

Dataflow in Practice: Computing Recursive Fibonacci in Parallel Using Transparent Dataflow Programming Model for Multicore and Many-core

Oleksandr Pochayevets

Introduction

The number of cores in modern Multicore/ Many-core computer systems grows and will continue to grow in the future up to hundreds and thousands. The parallel multithreading programming for multiple cores becomes a great challenge for those who would like to use multiple cores for speeding-up their applications. The community is getting more and more convinced that a revival of dataflow should close the gap between the evolving number of Multicores/ Many-cores and the difficulties of parallel programming for them.

How do we want to program Multicores/ Many-cores with dataflow? We want to program them like this:

1. We do not want to use any unconventional programming paradigm. We want to use a normal traditional control flow, however, a dataflow engine will run our control flow in a different order according to the dataflow principle: **when operands are ready then operators are executed in parallel on the underlying Multicores/ Many-cores hiding all synchronization issues from us:**

```
a = foo0(i);  
b = foo1(i+1);  
b = b + 1;  
c = foo2(b);
```

2. We do not want to be restricted with a single-assignment. **A dataflow engine should be able to create a different instance of a variable when the variable is re-assigned and then handle all instances correctly.**

Is there such a dataflow engine that can do this for us? Yes, BMDFM (Binary Modular Dataflow Machine; <http://bmdfm.com>) can do this. Further in this document, we provide a comprehensive test application example of recursive Fibonacci on how we program Multicores/ Many-cores using the BMDFM dataflow engine.

What do we want to achieve? We want to program our test application example of recursive Fibonacci sequentially with no special directives for parallel execution. We run our test using the BMDFM single-threaded engine that executes the test on a single processor core. Then we run our test using the BMDFM multithreaded engine that executes the test automatically on all available cores in parallel. **We expect to get a speedup that is almost equal to the number of cores!**

Test Application of Recursive Fibonacci

Fibonacci numbers are the integer sequence produced by the following recursive relationship:

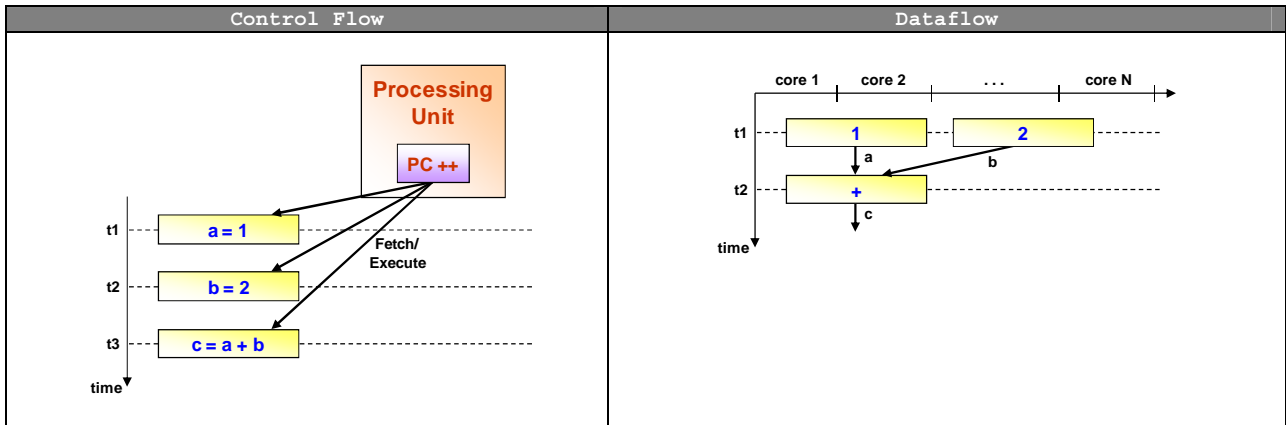
Recursive Fibonacci Algorithm (Pseudo-Code)
<pre>Fibonacci(0) = 0; Fibonacci(1) = 1; Fibonacci(N) = Fibonacci(N - 1) + Fibonacci(N - 2);</pre>

Thus, the Fibonacci sequence is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, . . . The next number in the sequence is found by adding up the two numbers before it. Our Fibonacci function receives one argument, which is a number in the sequence, and returns the Fibonacci value for this number in the sequence.

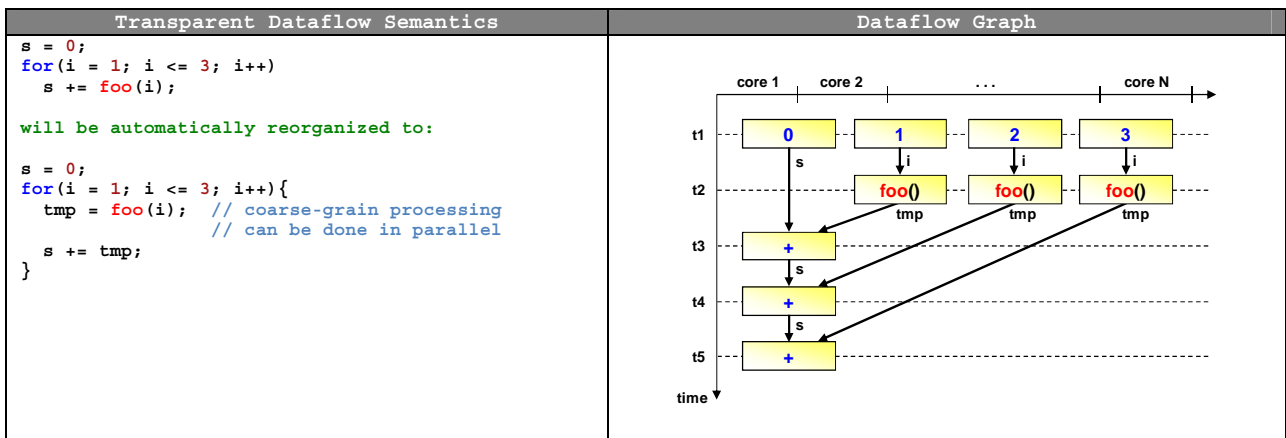
We program our test application of recursive Fibonacci sequentially with conventional control flow and let the BMDFM dataflow engine run everything (what is possible) in parallel on Multicores/ Many-cores.

Background (experts may skip this chapter)

- Control flow vs. dataflow:** control flow assumes that a processing unit has a Program Counter (PC) register pointing to executing instruction. The processing unit increments PC, fetches instruction that is pointed by PC and executes the instruction. Contrarily, dataflow tags operands with a token when they are ready. Operators of the dataflow graph process operands with ready-tokens.



- Transparent dataflow semantics:** an assignment `<variable> = <expression_of_operators_constants_variables>` creates a new instance of the variable and adds new nodes with dependencies to the dataflow graph dynamically at runtime (later on, variable instances and nodes will be garbage collected from the dataflow graph).



- C vs. LISP:** we program our applications in C and in a tiny subset of LISP in sake of convenience. We program our seamless helper functions in C. These are low-level coarse-grain functions. A dataflow engine does not apply any parallelization techniques to them. We program the rest of the code in LISP. This code is loaded into the dataflow engine for automatic parallelization. LISP programs are written in a prefix-form that is easy to understand from the following example (refer to the BMDFM comprehensive manual for more information; <http://bmdfm.com/download.html>).

