

## POMIARY CZASU:

### a) Wywołanie funkcji fork:

N 8000

Parent process user time = 0.000000  
Parent process system time = 0.000299  
Child process user time = 0.000002  
Child process system time = 0.000426  
Parent process real time = 2986657 clock ticks  
Child process real time = 0 clock ticks

N 10000

Parent process user time = 0.000001  
Parent process system time = 0.000345  
Child process user time = 0.000001  
Child process system time = 0.000423  
Parent process real time = 3462688 clock ticks  
Child process real time = 0 clock ticks

N 28000

Parent process user time = 0.000001  
Parent process system time = 0.001066  
Child process user time = 0.000003  
Child process system time = 0.001178  
Parent process real time = 10676517 clock ticks  
Child process real time = 0 clock ticks

N 40000

Parent process user time = 0.000002  
Parent process system time = 0.001488  
Child process user time = 0.000003  
Child process system time = 0.001679  
Parent process real time = 14909939 clock ticks  
Child process real time = 0 clock ticks

N 55000

Parent process user time = 0.000003  
Parent process system time = 0.002093  
Child process user time = 0.000004  
Child process system time = 0.002323  
Parent process real time = 20973547 clock ticks  
Child process real time = 0 clock ticks

### b) Wywołanie funkcji vfork:

N 50000

Parent process user time = 0.000000  
Parent process system time = 0.000904  
Child process user time = 0.000000  
Child process system time = 0.001023  
Parent process real time = 9050361 clock ticks  
Child process real time = 117164 clock ticks

N 100000

Parent process user time = 0.000000

Parent process system time = 0.000539

Child process user time = 0.000000

Child process system time = 0.000553

Parent process real time = 5393051 clock ticks

Child process real time = 56901 clock ticks

N 150000

Parent process user time = 0.000001

Parent process system time = 0.001234

Child process user time = 0.000000

Child process system time = 0.001304

Parent process real time = 12355777 clock ticks

Child process real time = 151176 clock ticks

N 250000

Parent process user time = 0.000003

Parent process system time = 0.003877

Child process user time = 0.000001

Child process system time = 0.004536

Parent process real time = 38803103 clock ticks

Child process real time = 525763 clock ticks

c) Wywołanie funkcji clone jako fork :

N 100000

Parent process user time = 0.000015

Parent process system time = 0.004283

Child process user time = 0.000000

Child process system time = 0.000000

Parent process real time = 42986012 clock ticks

Child process real time = 0 clock ticks

N 150000

Parent process user time = 0.000007

Parent process system time = 0.001993

Child process user time = 0.000000

Child process system time = 0.000000

Parent process real time = 20006470 clock ticks

Child process real time = 0 clock ticks

N 200000

Parent process user time = 0.000026

Parent process system time = 0.005975

Child process user time = 0.000000

Child process system time = 0.000000

Parent process real time = 60013764 clock ticks

Child process real time = 0 clock ticks

N 250000

Parent process user time = 0.000016

Parent process system time = 0.005033  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 50502222 clock ticks  
Child process real time = 0 clock ticks

N 500000

Parent process user time = 0.000056  
Parent process system time = 0.013937  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 139933072 clock ticks  
Child process real time = 0 clock ticks

d) Wywołanie funkcji clone jako vfork:

N 50000

Parent process user time = 0.000011  
Parent process system time = 0.003455  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 34674221 clock ticks  
Child process real time = 8780 clock ticks

N 150000

arent process user time = 0.000007  
Parent process system time = 0.002073  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 20809294 clock ticks  
Child process real time = 9106 clock ticks

N 200000

arent process user time = 0.000011  
Parent process system time = 0.002886  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 28978073 clock ticks  
Child process real time = 9147 clock ticks

