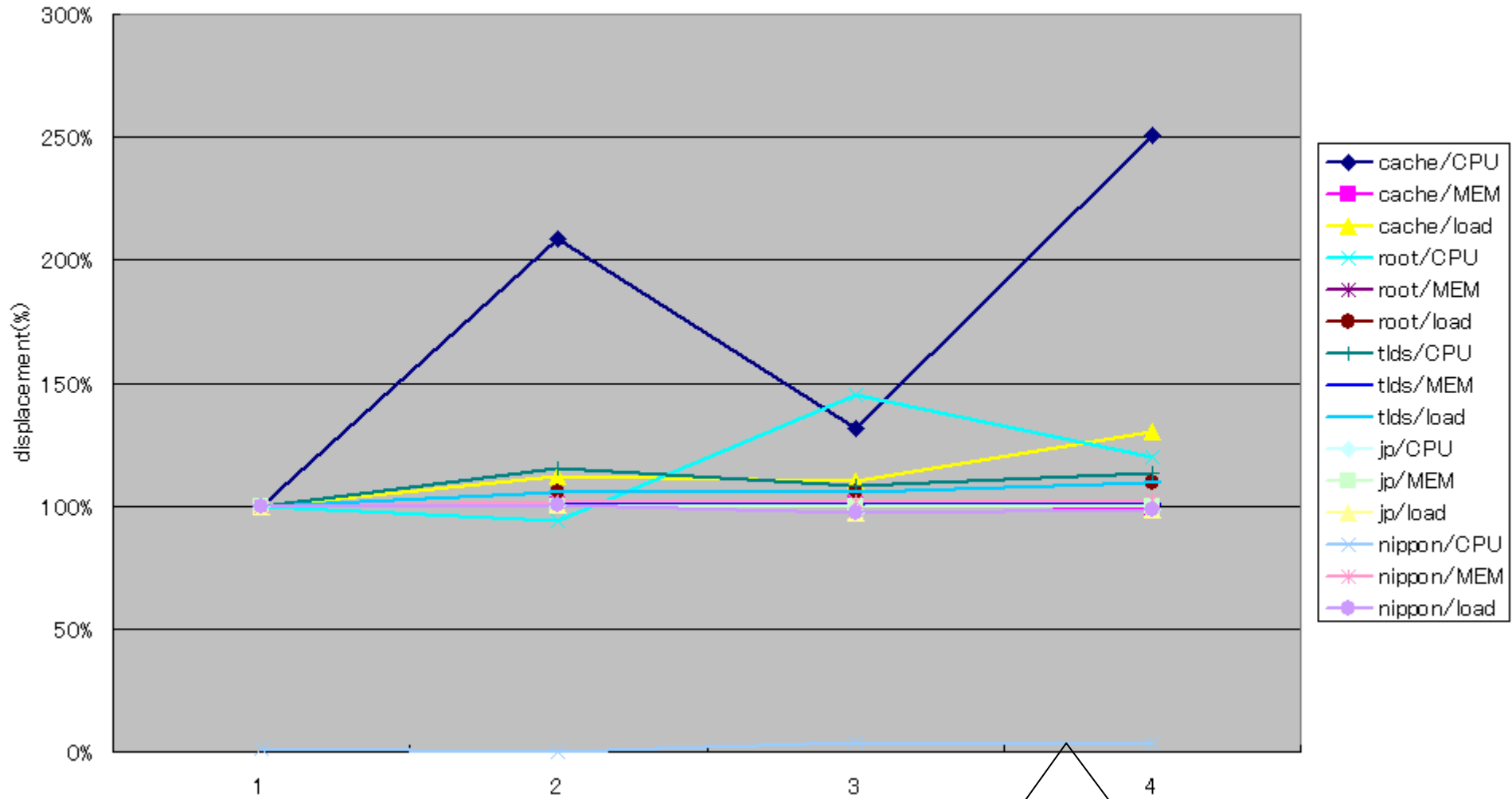


Note: nippon/CPU is 1/100 scaled

Product C queries



Product C load displacement



Note: nippon/CPU is 1/100 scaled