C	LISP
<pre> for(i = 1; i <= N; i++){ a = foo0(i); b = fool(i + 1); b++; printf("a = %d\n", a); printf("b = %d\n", b); } </pre>	<pre> (for i 1 1 N (progn (setq a (foo0 i)) (setq b (fool (+ i 1))) (setq b (++ b)) (outf "a = %d\n" a) (outf "b = %d\n" b))) </pre>

Implementation of Recursive Fibonacci

We can implement our recursive Fibonacci seamless helper function in LISP or in pure C. However, we use implementation in pure C for our tests due to better performance. We keep our helper functions away from the dataflow engine (they are seamless for the dataflow engine) in order to avoid unnecessary dataflow scheduling:

```
Recursive Fibonacci Seamless Helper Function (LISP)
# Refer to the BMDFM comprehensive manual for more information.

(defun FibonacciSeamless
  (progn
    (setq n (+ 0 $1))
    (if (< n 2)
      n
      (+ (FibonacciSeamless (-- n))
         (FibonacciSeamless (- n 2))
      )
    )
  )
)
```

```
Recursive Fibonacci Seamless Helper Function (Pure C)
#include <cflp_udf.h> /* BMDFM C-interface */
/* Refer to the BMDFM comprehensive manual for more information. */

#define ULO unsigned long int
#define SLO signed long int
#define UCH unsigned char

SLO _dffib_FibonacciSeamless(SLO n){
  return noterror()&&n>1?_dffib_FibonacciSeamless(n-1)+_dffib_FibonacciSeamless(n-2):n;
}

void dffib_FibonacciSeamless(const ULO *dat_ptr, struct fastlisp_data *ret_dat){
  SLO n;
  ret_ival(dat_ptr,&n); /* read argument from the stack */
  if(noterror()){
    ret_dat->single=1;
    ret_dat->type='I';
    ret_dat->value.ival=_dffib_FibonacciSeamless(n);
  }
  return;
}

/* Register function. */
INSTRUCTION_STRU INSTRUCTION_SET[]={
  {"FIBONACCISEAMLESS",1,'I',(UCH*)"I",&dffib_FibonacciSeamless}
};
const ULO INSTRUCTIONS=sizeof(INSTRUCTION_SET)/sizeof(INSTRUCTION_STRU);
```

Using transparent dataflow semantics, we write a simple trivial implementation of our parallel multithreaded recursive Fibonacci function into the *fib.flp* file. Note that we need neither special parallelization directives nor special reserved function names. We have “wrapped” the *FibonacciSeamless* function with the *FibonacciCoordinator* function in order to limit “unlimited parallelism”:

```
Implementation of Parallel Multithreaded Recursive Fibonacci
Using Transparent Dataflow Semantics

# fib.flp
# Refer to the BMDFM comprehensive manual for more information.

(defun FibonacciCoordinator
  (progn
    (setq n (+ 0 $1))
    (setq spawn (+ 0 $2))
    (if (< n 2)
      n
      (if (> spawn 0)
        (+ (FibonacciCoordinator (-- n) (>> spawn 1))
           (FibonacciCoordinator (- n 2) (>> spawn 1))
        )
        (+ (FibonacciSeamless (-- n))
           (FibonacciSeamless (- n 2))
        )
      )
    )
  )
)

(defun Fibonacci
  (progn
    (setq n (+ 0 $1))
    (setq spawn (n_cpusproc))
    (FibonacciCoordinator n spawn)
  )
)

# main() begins here
(setq n (+ 0 $1))
(Fibonacci n)
```

Running the Tests

We run our tests using the BMDFM single-threaded engine and multithreaded dataflow engine with the following batch shell-script:

```
#!/bin/sh

# Run fib.flp with single-threaded engine and log
fastlisp fib.flp 50 >fib.fastlisp

# Run fib.flp with multithreaded dataflow engine and log
BMDFMldr fib.flp 50 >fib.BMDFMldr
```

We tested our recursive Fibonacci on an affordable 128-way SMP x86-64 machine. The Linux OS reported in total 128 2.3GHz available processors (that actually are $\langle \text{processors_on_dies} \rangle$ multiplied by $\langle \text{cores_per_processor_die} \rangle$ multiplied by $\langle \text{simultaneous_threads_per_core} \rangle$):

Test Application	Single-threaded Control Flow	Multithreaded Dataflow
Recursive Fibonacci (fib.flp 50)	138sec.	1.2sec.

We also tested our recursive Fibonacci on the 192-way SMP IBM Power System S822L (8247-22L) based on IBM POWER8 processors. The Linux OS reported in total 192 3.7GHz available processors (that actually are $\langle \text{processors_on_dies} \rangle$ multiplied by $\langle \text{cores_per_processor_die} \rangle$ multiplied by $\langle \text{simultaneous_threads_per_core} \rangle$):

Test Application	Single-threaded Control Flow	Multithreaded Dataflow
Recursive Fibonacci (fib.flp 50)	242sec.	1.6sec.

And finally, in sake of political correctness, we tested our recursive Fibonacci on older parallel hardware too. We took the 64-way SMP Sun SPARC Enterprise T5120 Server based on UltraSPARC T2 (Niagara 2) processor. The Linux OS reported in total 64 1.4GHz available processors (that actually are $\langle \text{processors_on_dies} \rangle$ multiplied by $\langle \text{cores_per_processor_die} \rangle$ multiplied by $\langle \text{simultaneous_threads_per_core} \rangle$):

Test Application	Single-threaded Control Flow	Multithreaded Dataflow
Recursive Fibonacci (fib.flp 50)	1352sec.	44sec.

Appendix: Log Files

The log files are provided in this document for those who are interested in automatic control-flow-to-dataflow code transformations and time measurements:

