

Autores :

Ruben Izquierdo y Rocío García

USAGE ejecuta programas de prueba

Si el sistema tiene más de una CPU, las pruebas se ejecutarán dos veces, una vez con una sola copia de cada prueba ejecutándose a la vez, y una vez con N copias, donde N es el número de CPUs. Algunas categorías de pruebas, sin embargo solo se ejecutarán con una sola copia

Ejecución de los comandos

```
Actividades Terminal lun 09:35
usuario_local@pto0513: ~/byte-unixbench-5.1.3/UnixBench

Archivo Editar Ver Buscar Terminal Ayuda
BYTE UNIX Benchmarks (Version 5.1.3)

System: pto0513: GNU/Linux
OS: GNU/Linux -- 4.15.0-34-generic -- #37-Ubuntu SMP Mon Aug 27 15:21:48 UTC 2018
Machine: x86_64 (x86_64)
Language: en_US.utf8 (charmap="UTF-8", collate="UTF-8")
CPU 0: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 1: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 2: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 3: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 4: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 5: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 6: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
CPU 7: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
09:17:33 up 7 min, 1 user, load average: 1.61, 2.32, 1.30; runlevel 5

-----
Benchmark Run: lun abr 01 2019 09:17:33 - 09:27:04
8 CPUs in system; running 1 parallel copy of tests

Dhrystone 2 using register variables      50437037.8 lps (10.0 s, 2 samples)
Double-Precision Whetstone                3567.9 MWIPS (19.5 s, 2 samples)
Execl Throughput                          5474.8 lps (29.0 s, 1 samples)
File Copy 1024 bufsize 2000 maxblocks    836655.0 KBps (30.0 s, 1 samples)
File Copy 256 bufsize 500 maxblocks      206844.0 KBps (30.0 s, 1 samples)
File Copy 4096 bufsize 8000 maxblocks    2419025.0 KBps (30.0 s, 1 samples)
Pipe Throughput                          1495016.6 lps (10.0 s, 2 samples)
Pipe-based Context Switching              228939.1 lps (10.0 s, 2 samples)
Process Creation                          17011.3 lps (30.0 s, 1 samples)
Shell Scripts (1 concurrent)             14287.0 lpm (60.0 s, 1 samples)
Shell Scripts (8 concurrent)              4629.4 lpm (60.0 s, 1 samples)
System Call Overhead                     1072310.1 lps (10.0 s, 2 samples)

System Benchmarks Index Values
-----
Dhrystone 2 using register variables      116700.0   50437037.8   4321.9
Double-Precision Whetstone                55.0     3567.9     648.7
Execl Throughput                          43.0     5474.8    1273.2
File Copy 1024 bufsize 2000 maxblocks    3960.0   836655.0   2112.8
File Copy 256 bufsize 500 maxblocks      1655.0   206844.0   1249.8
File Copy 4096 bufsize 8000 maxblocks    5800.0   2419025.0  4170.7
Pipe Throughput                          12440.0   1495016.6  1201.8
Pipe-based Context Switching              4000.0   228939.1   572.3
Process Creation                          126.0    17011.3   1350.1
Shell Scripts (1 concurrent)              42.4     14287.0   3369.6
Shell Scripts (8 concurrent)              2.0       4629.4    1000.0
```

```
Actividades Terminal lun 09:36
usuario_local@pto0513: ~/byte-unixbench-5.1.3/UnixBench

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CPU 0: Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz (7200.0 bogomips)
Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Hyper-Threading, x86-64, MMX, Physical Address Ext, SYSENTER/SYSEXIT, SYSCALL/SYSRET, Intel virtualization
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Pipe-based Context Switching              228939.1 lps (10.0 s, 2 samples)
Process Creation                          17011.3 lps (30.0 s, 1 samples)
Shell Scripts (1 concurrent)              14287.0 lpm (60.0 s, 1 samples)
Shell Scripts (8 concurrent)              4629.4 lpm (60.0 s, 1 samples)
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System Benchmarks Index Values
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Execl Throughput                          43.0         5474.8        1273.2
File Copy 1024 bufsize 2000 maxblocks     3960.0       836655.0      2112.8
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Pipe Throughput                           12440.0      1495016.6     1201.8
Pipe-based Context Switching              4000.0       228939.1      572.3
Process Creation                          126.0        17011.3      1350.1
Shell Scripts (1 concurrent)              42.4         14287.0      3369.6
Shell Scripts (8 concurrent)               6.0          4629.4      7715.7
System Call Overhead                      15000.0      1072310.1     714.9

System Benchmarks Index Score
=====
1721.7

usuario_local@pto0513:~/byte-unixbench-5.1.3/UnixBench$
```

Hanoi: Mover la posición de los disco a las torres siguiendo una serie de normas y durante una duración de tiempo.

