

Benchmark	Pycket	Racket	Larceny	8/	Spidermonkey	Python	Pypy
	mean	mean	mean	mean	mean	mean	mean
Bubblechaperone	$776 \pm 7 \mathrm{ms}$	6667 ±5 ms	sm ±	sm ±	sm∓	sm =	∓ ms
Bubbledirect	$653 \pm 3 \mathrm{ms}$	$1382 \pm 2 \mathrm{ms}$	$1595 \pm 1 ms$	$336 \pm 0 \mathrm{ms}$	$221 \pm 0 ms$	$20626 \pm 36 \text{ms}$	$597 \pm 2 \mathrm{ms}$
Bubbleproxy	\pm ms	± ms	\pm ms	$111379 \pm 4449 ms$	$113832 \pm 2284 ms$	$100209 \pm 816 ms$	$1248 \pm 11 ms$
Bubbleunsafe	$547 \pm 2 \text{ms}$	$955 \pm 2 \text{ms}$	\pm ms	\pm ms	\pm ms	∓ ms	\pm ms
Bubble _{unsafe2}	$540 \pm 2 ms$	$726 \pm 1 \mathrm{ms}$	\pm ms	∓ ms	± ms	∓ ms	∓ ms
Church _{chaperone}	$6960\pm49\mathrm{ms}$	$38042 \pm 1200 ms$	\pm ms	∓ ms	\pm ms	∓ ms	\pm ms
Church _{chaperone-a}	$1239 \pm 6 \mathrm{ms}$	$4542\ \pm 213ms$	\pm ms	∓ ms	\pm ms	∓ ms	\pm ms
Churchcontract	$1448{\pm}12ms$	$10330\ \pm 284ms$	\pm ms	$291928 \pm 1548 ms$	$403966 \pm 5428 ms$	\pm ms	\pm ms
Church _{direct}	$752 \pm 3 \text{ms}$	$1241 \pm 7 ms$	$796\pm12\mathrm{ms}$	$2067 \pm 7 \mathrm{ms}$	$3470 \pm 10 ms$	\pm ms	\pm ms
Church _{proxy}	\pm ms	\pm ms	\pm ms	$54073\ \pm 118ms$	$153989 \pm 680 ms$	\pm ms	\pm ms
Church _{proxy-a}	\pm ms	\pm ms	\pm ms	$51991 \pm 125 ms$	$150996 \pm 950 ms$	\pm ms	\pm ms
Churchwrap	$2392 \pm 8 ms$	$4184 \pm 8ms$	$4129\pm19ms$	$8588 \pm 39 \mathrm{ms}$	$17171 \pm 203 ms$	$298532\pm6236 ms$	$68958{\pm}172ms$
Procchaperone	$88 \pm 1 ms$	$1051 \pm 10 ms$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
Procchaperone+return	$90 \pm 1 ms$	$1576 \pm 8 \text{ms}$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
Procdirect	$21 \pm 1 ms$	$34 \pm 0 \mathrm{ms}$	\pm ms	$39 \pm 0 \mathrm{ms}$	$27 \pm 0 ms$	$1464 \pm 25 \mathrm{ms}$	$67 \pm 1 ms$
Procimpersonate	$88 \pm 1 ms$	$1020 \pm 7 \mathrm{ms}$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
Procimpersonate+return	$90 \pm 1 ms$	$1532 \pm 10 \mathrm{ms}$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
Procindirect	$20 \pm 1 ms$	$124 \pm 2 \mathrm{ms}$	\pm ms	$38 \pm 0 \mathrm{ms}$	$28 \pm 1 ms$	$1453 \pm 25 \mathrm{ms}$	$80 \pm 1 ms$
Procproxy	\pm ms	\pm ms	\pm ms	$1555 \pm 9 \mathrm{ms}$	$2604 \pm 8 ms$	\pm ms	\pm ms
Procwrapped	$22 \pm 1 ms$	$180 \pm 1 ms$	\pm ms	$38 \pm 0 \mathrm{ms}$	$27 \pm 0 ms$	$2682 \pm 15 ms$	$72 \pm 2 \mathrm{ms}$
Procwrapped+check	$23 \pm 1 ms$	$366 \pm 3 \mathrm{ms}$	\pm ms	$118 \pm 1 \mathrm{ms}$	$140 \pm 0 \mathrm{ms}$	$4319 \pm 92 \mathrm{ms}$	83 ±2 ms
Procwrapped+return	$23 \pm 1 ms$	$405 \pm 7 ms$	\pm ms	368 ±1 ms	899 ∓5 ms	$5457 \pm 57 \mathrm{ms}$	$276 \pm 1 ms$
Structchaperone	$135 \pm 1 \text{ms}$	$5546 \pm 60 \mathrm{ms}$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
Structdirect	$134 \pm 1 ms$	$527 \pm 0 ms$	$1069 \pm 1 ms$	$377 \pm 0 \mathrm{ms}$	$271 \pm 18 ms$	$4650 \pm 34 \mathrm{ms}$	$126 \pm 1 ms$
Structimpersonate	$136 \pm 1 ms$	$5530 \pm 103 ms$	\pm ms	\pm ms	\pm ms	\pm ms	\pm ms
$Struct_{proxy}$	\pm ms	\pm ms	\pm ms	$26531\ \pm 618ms$	$26760 \pm 103 ms$	$103454 \pm 860 ms$	$2077 \pm 28 ms$
Structunsafe	$133 \pm 1 ms$	$337 \pm 0 \mathrm{ms}$	\pm ms	\pm ms	\pm ms	∓ ms	\pm ms
$Struct_{unsafe2}$	$133 \pm 1 \text{ms}$	$337 \pm 0 \mathrm{ms}$	\pm ms	\pm ms	∓ ms	sm ∓	\pm ms