cat /proc/cpuinfo

```
processor       : 0
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2849.933
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 0
cpu cores    : 16
apicid       : 0
initial apicid : 0
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 1
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2821.632
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 1
cpu cores    : 16
apicid       : 2
initial apicid : 2
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 2
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2784.707
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 2
cpu cores    : 16
apicid       : 4
initial apicid : 4
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 3
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2818.308
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 3
cpu cores    : 16
apicid       : 8
initial apicid : 8
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 4
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2836.277
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 4
cpu cores    : 16
apicid       : 8
initial apicid : 8
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 5
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2810.042
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 5
cpu cores    : 16
apicid       : 10
initial apicid : 10
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 6
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz      : 2825.585
cache size   : 46080 KB
physical id  : 0
siblings     : 32
core id      : 6
cpu cores    : 16
apicid       : 12
initial apicid : 12
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 7
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2828.011
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 7
cpu cores : 16
apicid : 14
initial apicid : 14
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 8
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2838.613
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 8
cpu cores : 16
apicid : 16
initial apicid : 16
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 9
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2709.957
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 9
cpu cores : 16
apicid : 18
initial apicid : 18
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 10
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2712.023
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 10
cpu cores : 16
apicid : 20
initial apicid : 20
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf

eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 11
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2788.210
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 11
cpu cores : 16
apicid : 22
initial apicid : 22
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 12
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2836.546
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 12
cpu cores : 16
apicid : 24
initial apicid : 24
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 13
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2808.156
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 13
cpu cores : 16
apicid : 26
initial apicid : 26
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 14
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2826.125
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 14
cpu cores : 16
apicid : 28
initial apicid : 28
fpu : yes
fpu_exception : yes
cpuid level : 13

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wp          : yes
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips   : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor    : 15
vendor_id   : GenuineIntel
cpu family  : 6
model       : 63
model name  : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 2829.179
cache size  : 46080 KB
physical id : 0
siblings    : 32
core id     : 15
cpu cores   : 16
apicid      : 30
initial apicid : 30
fpu         : yes
fpu_exception : yes
cpuid level : 13
wp          : yes
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips   : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor    : 16
vendor_id   : GenuineIntel
cpu family  : 6
model       : 63
model name  : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 2830.078
cache size  : 46080 KB
physical id : 1
siblings    : 32
core id     : 0
cpu cores   : 16
apicid      : 64
initial apicid : 64
fpu         : yes
fpu_exception : yes
cpuid level : 13
wp          : yes
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips   : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor    : 17
vendor_id   : GenuineIntel
cpu family  : 6
model       : 63
model name  : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 2856.402
cache size  : 46080 KB
physical id : 1
siblings    : 32
core id     : 1
cpu cores   : 16
apicid      : 66
initial apicid : 66
fpu         : yes
fpu_exception : yes
cpuid level : 13
wp          : yes
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips   : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor    : 18
vendor_id   : GenuineIntel
cpu family  : 6
model       : 63
model name  : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 2819.207
cache size  : 46080 KB
physical id : 1
siblings    : 32
core id     : 2
cpu cores   : 16
apicid      : 68
initial apicid : 68
fpu         : yes
fpu_exception : yes
cpuid level : 13
wp          : yes
flags      : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips   : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

initial apicid : 68
fpu            : yes
fpu_exception  : yes
cpuid level    : 13
wp            : yes
flags          : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4843.33
clflush size   : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor       : 19
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2801.867
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 3
cpu cores     : 16
apicid        : 70
initial apicid : 70
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 20
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2756.226
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 4
cpu cores     : 16
apicid        : 72
initial apicid : 72
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 21
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2809.144
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 5
cpu cores     : 16
apicid        : 74
initial apicid : 74
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor       : 22
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2821.273
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 6
cpu cores     : 16
apicid        : 76
initial apicid : 76
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

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siblings      : 32
core id       : 6
cpu cores     : 16
apicid        : 76
initial apicid : 76
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 23
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2826.035
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 7
cpu cores     : 16
apicid        : 78
initial apicid : 78
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 24
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2828.460
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 8
cpu cores     : 16
apicid        : 80
initial apicid : 80
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 25
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2828.730
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 9
cpu cores     : 16
apicid        : 82
initial apicid : 82
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 26
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2821.902
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 10
cpu cores     : 16
apicid        : 84
initial apicid : 84
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 27
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2816.601
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 11
cpu cores     : 16
apicid        : 86
initial apicid : 86
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 28
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2797.285
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 12
cpu cores     : 16
apicid        : 88
initial apicid : 88
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 29
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2820.464
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 13
cpu cores     : 16
apicid        : 90
initial apicid : 90
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 30
vendor_id     : GenuineIntel

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```
cpu family      : 6
model          : 63
model name     : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2833.941
cache size    : 46080 KB
physical id   : 1
siblings     : 32
core id      : 14
cpu cores    : 16
apicid      : 92
initial apicid : 92
fpu         : yes
fpu_exception : yes
cpuid level  : 13
wp         : yes
flags       : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips    : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
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```
processor       : 31
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 2826.574
cache size  : 46080 KB
physical id : 1
siblings   : 32
core id    : 15
cpu cores  : 16
apicid    : 94
initial apicid : 94
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor       : 32
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1581.789
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 0
cpu cores  : 16
apicid    : 128
initial apicid : 128
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor       : 33
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1524.378
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 1
cpu cores  : 16
apicid    : 130
initial apicid : 130
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
```

```
power management:
processor       : 34
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1564.539
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 2
cpu cores  : 16
apicid    : 132
initial apicid : 132
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor       : 35
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1528.960
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 3
cpu cores  : 16
apicid    : 134
initial apicid : 134
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor       : 36
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1545.402
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 4
cpu cores  : 16
apicid    : 136
initial apicid : 136
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor       : 37
vendor_id     : GenuineIntel
cpu family    : 6
model        : 63
model name   : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping    : 4
microcode   : 0x9
cpu MHz     : 1619.703
cache size  : 46080 KB
physical id : 2
siblings   : 32
core id    : 5
cpu cores  : 16
apicid    : 138
initial apicid : 138
fpu       : yes
fpu_exception : yes
cpuid level : 13
wp       : yes
flags    : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
```

```

bogomips      : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 38
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1526.535
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 6
cpu cores    : 16
apicid       : 140
initial apicid : 140
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 39
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1555.285
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 7
cpu cores    : 16
apicid       : 142
initial apicid : 142
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 40
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1562.742
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 8
cpu cores    : 16
apicid       : 144
initial apicid : 144
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 41
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1556.273
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 9
cpu cores    : 16
apicid       : 146
initial apicid : 146
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 42
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1565.886
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 10
cpu cores    : 16
apicid       : 148
initial apicid : 148
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 43
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1574.691
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 11
cpu cores    : 16
apicid       : 150
initial apicid : 150
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 44
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1542.347
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 12
cpu cores    : 16
apicid       : 152
initial apicid : 152
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
cflflush size : 64
cache_alignment : 64
address sizes  : 46 bits physical, 48 bits virtual
power management:

processor      : 45
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1513.328
cache size   : 46080 KB
physical id   : 2
siblings     : 32
core id      : 13
cpu cores    : 16
apicid       : 154
initial apicid : 154
fpu          : yes
fpu_exception : yes

```



```

physical id      : 3
siblings        : 32
core id         : 5
cpu cores       : 16
apicid          : 202
initial apicid  : 202
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 54
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1635.425
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 6
cpu cores       : 16
apicid          : 204
initial apicid  : 204
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 55
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1605.867
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 7
cpu cores       : 16
apicid          : 206
initial apicid  : 206
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 56
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1602.722
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 8
cpu cores       : 16
apicid          : 208
initial apicid  : 208
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 57
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz

