Go and PHP: capacity per core

Go, FrankenPHP and PHP-FPM on the same OAuth2 service: requests per core, CPU per request, PostgreSQL load and instance count.

01 OAUTH2 SERVICE · MEDIUM CONFIDENCE

Requests per second per core

14,330
Go
Go 1.27.1

6,415
FrankenPHP
1.12.1, worker mode

5,152
PHP-FPM
PHP 8.5.10

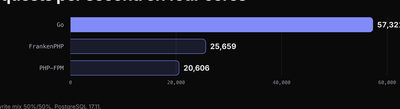
02 ON FOUR CORES

Go does 2.78 times the work of PHP-FPM.

2.23 times that of FrankenPHP. The measurement was published with medium confidence; the number is a saturation ceiling, not an SLO.

03 CEILING

Requests per second on four cores



Read/write mix 50%/50%, PostgreSQL 17.11.

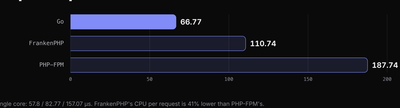
04 CEILING

Req/s by core count

CORES	GO	FRANKENPHP	PHP-FPM
1	16,883	6,544	6,218
2	29,449	14,306	11,211
4	57,321	25,659	20,606

05 EFFICIENCY

CPU per request on four cores



On a single core: 57.8 / 82.77 / 157.07 µs. FrankenPHP's CPU per request is 41% lower than PHP-FPM's.

06 EFFICIENCY

FrankenPHP does not fill the core

0.54
Used on 1 core
Go and PHP-FPM 0.98

1.44
Used on 2 cores
Go 1.87, PHP-FPM 1.95

2.84
Used on 4 cores
Go 3.83, PHP-FPM 3.87

07 AT THE CEILING

Latency and memory

CANDIDATE	P50 READ / WRITE	P99 READ / WRITE	RSS
Go	1.81 / 2.42 ms	4.69 / 5.41 ms	30.4 MiB
FrankenPHP	4.77 / 4.96 ms	8.80 / 9.06 ms	60.3 MiB
PHP-FPM	6.03 / 6.24 ms	8.27 / 8.45 ms	60.0 MiB

08 DATABASE

PostgreSQL's share

SATURATING CANDIDATE	WRITES + READS	POSTGRESQL CORES	CPU PER REQUEST
Go	24,930 + 32,392	2.34	40.75 µs
FrankenPHP	12,575 + 13,084	1.11	43.2 µs
PHP-FPM	10,128 + 10,478	1.46	71.07 µs

09 CAPACITY

Cores needed for 30,000 req/s

2.0
Go

3.3
FrankenPHP

5.6
PHP-FPM

10 CAPACITY

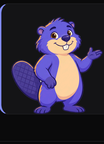
Instance count by target rate

TARGET REQ/S	GO	FRANKENPHP	PHP-FPM
10,000	1	1	1
20,000	1	1	1
30,000	1	2	2
50,000	1	2	3
100,000	2	4	5

11 TUNING

Pool size and the cost of a wrong choice

CANDIDATE	BEST POOL (1/2/4 CORES)	COST OF THE WORST CHOICE
Go	16 / 64 / 64	70.6%
PHP-FPM	8 / 16 / 32	30.7%
FrankenPHP	8 / 8 / 8	29.6%



FORMULA

Below 20,000 req/s, all three candidates fit on a single instance. Beyond that: target rate × CPU per request = cores; +⅓ for FrankenPHP.

13 AS YOU READ

The limits of these numbers

CEILING The published number is a saturation ceiling, not an SLO. 45 of 45 repetitions passed the load-generator probe.

ENVIRONMENT In one run, a headless Chromium on the host machine dropped Go to 17,490 req/s instead of 57,321; that run was discarded.

DISK The VM disk's fsync guarantee was not verified; absolute write numbers may be optimistic, the comparison is not affected.