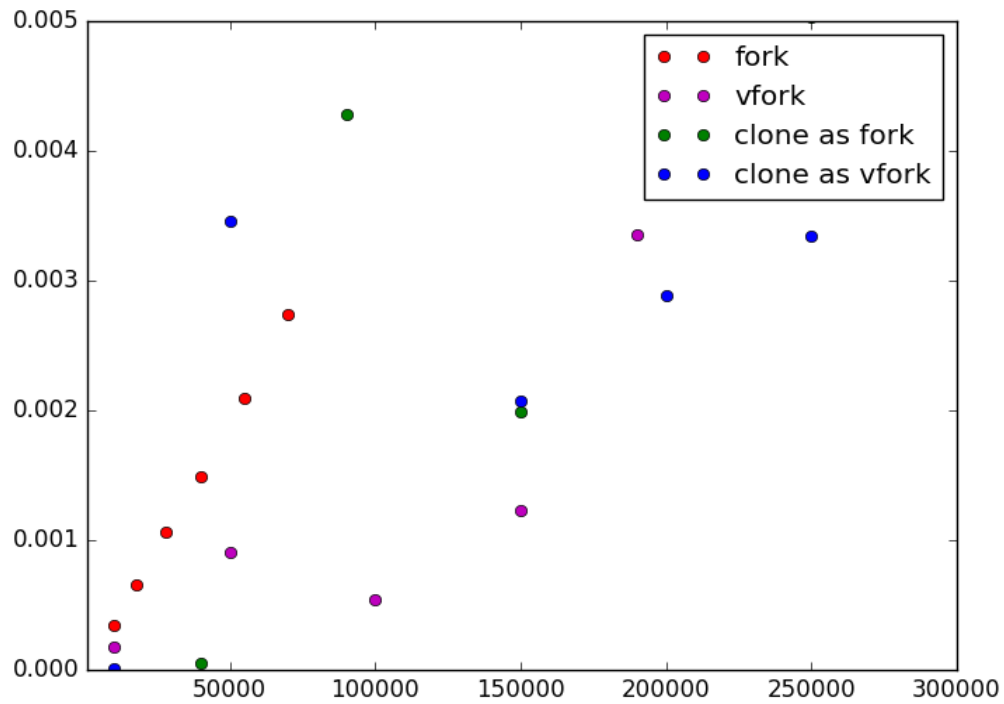
N 250000

Parent process user time = 0.000010  
Parent process system time = 0.003340  
Child process user time = 0.000000  
Child process system time = 0.000000  
Parent process real time = 33509119 clock ticks  
Child process real time = 7729 clock ticks

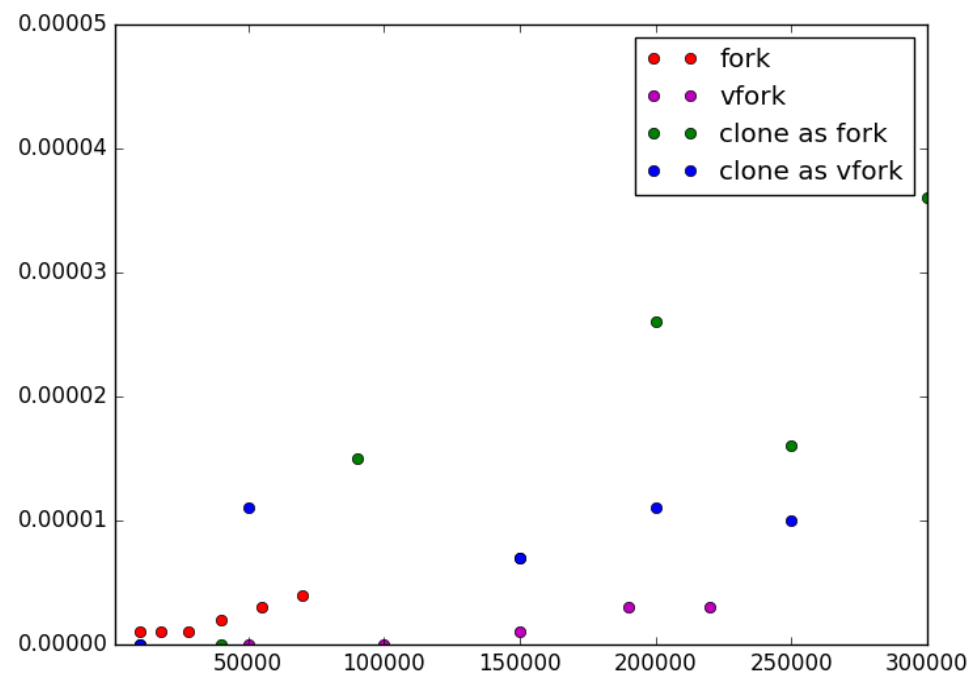
## WYKRESY Z POMIARAMI CZASU:

wykres 1) tylko czas procesu macierzystego

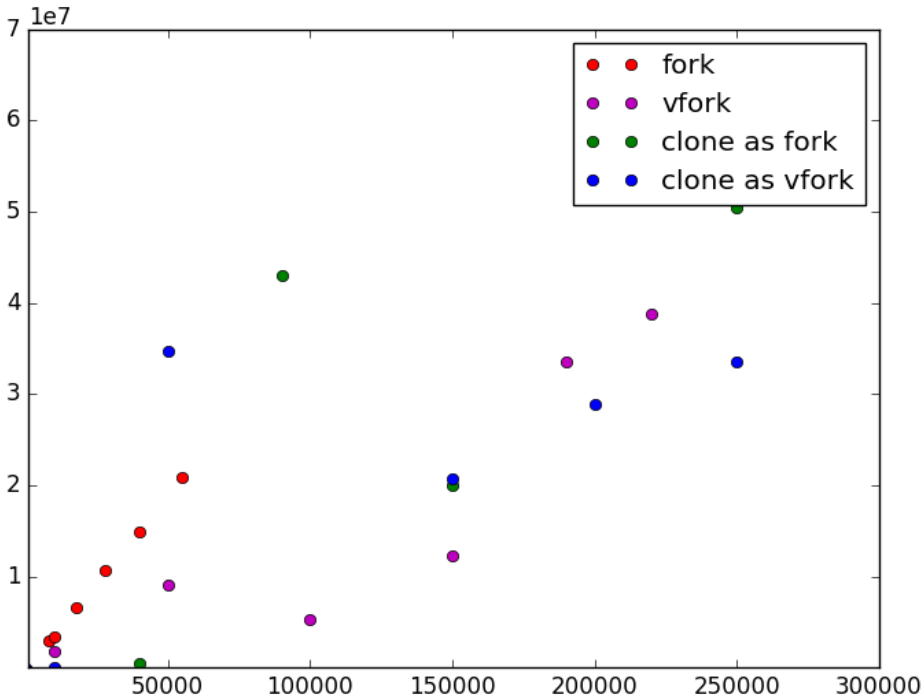
- czas systemowy



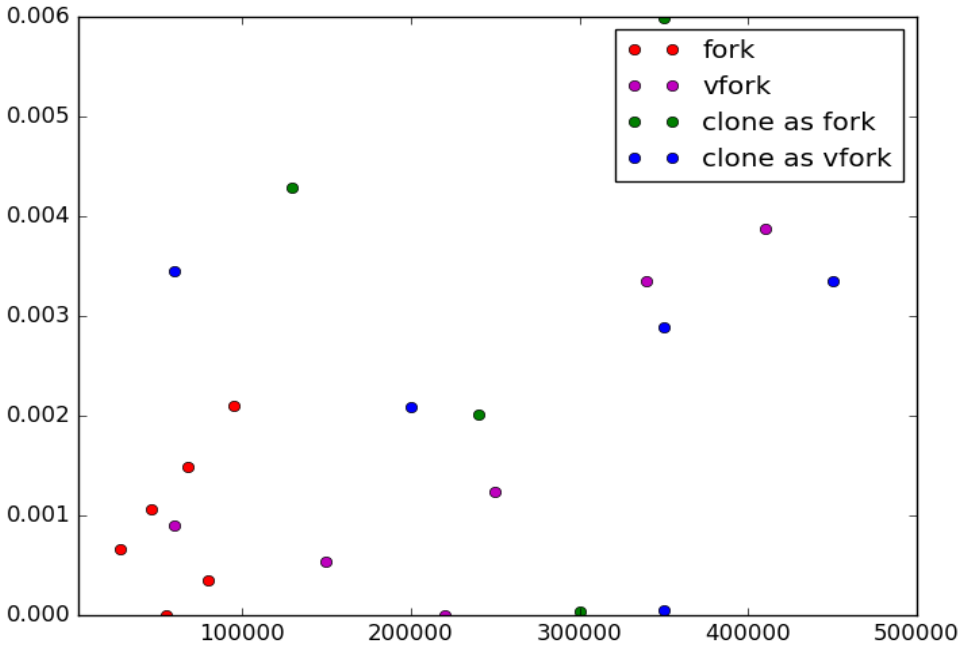