```

```

stepping        : 4
microcode       : 0x9
cpu MHz         : 1587.628
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 9
cpu cores       : 16
apicid          : 210
initial apicid  : 210
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 58
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1641.265
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 10
cpu cores       : 16
apicid          : 212
initial apicid  : 212
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 59
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1559.328
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 11
cpu cores       : 16
apicid          : 214
initial apicid  : 214
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 60
vendor_id       : GenuineIntel
cpu family      : 6
model           : 63
model name      : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping        : 4
microcode       : 0x9
cpu MHz         : 1653.484
cache size      : 46080 KB
physical id     : 3
siblings        : 32
core id         : 12
cpu cores       : 16
apicid          : 216
initial apicid  : 216
fpu             : yes
fpu_exception   : yes
cpuid level     : 13
wp              : yes
flags           : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc   arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips       : 4845.77
clflush size    : 64
cache alignment : 64
address sizes   : 46 bits physical, 48 bits virtual
power management:

processor        : 61

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vendor_id      : GenuineIntel
cpu family     : 6
model          : 63
model name     : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz        : 1649.531
cache size    : 46080 KB
physical id    : 3
siblings      : 32
core id       : 13
cpu cores     : 16
apicid        : 218
initial apicid : 218
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 62
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1603.261
cache size   : 46080 KB
physical id   : 3
siblings     : 32
core id      : 14
cpu cores    : 16
apicid       : 220
initial apicid : 220
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.77
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 63
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 1552.230
cache size   : 46080 KB
physical id   : 3
siblings     : 32
core id      : 15
cpu cores    : 16
apicid       : 222
initial apicid : 222
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.77
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 64
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 2852.000
cache size   : 46080 KB
physical id   : 0
siblings     : 32
core id      : 0
cpu cores    : 16
apicid       : 1
initial apicid : 1
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4600.07
clflush size : 64
cache alignment : 64

address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 65
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 2804.742
cache size   : 46080 KB
physical id   : 0
siblings     : 32
core id      : 1
cpu cores    : 16
apicid       : 3
initial apicid : 3
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 66
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 2813.457
cache size   : 46080 KB
physical id   : 0
siblings     : 32
core id      : 2
cpu cores    : 16
apicid       : 5
initial apicid : 5
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 67
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 2822.531
cache size   : 46080 KB
physical id   : 0
siblings     : 32
core id      : 3
cpu cores    : 16
apicid       : 7
initial apicid : 7
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 68
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping     : 4
microcode    : 0x9
cpu MHz       : 2840.769
cache size   : 46080 KB
physical id   : 0
siblings     : 32
core id      : 4
cpu cores    : 16
apicid       : 9
initial apicid : 9
fpu          : yes
fpu_exception : yes
cpuid level  : 13
wp           : yes
flags        : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic

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movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 69
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2820.734
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 5
cpu cores : 16
apicid : 11
initial apicid : 11
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 70
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2821.273
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 6
cpu cores : 16
apicid : 13
initial apicid : 13
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 71
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2821.812
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 7
cpu cores : 16
apicid : 15
initial apicid : 15
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 72
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2841.218
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 8
cpu cores : 16
apicid : 17
initial apicid : 17
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 73
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2829.269
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 9
cpu cores : 16
apicid : 19
initial apicid : 19
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 74
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2831.335
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 10
cpu cores : 16
apicid : 21
initial apicid : 21
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 75
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2829.449
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 11
cpu cores : 16
apicid : 23
initial apicid : 23
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 76
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2822.710
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 12
cpu cores : 16
apicid : 25
initial apicid : 25

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fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 77
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2827.742
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 13
cpu cores : 16
apicid : 27
initial apicid : 27
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 78
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2826.304
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 14
cpu cores : 16
apicid : 29
initial apicid : 29
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 79
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2831.246
cache size : 46080 KB
physical id : 0
siblings : 32
core id : 15
cpu cores : 16
apicid : 31
initial apicid : 31
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4600.07
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 80
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2828.371
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 16
cpu cores : 16
apicid : 67
initial apicid : 67
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 81
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2797.464
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 1
cpu cores : 16
apicid : 67
initial apicid : 67
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 82
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2815.882
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 2
cpu cores : 16
apicid : 69
initial apicid : 69
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 83
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2829.269
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 3
cpu cores : 16
apicid : 71
initial apicid : 71
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdprand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 84
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9

```

```

cpu MHz : 2833.761
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 4
cpu cores : 16
apicid : 73
initial apicid : 73
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpelgb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 85
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2822.171
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 5
cpu cores : 16
apicid : 75
initial apicid : 75
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 86
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2841.128
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 6
cpu cores : 16
apicid : 77
initial apicid : 77
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 87
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2833.132
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 7
cpu cores : 16
apicid : 79
initial apicid : 79
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 88
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2831.695
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 9
cpu cores : 16
apicid : 83
initial apicid : 83
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 89
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2831.695
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 9
cpu cores : 16
apicid : 83
initial apicid : 83
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 90
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2824.867
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 10
cpu cores : 16
apicid : 85
initial apicid : 85
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 91
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 2823.968
cache size : 46080 KB
physical id : 1
siblings : 32
core id : 11
cpu cores : 16
apicid : 87
initial apicid : 87
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xaaveopt
bogomips : 4843.33
clflush size : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

```



```
processor      : 92
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2804.652
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 12
cpu cores     : 16
apicid        : 89
initial apicid : 89
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 93
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2821.812
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 13
cpu cores     : 16
apicid        : 91
initial apicid : 91
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 94
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2834.031
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 14
cpu cores     : 16
apicid        : 93
initial apicid : 93
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4843.33
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 95
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2828.371
cache size    : 46080 KB
physical id   : 1
siblings      : 32
core id       : 15
cpu cores     : 16
apicid        : 95
initial apicid : 95
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4843.33
```

```
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 96
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1576.039
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 0
cpu cores     : 16
apicid        : 129
initial apicid : 129
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 97
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1506.140
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 1
cpu cores     : 16
apicid        : 131
initial apicid : 131
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 98
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1535.070
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 2
cpu cores     : 16
apicid        : 133
initial apicid : 133
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips     : 4845.72
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 99
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1556.812
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 3
cpu cores     : 16
apicid        : 135
initial apicid : 135
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
```

```

eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 100
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1534.351
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 4
cpu cores : 16
apicid : 137
initial apicid : 137
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 101
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1610.449
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 5
cpu cores : 16
apicid : 139
initial apicid : 139
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 102
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1536.328
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 6
cpu cores : 16
apicid : 141
initial apicid : 141
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 103
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1557.710
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 7
cpu cores : 16
apicid : 143
initial apicid : 143
fpu : yes
fpu_exception : yes
cpuid level : 13

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wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 104
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1551.601
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 8
cpu cores : 16
apicid : 145
initial apicid : 145
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 105
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1535.160
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 9
cpu cores : 16
apicid : 147
initial apicid : 147
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 106
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1551.421
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 10
cpu cores : 16
apicid : 149
initial apicid : 149
fpu : yes
fpu_exception : yes
cpuid level : 13
wp : yes
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est sse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips : 4845.72
clflush size : 64
cache_alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor : 107
vendor_id : GenuineIntel
cpu family : 6
model : 63
model name : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping : 4
microcode : 0x9
cpu MHz : 1584.664
cache size : 46080 KB
physical id : 2
siblings : 32
core id : 11
cpu cores : 16
apicid : 151

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initial apicid : 151
fpu            : yes
fpu_exception  : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.72
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 108
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1566.335
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 12
cpu cores     : 16
apicid        : 153
initial apicid : 153
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.72
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 109
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1536.148
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 13
cpu cores     : 16
apicid        : 155
initial apicid : 155
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.72
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 110
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1538.753
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 14
cpu cores     : 16
apicid        : 157
initial apicid : 157
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.72
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 111
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1580.351
cache size    : 46080 KB
physical id   : 2
siblings      : 32
core id       : 15
cpu cores     : 16
apicid        : 159
initial apicid : 159
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.72
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 112
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 2185.539
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 0
cpu cores     : 16
apicid        : 193
initial apicid : 193
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 113
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1578.195
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 1
cpu cores     : 16
apicid        : 195
initial apicid : 195
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 114
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1599.218
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 2
cpu cores     : 16
apicid        : 197
initial apicid : 197
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 cflshl mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscpl lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
cflshl size   : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 115
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4

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microcode      : 0x9
cpu MHz        : 1672.531
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 3
cpu cores     : 16
apicid        : 199
initial apicid : 199
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 116
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1585.832
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 4
cpu cores     : 16
apicid        : 201
initial apicid : 201
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 117
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1640.906
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 5
cpu cores     : 16
apicid        : 203
initial apicid : 203
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 118
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1630.035
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 6
cpu cores     : 16
apicid        : 205
initial apicid : 205
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 119
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1597.421
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 7
cpu cores     : 16
apicid        : 207
initial apicid : 207
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 120
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1588.167
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 8
cpu cores     : 16
apicid        : 209
initial apicid : 209
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 121
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1593.019
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 9
cpu cores     : 16
apicid        : 211
initial apicid : 211
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

processor      : 122
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1648.992
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 10
cpu cores     : 16
apicid        : 213
initial apicid : 213
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good noopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment : 64
address sizes : 46 bits physical, 48 bits virtual
power management:

```

```
power management:
processor      : 123
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1564.808
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 11
cpu cores     : 16
apicid        : 215
initial apicid : 215
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment: 64
address sizes  : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 124
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1641.445
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 12
cpu cores     : 16
apicid        : 217
initial apicid : 217
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment: 64
address sizes  : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 125
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1647.464
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 13
cpu cores     : 16
apicid        : 219
initial apicid : 219
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment: 64
address sizes  : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 126
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1612.785
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 14
cpu cores     : 16
apicid        : 221
initial apicid : 221
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
```

```
bogomips      : 4845.77
clflush size  : 64
cache alignment: 64
address sizes  : 46 bits physical, 48 bits virtual
power management:
```

```
processor      : 127
vendor_id     : GenuineIntel
cpu family    : 6
model         : 63
model name    : Intel(R) Xeon(R) CPU E7-8880 v3 @ 2.30GHz
stepping      : 4
microcode     : 0x9
cpu MHz       : 1567.144
cache size    : 46080 KB
physical id   : 3
siblings      : 32
core id       : 15
cpu cores     : 16
apicid        : 223
initial apicid : 223
fpu           : yes
fpu_exception : yes
cpuid level   : 13
wp            : yes
flags         : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx pdpe1gb rdtscp lm
constant_tsc arch_perfmon rep_good nopl xtopology nonstop_tsc aperfmperf
eagerfpu pni pclmulqdq monitor est ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand hypervisor lahf_lm
abm ida fsgsbase bmi1 hle avx2 smep bmi2 erms invpcid rtm xsaveopt
bogomips      : 4845.77
clflush size  : 64
cache alignment: 64
address sizes  : 46 bits physical, 48 bits virtual
power management:
```

fib.fastlisp

```
Current termcap settings:
TERM_TYPE='xterm'; LINES_TERM='51'; COLUMNS_TERM='109';
CLRSKR_TERM='\e[H[2J'; REVERSE_TERM='\e[7m'; BLINK_TERM='\e[5m';
BOLD_TERM='\e[1m'; NORMAL_TERM='\e[0m'; HIDECURSOR_TERM='\e[?25l';
SHOWCURSOR_TERM='\e[?12l\e[?25h'; GOTOCURSOR_TERM='\e[%;dH'.
Checking whether the `fib.flp' file is already precompiled...
Reading the `fib.flp' source FastLisp file...
*** Resetting time counters (first null assignment)... ***
Modifying the FastLisp code (PATTERN No# 1)...
(PROGN <FastLisp_prog>)
Checking the syntax of the source FastLisp file...
Modifying the FastLisp code (PATTERN No# 2)...
(PROGN {(SETQ <termcap_var> <termcap_val>)} <FastLisp_prog>)
Modifying the FastLisp code (PATTERN No# 3)...
(PROGN {(SETQ $<arg_num> <arg_val>)} <FastLisp_prog>)
Squeezing the nested source PROGN statements...
Redundant nested source PROGN statements removed: 2.
Looking for uninitialized variables/arrays in the FastLisp code...
Resolving data types in the FastLisp code...
```

```
-----
(PROGN
  (SETQ@I $1 50)
  (SETQ@S TERM_TYPE@S "xterm")
  (SETQ@I LINES_TERM@I 51)
  (SETQ@I COLUMNS_TERM@I 109)
  (SETQ@S CLRSKR_TERM@S "\e[H[2J")
  (SETQ@S REVERSE_TERM@S "\e[7m")
  (SETQ@S BLINK_TERM@S "\e[5m")
  (SETQ@S BOLD_TERM@S "\e[1m")
  (SETQ@S NORMAL_TERM@S "\e[0m")
  (SETQ@S HIDECURSOR_TERM@S "\e[?25l")
  (SETQ@S SHOWCURSOR_TERM@S "\e[?12l\e[?25h")
  (SETQ@S GOTOCURSOR_TERM@S "\e[%;dH")
  (DEFUN
    FIBONACCICOORDINATOR
    (PROGN
      (SETQ@I @I (+ 0 $1))
      (SETQ@I SPAWN@I (+ 0 $2))
      (IF@J
        (<@I @I 2)
        @I
        (IF@J
          (>@J SPAWN@I 0)
          (+@J
            (FIBONACCICOORDINATOR (--@J @I) (>>@J SPAWN@I 1))
            (FIBONACCICOORDINATOR (-@J @I 2) (>>@J SPAWN@I 1))
          )
          (+@J
            (FIBONACCISEAMLESS@J (--@J @I))
            (FIBONACCISEAMLESS@J (-@J @I 2))
          )
        )
      )
    )
  )
  (DEFUN
    FIBONACCI
    (PROGN
      (SETQ@I @I (+ 0 $1))
      (SETQ@I SPAWN@I (N CPUPROC))
      (FIBONACCICOORDINATOR @I SPAWN@I)
    )
  )
  (SETQ@I @I (+@J 0 $1))
  (FIBONACCI @I)
)
-----
```

```
(PROGN (SETQ@I $1 50) (SETQ@S TERM_TYPE@S "xterm") (SETQ@I LINES_TERM@I 51) (SE
T@Q@I COLUMNS_TERM@I 109) (SETQ@S CLRSKR_TERM@S "\e[H[2J") (SETQ@S REVERSE_TER
M@S "\e[7m") (SETQ@S BLINK_TERM@S "\e[5m") (SETQ@S BOLD_TERM@S "\e[1m") (SETQ@S
NORMAL_TERM@S "\e[0m") (SETQ@S HIDECURSOR_TERM@S "\e[?25l") (SETQ@S SHOWCURSOR
_TERM@S "\e[?12l\e[?25h") (SETQ@S GOTOCURSOR_TERM@S "\e[%;dH") (DEFUN FIBON
ACCICOORDINATOR (PROGN (SETQ@I @I (+ 0 $1)) (SETQ@I SPAWN@I (+ 0 $2)) (IF@J (<
```



```

(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:$1
(--@J MAIN:FIBONACCICOORDINATOR:SHADOW:N@I)
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 F4 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
(Var_Ptrs 0 1)
)
(Fnc
(N# 1)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:$2
(>>@J MAIN:FIBONACCICOORDINATOR:SHADOW:SPAWN@I 1)
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 \ ( 01 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
(Var_Ptrs 2 3)
)
)
(REM
"UDF `MAIN:FIBONACCICOORDINATOR' invoke initialization (passing the
arguments)"
)
)
(CTRL
(N# 15)
(OpGroup 2)
(COP 15)
(GOSUB 2)
(REM "UDF `MAIN:FIBONACCICOORDINATOR' call")
)
)
(CTRL
(N# 16)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Var_N# Ref_Name [Array]
(0 17 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000001@I")
(1 22 "MAIN:FIBONACCICOORDINATOR:TMP_000000000@I")
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000001@I
MAIN:FIBONACCICOORDINATOR:TMP_000000000@I
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
(Var_Ptrs 0 1)
)
)
)
(REM "UDF `MAIN:FIBONACCICOORDINATOR' returned value")
)
(CTRL (N# 17) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 18)
(OpGroup 2)
(COP 12)
(ENTER_RECURSION)
(Var_N# Ref_Name [Array]
(0 11 "MAIN:FIBONACCICOORDINATOR:N@I")
(1 9 "MAIN:FIBONACCICOORDINATOR:$1")
(2 21 "MAIN:FIBONACCICOORDINATOR:SPAWN@I")
(3 10 "MAIN:FIBONACCICOORDINATOR:$2")
(4 26 "MAIN:FIBONACCICOORDINATOR:TMP_000000004@I")
(5 22 "MAIN:FIBONACCICOORDINATOR:TMP_000000000@I")
(6 25 "MAIN:FIBONACCICOORDINATOR:TMP_000000003@I")
(7 23 "MAIN:FIBONACCICOORDINATOR:TMP_000000001@I")
(8 24 "MAIN:FIBONACCICOORDINATOR:TMP_000000002@I")
)
)
)
(CTRL
(N# 19)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Var_N# Ref_Name [Array]
(0 9 "MAIN:FIBONACCICOORDINATOR:$1")
(1 14 "MAIN:FIBONACCICOORDINATOR:SHADOW:N@I")
(2 10 "MAIN:FIBONACCICOORDINATOR:$2")
(3 15 "MAIN:FIBONACCICOORDINATOR:SHADOW:SPAWN@I")
)
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:$1
(--@J MAIN:FIBONACCICOORDINATOR:SHADOW:N@I 2)
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 C4 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
)
)
)
)