Según el código dado como dependemos solo de tiempos podríamos usar la media aritmética

Whetstone: programa de prueba de única o doble precisión. El programa normalmente necesita 100 segundos que son necesarios por la baja resolución del reloj de algunos PC. El concepto original de stos es incluirlas como llamadas a subrutinas y dividir cual debe ser la cambiada para su optimización.

Como depende de la frecuencia del reloj de CPU podríamos usar una media geométrica, que nos garantiza la neutralidad de la máquina referenciada.

Dhrystone: Es un pequeño benchmark que está basado en estadísticas publicadas sobre el uso de los SO, compiladores, lenguajes de programación etc..

Cómo está basado en estadísticas que podemos entenderlo como pesos entre ratios podríamos usar una media armónica

Los resultados se calculan según la ley de Amdahl

$$A = T_o/T_m = 1/(1-f) + (f/k)$$

O calculando máximos entre mínimos para ver cuánta mejora se ha producido respecto entre un modo y otro

Iozone: Es una herramienta de benchmarks de archivos. El benchmark genera y mide una serie de operaciones en los archivos.

Obtén resultados con un fichero de pruebas de 100MB:

\$./iozone -s 100m

```
Actividades Terminal lun 10:13
usuario_local@pto0513: ~/Descargas/iozone3_487/src/current

Archivo Editar Ver Buscar Terminal Ayuda

Building fileop for Linux
cc -Wall -c -O3 fileop.c -o fileop_linux.o
Building the pit_server
cc -c pit_server.c -o pit_server.o
cc -O3 iozone_linux.o libasynch.o libbif.o -lpthread \
-lrt -o iozone
cc -O3 -Dlinux fileop_linux.o -o fileop
cc -O3 -Dlinux pit_server.o -o pit_server
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$ ./iozone -s 100m
$: orden no encontrada
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$ cd ..
usuario_local@pto0513:~/Descargas/iozone3_487/src$ cd ..
usuario_local@pto0513:~/Descargas/iozone3_487$ cd ..
usuario_local@pto0513:~/Descargas$ cd iozone3_487/src/current
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$ ./iozone -s 100m
Iozone: Performance Test of File I/O
Version $Revision: 3.487 $
Compiled for 64 bit mode.
Build: linux

Contributors:William Norcott, Don Capps, Isom Crawford, Kirby Collins
Al Slater, Scott Rhine, Mike Wisner, Ken Goss
Steve Landherr, Brad Smith, Mark Kelly, Dr. Alain CYR,
Randy Dunlap, Mark Montague, Dan Million, Gavin Brebner,
Jean-Marc Zucconi, Jeff Blomberg, Benny Halevy, Dave Boone,
Erik Habbington, Kris Strecker, Walter Wong, Joshua Root,
Fabrice Bacchella, Zhenghua Xue, Qin Li, Darren Sawyer,
Vangel Bojaxhi, Ben England, Vikentsi Lapa,
Alexey Skidanov, Sudhir Kumar.

Run began: Mon Apr 1 10:12:57 2019

File size set to 102400 kB
Command line used: ./iozone -s 100m
Output is in kBytes/sec
Time Resolution = 0.000001 seconds.
Processor cache size set to 1024 kBytes.
Processor cache line size set to 32 bytes.
File stride size set to 17 * record size.

random random bkwd record stride
read read read read read
101 102400 4 2148366 3320582 5005917 5864172 4419517 2868823 1805170 3742016 2209938 3462515 3081926 5097593 6487

iozone test complete.
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$
```