-czas uzytkownika



-czas rzeczywisty

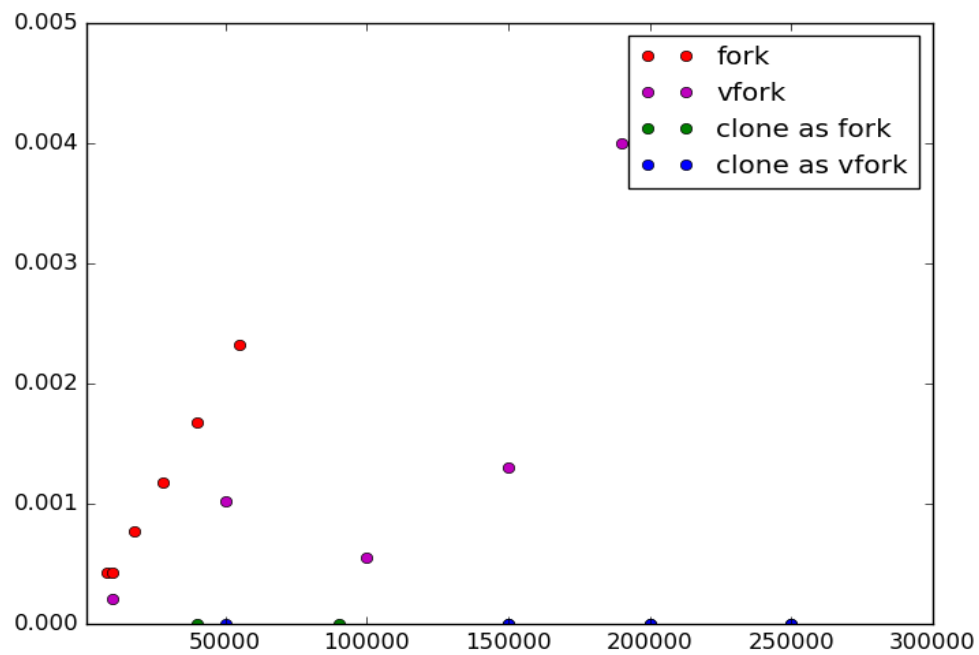


-uzytkownika + systemowy