```

```

"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
(Var_Ptrs 0 1)
)
(Fnc
(N# 1)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:$2
(>>@J MAIN:FIBONACCICOORDINATOR:SHADOW:SPAWN@I 1)
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 \ ( 01 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
(Var_Ptrs 2 3)
)
)
)
(REM
"UDF `MAIN:FIBONACCICOORDINATOR' invoke initialization (passing the
arguments)"
)
)
(CTRL
(N# 20)
(OpGroup 2)
(COP 15)
(GOSUB 2)
(REM "UDF `MAIN:FIBONACCICOORDINATOR' call")
)
)
(CTRL
(N# 21)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Var_N# Ref_Name [Array]
(0 18 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000002@I")
(1 22 "MAIN:FIBONACCICOORDINATOR:TMP_000000000@I")
)
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000002@I
MAIN:FIBONACCICOORDINATOR:TMP_000000000@I
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
(Var_Ptrs 0 1)
)
)
)
)
(REM "UDF `MAIN:FIBONACCICOORDINATOR' returned value")
)
(CTRL (N# 22) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 23)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Var_N# Ref_Name [Array]
(0 17 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000001@I")
(1 18 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000002@I")
(2 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000000@I")
)
)
)
)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000000@I
(+@J
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000001@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000002@I
)
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "03 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 BC 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
(Var_Ptrs 2 0 1)
)
)
)
)
(CTRL
(N# 24)
(OpGroup 2)
(COP 14)
(GOTO 26)
(REM
"Pass over `MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000003@I' <else>
conditional branch"
)
)
)
(CTRL
(N# 25)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Var_N# Ref_Name [Array]
(0 14 "MAIN:FIBONACCICOORDINATOR:SHADOW:N@I")
(1 17 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000001@I")
(2 18 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000002@I")
(3 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_000000000@I")
)
)
)
)
)

```

```

)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_00000001@I
(FIBONACCISEAMLESS@J (--@J MAIN:FIBONACCICOORDINATOR:SHADOW:N@I)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" t B4 03 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 F4 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 1 0)
)
(Fnc
(N# 1)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_00000002@I
(FIBONACCISEAMLESS@J (-@J MAIN:FIBONACCICOORDINATOR:SHADOW:N@I 2)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" t B4 03 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 C4 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 2 0)
)
(Fnc
(N# 2)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_00000000@I
(+@J
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_00000001@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP_00000002@I
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "03 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 BC 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 3 1 2)
)
)
(CTRL
(N# 26)
(OpGroup 2)
(COP 16)
(RETURN)
(REM "End of UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' body")
)
(CTRL
(N# 27)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name [Array]
(0 9 "MAIN:FIBONACCICOORDINATOR:$1")
(1 11 "MAIN:FIBONACCICOORDINATOR:N@I")
(2 10 "MAIN:FIBONACCICOORDINATOR:$2")
(3 21 "MAIN:FIBONACCICOORDINATOR:SPAWN@I")
(4 26 "MAIN:FIBONACCICOORDINATOR:TMP_00000004@I")
)
)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:N@I
(+ 0 MAIN:FIBONACCICOORDINATOR:$1)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" t BC 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " V 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 1 0)
)
(Fnc
(N# 1)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:SPAWN@I
(+ 0 MAIN:FIBONACCICOORDINATOR:$2)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" t BC 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " V 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 3 2)
)
)

```

```

(Fnc
(N# 2)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:TMP_00000004@I
(<@I MAIN:FIBONACCICOORDINATOR:N@I 2)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 x 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 4 1)
)
)
(CTRL
(N# 28)
(OpGroup 1)
(COP 70)
(dfmput_zdata
(VarRef 26)
(VarName "MAIN:FIBONACCICOORDINATOR:TMP_00000004@I")
(Inq_Dest Ld)
)
)
(CTRL (N# 29) (OpGroup 1) (COP 81) (<accum_slo> (dfmget_idata)))
(CTRL
(N# 30)
(OpGroup 2)
(COP 17)
(IF NOT <accum_slo> (GOTO 33))
(REM
"Pass over `MAIN:FIBONACCICOORDINATOR:TMP_00000004@I' <if> conditional
branch"
)
)
(CTRL
(N# 31)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name [Array]
(0 11 "MAIN:FIBONACCICOORDINATOR:N@I")
(1 22 "MAIN:FIBONACCICOORDINATOR:TMP_00000000@I")
)
)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:TMP_00000000@I
MAIN:FIBONACCICOORDINATOR:N@I
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 1 0)
)
)
(CTRL
(N# 32)
(OpGroup 2)
(COP 14)
(GOTO 50)
(REM
"Pass over `MAIN:FIBONACCICOORDINATOR:TMP_00000004@I' <else> conditional
branch"
)
)
(CTRL
(N# 33)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name [Array]
(0 21 "MAIN:FIBONACCICOORDINATOR:SPAWN@I")
(1 25 "MAIN:FIBONACCICOORDINATOR:TMP_00000003@I")
)
)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:TMP_00000003@I
(>@I MAIN:FIBONACCICOORDINATOR:SPAWN@I 0)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 80 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 1 0)
)
)
(CTRL
(N# 34)
(OpGroup 1)
(COP 70)
(dfmput_zdata
(VarRef 25)
(VarName "MAIN:FIBONACCICOORDINATOR:TMP_00000003@I")
(Inq_Dest Ld)
)
)
(CTRL (N# 35) (OpGroup 1) (COP 81) (<accum_slo> (dfmget_idata)))
)