La opción -I usa la DIRECT IO si es posible para todas las operaciones y dice al archivo del sistema cuáles de ellas son operaciones de archivos para el bypass del buffer de la caché y enviarlas directamente al disco

```
Actividades Terminal lun 10:33
usuario_local@pto0513: ~/Descargas/iozone3_487/src/current

Archivo Editar Ver Buscar Terminal Ayuda
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$ ./iozone -s 100m -I
Iozone: Performance Test of File I/O
Version $Revision: 3.487 $
Compiled for 64 bit mode.
Build: linux

Contributors: William Norcott, Don Capps, Isom Crawford, Kirby Collins
Al Slater, Scott Rhine, Mike Wisner, Ken Goss
Steve Landherr, Brad Smith, Mark Kelly, Dr. Alain CYR,
Randy Dunlap, Mark Montague, Dan Million, Gavin Brebner,
Jean-Marc Zucconi, Jeff Blomberg, Benny Halevy, Dave Boone,
Erik Hablinga, Kris Strecker, Walter Wong, Joshua Root,
Fabrice Bacchella, Zhenghua Xue, Qin Li, Darren Sawyer,
Vangel Bojaxhi, Ben England, Vikentsi Lapa,
Alexey Skidanov, Sudhir Kumar.

Run began: Mon Apr 1 10:29:09 2019

File size set to 102400 kB
O_DIRECT feature enabled
Command line used: ./iozone -s 100m -I
Output is in kBytes/sec
Time Resolution = 0.000001 seconds.
Processor cache size set to 1024 kBytes.
Processor cache line size set to 32 bytes.
File stride size set to 17 * record size.

          random    random    bkwd    record    stride
          kB reclen  write rewrite  read  reread  read  write  read  rewrite  read  fwrite frewrite  fread  frer
read
295      102400      4    86700    83936  113032  94050    789    1228  11651    18471    11207  1602630  3405412  5223953  5525

iozone test complete.
usuario_local@pto0513:~/Descargas/iozone3_487/src/current$
```

Con la opción menos **I** se reducen algunos de los tiempos de read, write, reread, rewrite y los mismos para la memoria principal

La opción **-r 16k** se usa para especificar el tamaño que queremos grabar en KB, para probarlo

```

Actividades Terminal lun 10:24
usuario_local@pto0513: ~/Descargas/lozone3_487/src/current

File size set to 102400 kB
O_DIRECT feature enabled
Command line used: ./iozone -s 100m -I
Output is in kBytes/sec
Time Resolution = 0.000001 seconds.
Processor cache size set to 1024 kBytes.
Processor cache line size set to 32 bytes.
File stride size set to 17 * record size.

random random bkwd record stride
kB reclen write rewrite read reread read write read rewrite read fwrite frewrite fread frer
read 102400 4 81816 75004 85234 85150 796 1215 12473 20190 10258 1647337 1560473 5981948 5287
883

iozone test complete.
usuario_local@pto0513:~/Descargas/lozone3_487/src/current$ ./iozone -s 100m -I -r 16k
Iozone: Performance Test of File I/O
Version $Revision: 3.487 $
Compiled for 64 bit mode.
Build: linux

Contributors: William Norcott, Don Capps, Isom Crawford, Kirby Collins
Al Slater, Scott Rhine, Mike Wisner, Ken Goss
Steve Landherr, Brad Smith, Mark Kelly, Dr. Alain CYR,
Randy Dunlap, Mark Montague, Dan Million, Gavin Brebner,
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Erik Habbington, Kris Strecker, Walter Wong, Joshua Root,
Fabrice Bacchella, Zhenghua Xue, Qin Li, Darren Sawyer,
Vangel Bojaxhi, Ben England, Vikentsi Lapa,
Alexey Skidanov, Sudhir Kumar.

Run began: Mon Apr 1 10:22:54 2019

File size set to 102400 kB
O_DIRECT feature enabled
Record Size 16 kB
Command line used: ./iozone -s 100m -I -r 16k
Output is in kBytes/sec
Time Resolution = 0.000001 seconds.
Processor cache size set to 1024 kBytes.
Processor cache line size set to 32 bytes.
File stride size set to 17 * record size.

random random bkwd record stride
kB reclen write rewrite read reread read write read rewrite read fwrite frewrite fread frer
read 102400 16 151939 159748 165158 167500 3072 4959 30421 68810 10562 3008126 3757928 6650635 6047
051

iozone test complete.
usuario_local@pto0513:~/Descargas/lozone3_487/src/current$

```

Como le hemos pedido que haga la operación de grabar de un tamaño de 16kb , el tiempo de read,write,rewrite, reread aumenta sin embargo respecto al anterior disminuye la memoria principal.

