



MetaclassTalk 0.3 Benchmarks

<http://csl.ensm-douai.fr/MetaclassTalk>

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1 Benchmark Description

1.1 Platform

Computer: PC

CPU: Intel Pentium III - 850MHz

RAM: 512MB

Operating System: GNU Linux - Distribution: Mandrak 8.1

Smalltalk: Squeak 3.0 of 4 February 2001 (latest update: 3552)

1.2 Benchmarks Performed

The aim of the benchmark is to compare MetaclassTalk message sends and accesses to instance variables to the same operations in Smalltalk. Therefore, we first measure the average time in “pure” Smalltalk. We have then three reference average-times:

- a Smalltalk object sending message to another Smalltalk object,
- a Smalltalk object reading an instance variable,
- a Smalltalk object writing a value into an instance variable.

These reference times allows to compute the ratio of speedness/slowness of MetaclassTalk. The current implementation allows having both Smalltalk objects and MetaclassTalk ones. This have some consequences on implementation and thus on benchmarks.

We have different benchmarks for message sends, since various hooks are required for capturing messages according to the “kind” of object is the sender, i.e. a Smalltalk one or a MetaclassTalk one. To capture message from a Smalltalk object to a MetaclassTalk one, we use method wrappers. But, when a MetaclassTalk object sends a message to an other object (should it be a Smalltalk one or a MetclassTalk one) jump to the meta-level occurs on the sender side thanks to a code transformation.

Because of encapsulation, access to instance variables are only done by owner objects (only an object can access to its own instance variables). Therefore, we have only one kind hook: a code transformation that allows jumping to the meta-level.

This lead us to mesuring five average-times in the MetaclassTalk context:

- messages sent from a Smalltalk object to a MetaclassTalk one,
- messages sent from a Metaclassesstalk object to a Smalltalk one,
- messages sent from a MetaclassTalk object to a MetaclassTalk one,
- write accesses to an instance variable of a MetaclassTalk object.
- read accesses to an instance variable of a MetaclassTalk object, and

2 Benchmark Results

We made six benchmark runs. Each one of the two first performed 10000 (ten thousands) loops for measuring each average time. The third and the fourth runs performed 100000 (a hundred thousands) loops. And each one of the two last runs performed 1000000 (a million) loops.

2.1 Ratios Summary

Total loops	10 000	10 000	100 000	100 000	1000 000	1000 000	Average
ST-MT	0.043%	0.052%	0.041%	0.043%	0.007%	0.038%	0.037%
MT-ST	5.882%	7.463%	5.706%	6.268%	5.800%	5.578%	6.116%
MT-MT	0.042%	0.051%	0.039%	0.041%	0.039%	0.037%	0.041%
IV Write	15.000%	14.286%	16.019%	16.505%	16.356%	15.675%	15.640%
IV Read	15.000%	15.000%	16.583%	15.122%	15.573%	17.370%	15.775%

- ST-MT: Message sent from a Smalltalk object to a MetaclassTalk one.
- MT-ST: Message sent from a MetaclassTalk object to a Smalltalk one.
- MT-MT: Message Sent from a MetaclassTalk object to a MetaclassTalk one.
- IV Write: Write access to an instance variable of a MetaclassTalk object.
- IV Read: Read access to an instance variable of a MetaclassTalk object.

2.2 Full details

Each benchmark start by a dashed line followed by a line with a time stamp. Then we have the number of loops made for the benchmark.

```
-----  
MetaclassTalk Benchmarks on #(29 July 2002 9:17:33 am)
```

```
Total Loops per test: 10000
```

```
-Message sent by a Smalltalk object to a Smalltalk object
```

```
  Average time: 0.0004
```

```
  Ratio: 100.0%
```

```
-Message sent by a Smalltalk object to a MetaclassTalk object
```

```
  Average time: 0.9282
```

```
  Ratio: 0.043%
```

-Message sent by a MetaclassTalk object to a Smalltalk object
Average time: 0.0068
Ratio: 5.882%

-Message sent by a MetaclassTalk object to a MetaclassTalk object
Average time: 0.9482
Ratio: 0.042%

-Smalltalk IV write accessor
Average time: 0.0003
Ratio: 100.0%

-MetaclassTalk IV write accessor
Average time: 0.002
Ratio: 15.0%

-Smalltalk IV read accessor
Average time: 0.0003
Ratio: 100.0%

-MetaclassTalk IV read accessor
Average time: 0.002
Ratio: 15.0%

MetaclassTalk Benchmarks on #(29 July 2002 9:18:32 am)