```

```

(CTRL
(N# 36)
(OpGroup 2)
(COP 17)
(IF_NOT <accum_slo> (GOTO 49))
(REM
"Pass over `MAIN:FIBONACCICOORDINATOR:TMP__00000003@I' <if> conditional
branch"
)
)
(CTRL
(N# 37)
(OpGroup 2)
(COP 12)
(ENTER_RECURSION)
(Vars_N#_Ref_Name_[Array]
(0 14 "MAIN:FIBONACCICOORDINATOR:SHADOW:N@I")
(1 12 "MAIN:FIBONACCICOORDINATOR:SHADOW:$1")
(2 15 "MAIN:FIBONACCICOORDINATOR:SHADOW:SPAWN@I")
(3 13 "MAIN:FIBONACCICOORDINATOR:SHADOW:$2")
(4 20 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000004@I")
(5 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I")
(6 19 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000003@I")
(7 17 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000001@I")
(8 18 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000002@I")
)
)
)
(CTRL
(N# 38)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name_[Array]
(0 12 "MAIN:FIBONACCICOORDINATOR:SHADOW:$1")
(1 11 "MAIN:FIBONACCICOORDINATOR:N@I")
(2 13 "MAIN:FIBONACCICOORDINATOR:SHADOW:$2")
(3 21 "MAIN:FIBONACCICOORDINATOR:SPAWN@I")
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:$1
(--@J MAIN:FIBONACCICOORDINATOR:N@I)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 F4 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
(Fnc
(N# 1)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:$2
(>@J MAIN:FIBONACCICOORDINATOR:SPAWN@I 1)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 \ ( 01 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 2 3)
)
)
)
(REM
"UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' invoke initialization (passing the
arguments)"
)
)
(CTRL
(N# 39)
(OpGroup 2)
(COP 15)
(GOSUB 3)
(REM "UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' call")
)
)
(CTRL
(N# 40)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name_[Array]
(0 23 "MAIN:FIBONACCICOORDINATOR:TMP__00000001@I")
(1 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I")
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:TMP__00000001@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
)
)
(REM "UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' returned value")
)
)
(CTRL (N# 41) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 42)
(OpGroup 2)
(COP 12)

```

```

(ENTER_RECURSION)
(Vars_N#_Ref_Name_[Array]
(0 14 "MAIN:FIBONACCICOORDINATOR:SHADOW:N@I")
(1 12 "MAIN:FIBONACCICOORDINATOR:SHADOW:$1")
(2 15 "MAIN:FIBONACCICOORDINATOR:SHADOW:SPAWN@I")
(3 13 "MAIN:FIBONACCICOORDINATOR:SHADOW:$2")
(4 20 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000004@I")
(5 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I")
(6 19 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000003@I")
(7 17 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000001@I")
(8 18 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000002@I")
)
)
(CTRL
(N# 43)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name_[Array]
(0 12 "MAIN:FIBONACCICOORDINATOR:SHADOW:$1")
(1 11 "MAIN:FIBONACCICOORDINATOR:N@I")
(2 13 "MAIN:FIBONACCICOORDINATOR:SHADOW:$2")
(3 21 "MAIN:FIBONACCICOORDINATOR:SPAWN@I")
)
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:$1
(--@J MAIN:FIBONACCICOORDINATOR:N@I 2)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 C4 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
)
(Fnc
(N# 1)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:SHADOW:$2
(>@J MAIN:FIBONACCICOORDINATOR:SPAWN@I 1)
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 \ ( 01 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " i 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 2 3)
)
)
)
(REM
"UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' invoke initialization (passing the
arguments)"
)
)
(CTRL
(N# 44)
(OpGroup 2)
(COP 15)
(GOSUB 3)
(REM "UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' call")
)
)
(CTRL
(N# 45)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name_[Array]
(0 24 "MAIN:FIBONACCICOORDINATOR:TMP__00000002@I")
(1 16 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I")
)
)
(Fnc
(N# 0)
(FLP
(ALSETQ
MAIN:FIBONACCICOORDINATOR:TMP__00000002@I
MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000000@I
)
)
(FLP_COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
)
)
(REM "UDF `MAIN:FIBONACCICOORDINATOR:SHADOW' returned value")
)
)
(CTRL (N# 46) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 47)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars_N#_Ref_Name_[Array]
(0 23 "MAIN:FIBONACCICOORDINATOR:TMP__00000001@I")
(1 24 "MAIN:FIBONACCICOORDINATOR:SHADOW:TMP__00000002@I")
(2 22 "MAIN:FIBONACCICOORDINATOR:TMP__00000000@I")
)
)
)
(Fnc
(N# 0)
(FLP
(SETQ@I
MAIN:FIBONACCICOORDINATOR:TMP__00000000@I
(+@J

```



```

)
(REM "UDF `MAIN:FIBONACCOORDINATOR' returned value")
)
(CTRL (N# 57) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 58)
(OpGroup 2)
(COP 16)
(RETURN)
(REM "End of UDF `MAIN:FIBONACCI' body")
)
(CTRL
(N# 59)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars N# Ref Name [Array] (0 0 "MAIN:$1") (1 30 "MAIN:N#I"))
(Fnc
(N# 0)
(FLP (SETQ@I MAIN:N#I (+@J 0 MAIN:$1)))
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 04 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"D4 BC 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"03 00 00 00 00 00 00 00" " I 00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " V 00 00 00 00 00 00 00 00"
"01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 1 0)
)
)
(CTRL
(N# 60)
(OpGroup 2)
(COP 12)
(ENTER_RECURSION)
(Vars N# Ref Name [Array]
(0 6 "MAIN:FIBONACCI:N#I")
(1 5 "MAIN:FIBONACCI:$1")
(2 7 "MAIN:FIBONACCI:SPAWN#I")
(3 8 "MAIN:FIBONACCI:TMP_000000000#I")
)
)
(CTRL
(N# 61)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars N# Ref Name [Array] (0 5 "MAIN:FIBONACCI:$1") (1 30 "MAIN:N#I"))
(Fnc
(N# 0)
(FLP (ALSETQ MAIN:FIBONACCI:$1 MAIN:N#I))
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
)
(REM "UDF `MAIN:FIBONACCI' invoke initialization (passing the arguments)")
)
(CTRL
(N# 62)
(OpGroup 2)
(COP 15)
(GOSUB 52)
(REM "UDF `MAIN:FIBONACCI' call")
)
(CTRL
(N# 63)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars N# Ref Name [Array]
(0 36 "MAIN:TMP_000000001")
(1 8 "MAIN:FIBONACCI:TMP_000000000#I")
)
(Fnc
(N# 0)
(FLP (ALSETQ MAIN:TMP_000000001 MAIN:FIBONACCI:TMP_000000000#I))
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" " T 08 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" i 00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
)
(Var_Ptrs 0 1)
)
)
(REM "UDF `MAIN:FIBONACCI' returned value")
)
(CTRL (N# 64) (OpGroup 2) (COP 13) (LEAVE_RECURSION))
(CTRL
(N# 65)
(OpGroup 1)
(COP 50)
(dfmput_marshaled_cluster
(Vars N# Ref Name [Array]
(0 36 "MAIN:TMP_000000001")
(1 36 "MAIN:TMP_000000001")
(2 35 "MAIN:TMP_000000000#S")
)
(Fnc
(N# 0)
(FLP
(SETQ@S
MAIN:TMP_000000001
(OUTF (PRN_STRING_FMT) (CAT "" MAIN:TMP_000000001))
)
)
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 05 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" T 8 00 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"02 00 00 00 00 00 00 00" " T 80 02 00 00 00 00 00 00"
)
)
)
)