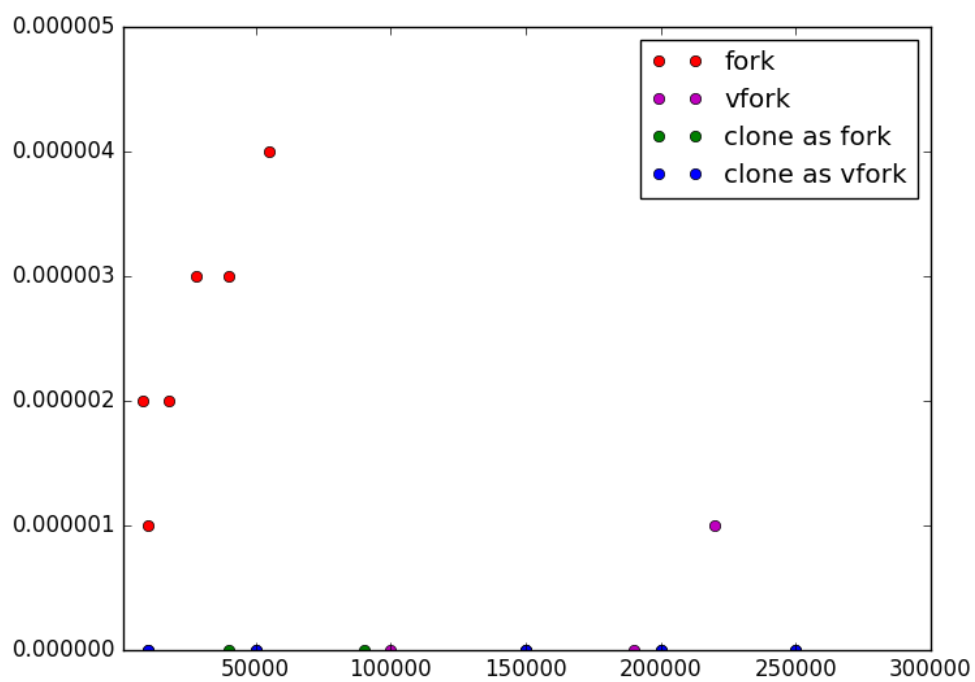


w2) tylko łączny czas procesów potomnych

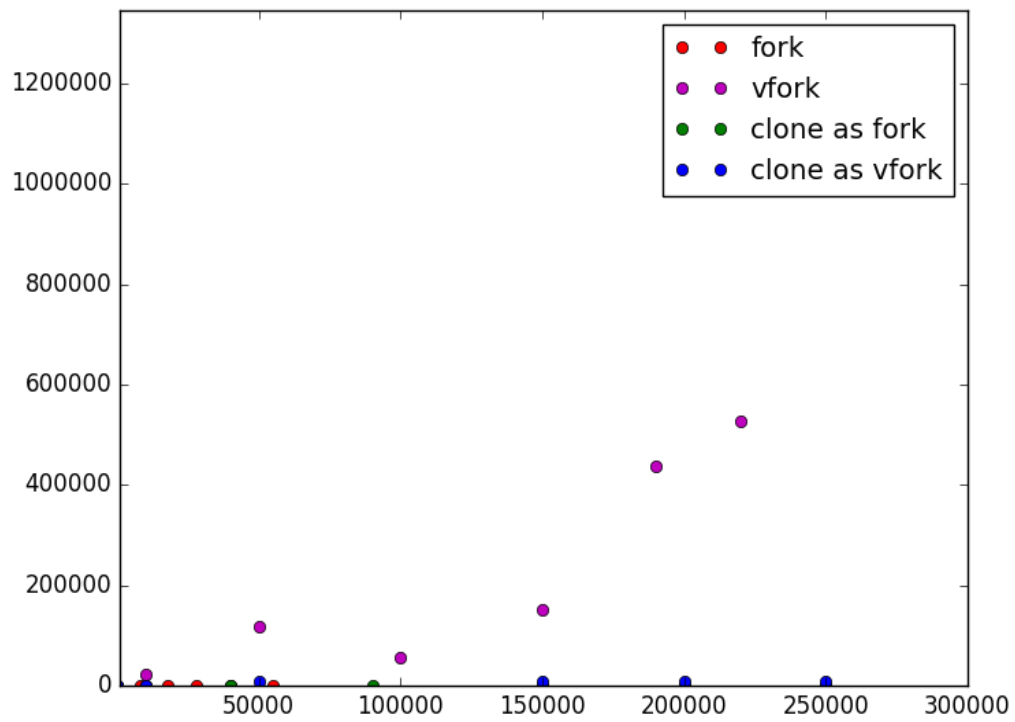