iperf3 es una herramienta para realizar mediciones de rendimiento de red. Puede probar el rendimiento TCP o UDP para realizar una prueba de iperf3

```
Actividades Terminal lun 10:43
usuario_local@pto0513: ~/iperf-3.1.2
Archivo Editar Ver Buscar Terminal Ayuda
usuario_local@pto0513:~/iperf-3.1.2$ src/iperf3 -c 192.168.201.1
Connecting to host 192.168.201.1, port 5201
[ 4] local 192.168.201.1 port 60576 connected to 192.168.201.1 port 5201
[ ID] Interval      Transfer    Bandwidth  Retr  Cwnd
[ 4] 0.00-1.00 sec    9.03 GBytes 77.6 Gbits/sec  0    1.87 MByt
[ 4] 1.00-2.00 sec    9.14 GBytes 78.5 Gbits/sec  0    1.87 MByt
[ 4] 2.00-3.00 sec    9.10 GBytes 78.2 Gbits/sec  0    1.87 MByt
[ 4] 3.00-4.00 sec    9.09 GBytes 78.1 Gbits/sec  0    1.87 MByt
[ 4] 4.00-5.00 sec    8.80 GBytes 75.6 Gbits/sec  0    1.87 MByt
[ 4] 5.00-6.00 sec    8.79 GBytes 75.5 Gbits/sec  0    1.87 MByt
[ 4] 6.00-7.00 sec    8.75 GBytes 75.1 Gbits/sec  0    1.87 MByt
[ 4] 7.00-8.00 sec    8.75 GBytes 75.1 Gbits/sec  0    1.87 MByt
[ 4] 8.00-9.00 sec    8.79 GBytes 75.5 Gbits/sec  0    1.87 MByt
[ 4] 9.00-10.00 sec   9.01 GBytes 77.4 Gbits/sec  0    1.87 MByt
- - - - -
[ ID] Interval      Transfer    Bandwidth  Retr
[ 4] 0.00-10.00 sec  89.2 GBytes 76.7 Gbits/sec  0
sender
[ 4] 0.00-10.00 sec  89.2 GBytes 76.7 Gbits/sec
receiver
iperf Done.
usuario_local@pto0513:~/iperf-3.1.2$

is.o -MD -MP -MF .deps/mis-mis.Tpo -c -o mis-mis.o `test -f 'mis.c' |
| echo './'`mis.c
mv -f .deps/mis-mis.Tpo .deps/mis-mis.Po
/bin/bash ../libtool --tag=CC --mode=link gcc -g -g -O2 -Wall -g
-o mis-mis.o ../src/libiperf.la
libtool: link: gcc -g -g -O2 -Wall -g -o .libs/mis-mis.o ../src/
.libs/libiperf.so
make[1]: se sale del directorio '/home/hlocal/iperf-3.1.2/examples'
make[1]: se entra en el directorio '/home/hlocal/iperf-3.1.2'
make[1]: No se hace nada para 'all-am'.
make[1]: se sale del directorio '/home/hlocal/iperf-3.1.2'
usuario_local@pto0513:~/iperf-3.1.2$ man src/iperf3.1
usuario_local@pto0513:~/iperf-3.1.2$ src/iperf3 -s
-----
Server listening on 5201
-----
Accepted connection from 192.168.201.1, port 60574
[ 5] local 192.168.201.1 port 5201 connected to 192.168.201.1 port 6
0576
[ ID] Interval      Transfer    Bandwidth
[ 5] 0.00-1.00 sec    8.68 GBytes 74.5 Gbits/sec
[ 5] 1.00-2.00 sec    9.15 GBytes 78.6 Gbits/sec
[ 5] 2.00-3.00 sec    9.10 GBytes 78.1 Gbits/sec
[ 5] 3.00-4.00 sec    9.10 GBytes 78.2 Gbits/sec
[ 5] 4.00-5.00 sec    8.80 GBytes 75.6 Gbits/sec
[ 5] 5.00-6.00 sec    8.80 GBytes 75.6 Gbits/sec
[ 5] 6.00-7.00 sec    8.75 GBytes 75.1 Gbits/sec
[ 5] 7.00-8.00 sec    8.74 GBytes 75.1 Gbits/sec
[ 5] 8.00-9.00 sec    8.79 GBytes 75.5 Gbits/sec
[ 5] 9.00-10.00 sec    9.00 GBytes 77.3 Gbits/sec
[ 5] 10.00-10.04 sec   359 MBytes 77.1 Gbits/sec
- - - - -
[ ID] Interval      Transfer    Bandwidth
[ 5] 0.00-10.04 sec    0.00 Bytes  0.00 bits/sec
ender
[ 5] 0.00-10.04 sec   89.2 GBytes 76.4 Gbits/sec
receiver
-----
Server listening on 5201
-----
```

src/iperf3 -s

src/iperf3 -c 192.168.201.1

Se comunican el cliente y el servidor y nos muestra el intervalo , la transferencia de datos y el ancho de banda .También si ha recibido y enviado información y el puerto en el que se está escuchando