Total Loops per test: 10000

-Message sent by a Smalltalk object to a Smalltalk object
Average time: 0.0005
Ratio: 100.0%

-Message sent by a Smalltalk object to a MetaclassTalk object
Average time: 0.9681
Ratio: 0.052%

-Message sent by a MetaclassTalk object to a Smalltalk object
Average time: 0.0067
Ratio: 7.463%

-Message sent by a MetaclassTalk object to a MetaclassTalk object
Average time: 0.9897

Ratio: 0.051%

-Smalltalk IV write accessor
Average time: 0.0003
Ratio: 100.0%

-MetaclassTalk IV write accessor
Average time: 0.0021
Ratio: 14.286%

-Smalltalk IV read accessor
Average time: 0.0003
Ratio: 100.0%

-MetaclassTalk IV read accessor
Average time: 0.002
Ratio: 15.0%

MetaclassTalk Benchmarks on #(29 July 2002 9:23:48 am)

Total Loops per test: 100000

-Message sent by a Smalltalk object to a Smalltalk object
Average time: 0.0004
Ratio: 100.0%

-Message sent by a Smalltalk object to a MetaclassTalk object
Average time: 0.98551
Ratio: 0.041%

-Message sent by a MetaclassTalk object to a Smalltalk object
Average time: 0.00701
Ratio: 5.706%

-Message sent by a MetaclassTalk object to a MetaclassTalk object
Average time: 1.0255
Ratio: 0.039%

-Smalltalk IV write accessor
Average time: 0.00033
Ratio: 100.0%

-MetaclassTalk IV write accessor
Average time: 0.00206
Ratio: 16.019%

-Smalltalk IV read accessor
Average time: 0.00033
Ratio: 100.0%

-MetaclassTalk IV read accessor
Average time: 0.00199
Ratio: 16.583%

MetaclassTalk Benchmarks on #(29 July 2002 9:27:40 am)

Total Loops per test: 100000

-Message sent by a Smalltalk object to a Smalltalk object
Average time: 0.00043
Ratio: 100.0%

-Message sent by a Smalltalk object to a MetaclassTalk object
Average time: 1.00093
Ratio: 0.043%

-Message sent by a MetaclassTalk object to a Smalltalk object
Average time: 0.00686
Ratio: 6.268%

-Message sent by a MetaclassTalk object to a MetaclassTalk object
Average time: 1.04535
Ratio: 0.041%

-Smalltalk IV write accessor
Average time: 0.00034
Ratio: 100.0%

-MetaclassTalk IV write accessor
Average time: 0.00206
Ratio: 16.505%

-Smalltalk IV read accessor
Average time: 0.00031
Ratio: 100.0%

-MetaclassTalk IV read accessor
Average time: 0.00205
Ratio: 15.122%

MetaclassTalk Benchmarks on #(29 July 2002 9:33:50 am)

Total Loops per test: 1000000

-Message sent by a Smalltalk object to a Smalltalk object
Average time: 0.000404
Ratio: 100.0%

-Message sent by a Smalltalk object to a MetaclassTalk object
Average time: 5.702213
Ratio: 0.007%

-Message sent by a MetaclassTalk object to a Smalltalk object
Average time: 0.006965
Ratio: 5.8%

-Message sent by a MetaclassTalk object to a MetaclassTalk object
Average time: 1.034176
Ratio: 0.039%

-Smalltalk IV write accessor
Average time: 0.000351
Ratio: 100.0%

-MetaclassTalk IV write accessor
Average time: 0.002146
Ratio: 16.356%

-Smalltalk IV read accessor
Average time: 0.000325
Ratio: 100.0%

-MetaclassTalk IV read accessor
Average time: 0.002087
Ratio: 15.573%

MetaclassTalk Benchmarks on #(29 July 2002 11:31:45 am)

Total Loops per test: 1000000

-Message sent by a Smalltalk object to a Smalltalk object

Average time: 0.000414

Ratio: 100.0%

-Message sent by a Smalltalk object to a MetaclassTalk object

Average time: 1.096929

Ratio: 0.038%

-Message sent by a MetaclassTalk object to a Smalltalk object

Average time: 0.007422

Ratio: 5.578%

-Message sent by a MetaclassTalk object to a MetaclassTalk object

Average time: 1.129039

Ratio: 0.037%

-Smalltalk IV write accessor

Average time: 0.000395

Ratio: 100.0%

-MetaclassTalk IV write accessor

Average time: 0.00252

Ratio: 15.675%

-Smalltalk IV read accessor

Average time: 0.000391

Ratio: 100.0%

-MetaclassTalk IV read accessor

Average time: 0.002251

Ratio: 17.37%