- czas systemowy



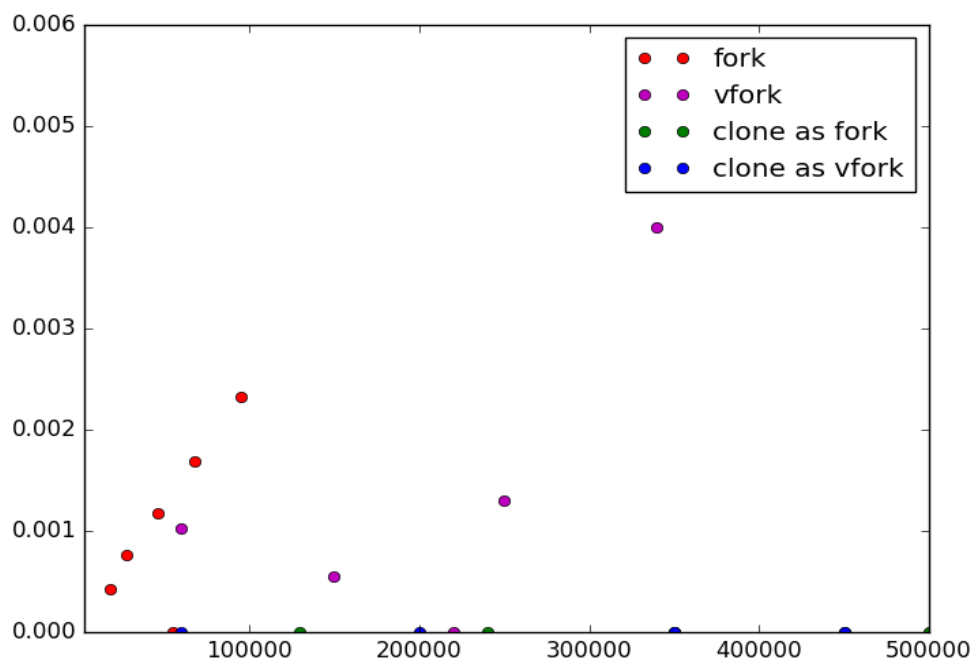
- czas użytkownika



- czas rzeczywisty

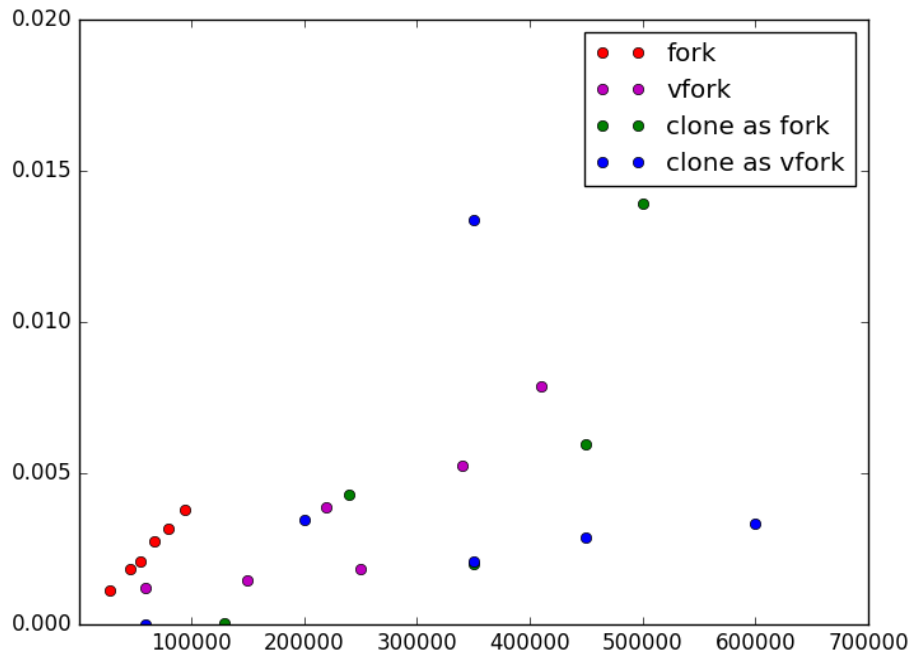


- uzytkownika + systemowy

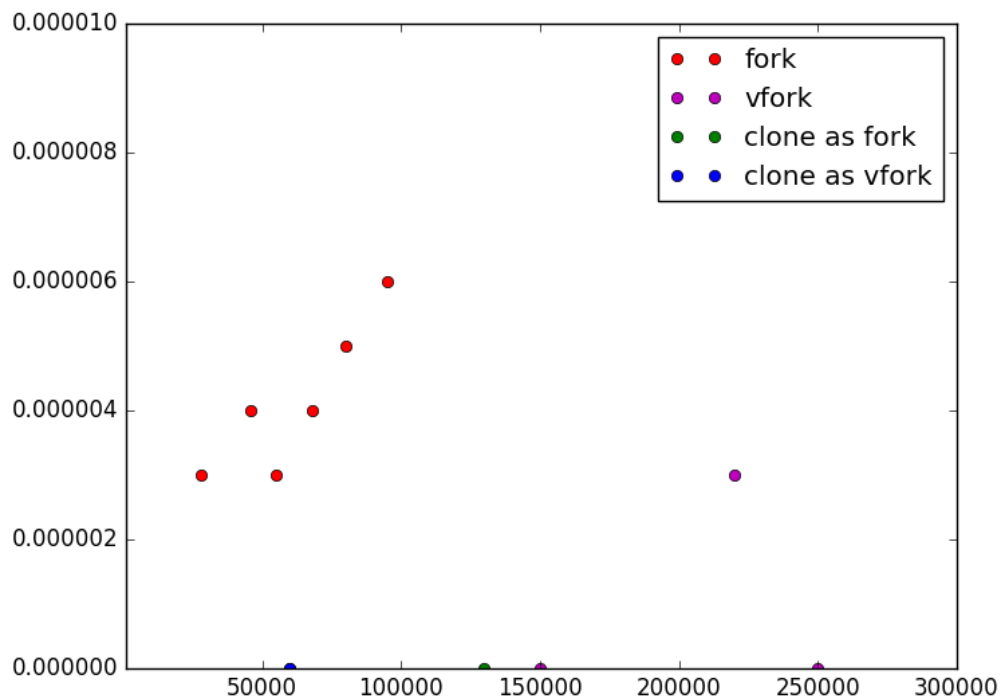


w3) sumaryczny czas w1) i w2)

- czas systemowy

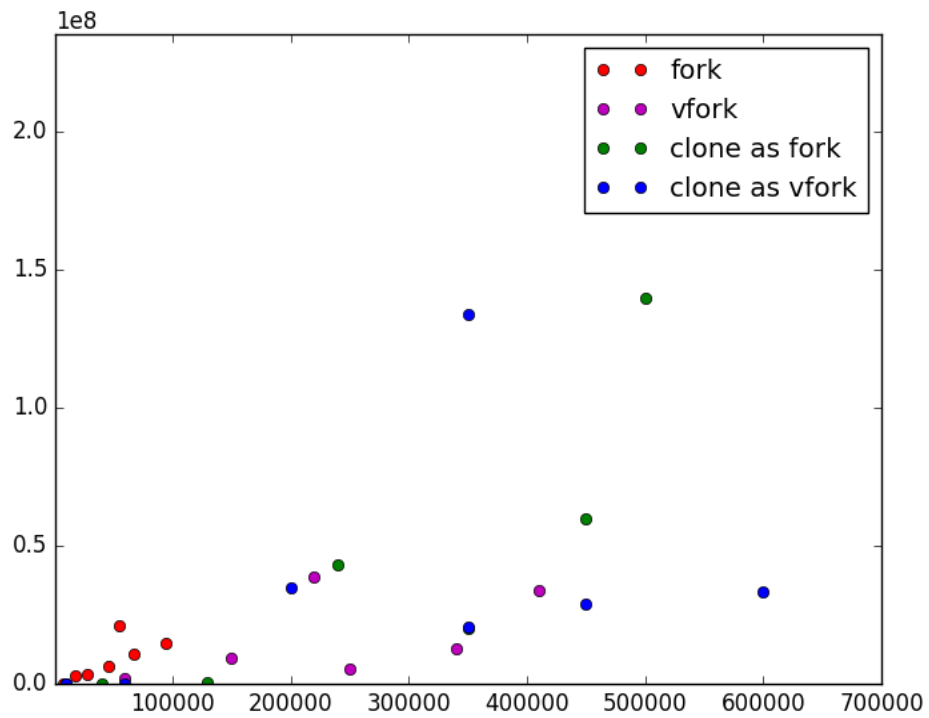


- czas uzytkownika

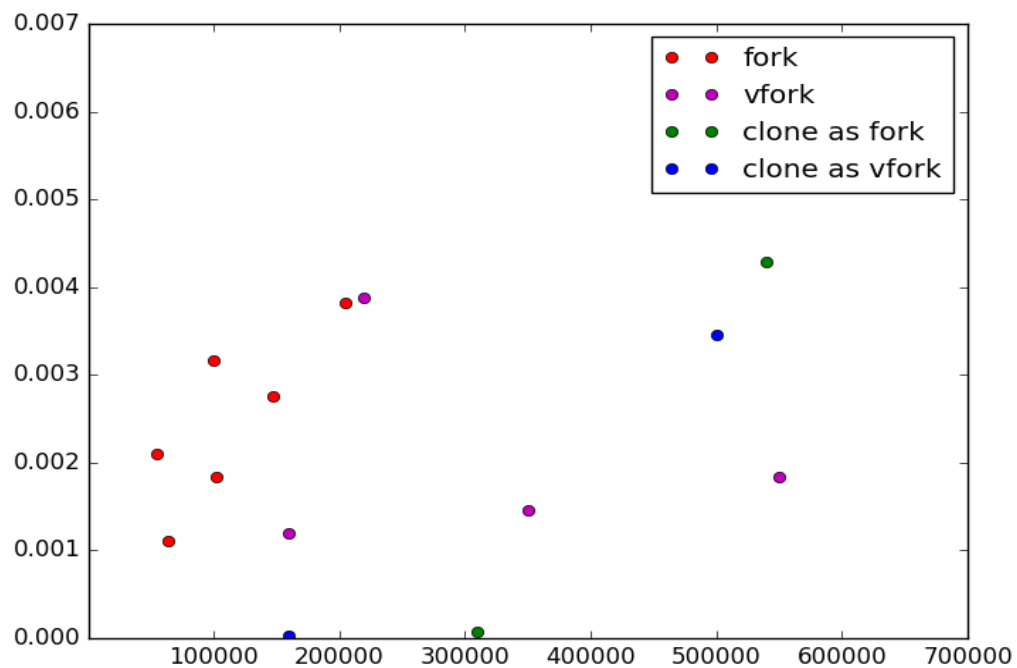




- czas rzeczywisty



- uzytkownika + systemowy



## WNIOSKI Z POMIARÓW :

1. Czas rzeczywisty mierzony dla potomnych procesów otrzymujemy 0 zarówno przy użyciu funkcji `fork()` , jak i wywołaniu `clone()` z odpowiednimi parametrami odpowiadającymi wywołaniu funkcji `fork`.
2. Widać na wykresach, że szybkość funkcji `fork` jest w przybliżeniu liniowa względem ilości wywołań.
3. Funkcja `fork` nie jest najlepsza pod względem szybkości na tle innych funkcji. Szczególnie widać tu przewagę `vfork` nad `fork`, także wywołanie `clone` jest szybsze od `fork`.

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data oddania: 23.03.2016r.