```

```

" T F4 01 00 00 00 00 00" "02 00 00 00 00 00 00 00"
"04 00 00 00 00 00 00 00" " S 00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "00 00 00 00 00 00 00 00"
" V 00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
)
(Inq_Dest Ls)
(Var_Ptrs 1 0)
)
(Fnc
(N# 1)
(FLP (SETQ@S MAIN:TMP_000000000#S ""))
(FLP COMPILED
"D5 01 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "D4 05 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00" "01 00 00 00 00 00 00 00"
" S 00 00 00 00 00 00 00" "00 00 00 00 00 00 00 00"
"00 00 00 00 00 00 00 00"
)
(Var_Ptrs 2)
)
)
(CTRL (N# 66) (OpGroup 4) (COP 200) (END) (REM "End of the control sequence"))
-----
*You may recompile BMDFMLdr module with commented `#define _NOISY_MODE1_'
to disable print of the BM_DFM control sequence.
*** Uploading and immediate running of the BM_DFM control sequence by
the BM_DFM kernel will start here just after the time report!
Time spent to check and prepare the task approx.:
Used by process: 0.019996sec.
Used by system: 0.003000sec.
Total used time: 2.299600000000E-02sec.
Real absolute time: 2.221202850342E-02sec.
*** Resetting time counters (second event controlpoint)... ***
=====
The task is being carried out on SocketN# 0.
=====
12586269025
=====
Time spent to run the task (by PARENT loader and CHILD listener):
Used by process: 0.006747sec.
Used by system: 0.004828sec.
Total used time: 1.157500000000E-02sec.
Real absolute time: 1.231257863478E+00sec.
Task has been detached (logged out) from the BM_DFM Server.
The BM_DFM Task Loader/Listener pair has done its job decently and gracefully.

```

cat /proc/cpuinfo

```

processor      : 0
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 1
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 2
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 3
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 4
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 5
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 6
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 7
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 8
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 9
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 10
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 11
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz
revision      : 2.1 (pvr 004b 0201)

processor      : 12
cpu           : POWER8E (raw), altivec supported
clock         : 3690.000000MHz

```



```

revision      : 2.1 (pvr 004b 0201)

processor     : 157
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 158
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 159
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 160
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 161
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 162
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 163
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 164
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 165
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 166
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 167
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 168
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 169
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 170
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 171
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 172
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 173
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 174
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 175
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 176
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 177
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 178
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 179
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 180
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz

```

```

revision      : 2.1 (pvr 004b 0201)

processor     : 181
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 182
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 183
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 184
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 185
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 186
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 187
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 188
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 189
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 190
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

processor     : 191
cpu          : POWER8E (raw), altivec supported
clock       : 3690.000000MHz
revision    : 2.1 (pvr 004b 0201)

timebase     : 512000000
platform     : PowerNV
model        : 8247-22L
machine      : PowerNV 8247-22L
firmware     : OPAL v3

```

fib.fastlisp

```

Time spent to check and prepare the task approx.:
  Used by process: 0.018573sec.
  Used by system: 0.000000sec.
  Total used time: 1.857300000000E-02sec.
Real absolute time: 1.614522933960E-02sec.
*** Resetting time counters (second event controlpoint)... ***
=====
12586269025
=====
Time spent to run the task:
  Used by process: 242.339492sec.
  Used by system: 0.007174sec.
  Total used time: 2.423466660000E+02sec.
Real absolute time: 2.423509399891E+02sec.

```

BMDFMsrv.cfg

```

# BMDFMsrv.cfg

SHMEM_POOL_SIZE      =8000000000 # Shared memory pool size [Bytes]
SHMEM_POOL_MNTADDR   = 999999999 # ShMemPool mount address (0=auto)
SHMEM_POOL_PERMS     = 432 # ShMemPool permissions (0660=="rw-rw----")
SHMEM_POOL_BANKS    = 400 # Number of banks in pool
ARRAYBLOCK_SIZE     = 80 # Array block size [Entities]
OQ_FUNC_ARG_COUNT    = 80 # OQ function argument count [Entities]

Q_OQ                 = 5000 # Operation Queue (OQ) size [Entities]
Q_DB                 = 500 # Data Buffer (DB) size [Entities]
Q_IORBP              = 100 # I/O Ring Buffer Port (IORBP) size [Entities]
N_IORBP              = 10 # Number of the IORBPs
N_TRACEPORT          = 5 # Number of the Trace Ports (TPs)

N_CPUPROC            = 400 # Number of the CPU PROCs
N_OQPROC              = 400 # Number of the OQ PROCs
N_IORBPProc          = 400 # Number of the IORBP PROCs

```

```

CPUPROC_MTHREAD = Yes # CPU PROC is multithreaded
OQPROC_MTHREAD = Yes # OQ PROC is multithreaded
IORBPPROC_MTHREAD = Yes # IORBPPROC is multithreaded
BMDFMLDR_MTHREAD = Yes # BMDFMLDR is multithreaded

T_STATISTIC = 1 # Time to scan DFM for statistic [Seconds]
PROC_HEARTBEATS = Yes # Heartbeats for the CPU, OQ && IORBPPROCS
DFSTLHAZARD_DETECT = Yes # Detection of dataflow stall hazards
ALLOW_DROP_NONPROD = No # Allow dropping nonproductive instructions
PROC_CPU_LOGS = No # Logs registration for the CPU && IORBPPROCS
HARD_ARRAY_SYNCHRO = No # Hard synchronization of the arrays
EXT_IN_OUT_SYNCHRO = Yes # I/O synchronization of external task
OQ_DB_SEM_LIMIT = 0 # Max number of OQ&DB semaphores (0=unlim.)

# <EOF>

```

fib.BMDFMLdr

```

Time spent to check and prepare the task approx.:
  Used by process: 0.018784sec.
  Used by system: 0.004000sec.
  Total used time: 2.278400000000E-02sec.
Real absolute time: 2.351703960373E-02sec.
*** Resetting time counters (second event controlpoint)... ***
=====
The task is being carried out on SocketN# 0.
=====
12586269025
=====
Time spent to run the task (by PARENT loader and CHILD listener):
  Used by process: 0.009467sec.
  Used by system: 0.002846sec.
  Total used time: 1.231300000000E-02sec.
Real absolute time: 1.610240067235E+00sec.
Task has been detached (logged out) from the BM_DFM Server.
The BM_DFM Task Loader/Listener pair has done its job decently and gracefully.

```

cat /proc/cpuinfo

```

cpu      : UltraSparc T2 (Niagara2)
fpu      : UltraSparc T2 integrated FPU
pmu      : niagara2
prom     : OBP 4.33.6 2012/03/14 08:07
type     : sun4v
ncpus probed : 64
ncpus active  : 64
D$ parity t11 : 0
I$ parity t11 : 0
cpucaps    : flush, stbar, swap, muldiv, v9, blkinit, n2, mul32, div32, v8plus,
popc, vis, vis2, ASIBlkInit
Cpu0ClkTck : 000000005458c3a0
Cpu1ClkTck : 000000005458c3a0
Cpu2ClkTck : 000000005458c3a0
Cpu3ClkTck : 000000005458c3a0
Cpu4ClkTck : 000000005458c3a0
Cpu5ClkTck : 000000005458c3a0
Cpu6ClkTck : 000000005458c3a0
Cpu7ClkTck : 000000005458c3a0
Cpu8ClkTck : 000000005458c3a0
Cpu9ClkTck : 000000005458c3a0
Cpu10ClkTck : 000000005458c3a0
Cpu11ClkTck : 000000005458c3a0
Cpu12ClkTck : 000000005458c3a0
Cpu13ClkTck : 000000005458c3a0
Cpu14ClkTck : 000000005458c3a0
Cpu15ClkTck : 000000005458c3a0
Cpu16ClkTck : 000000005458c3a0
Cpu17ClkTck : 000000005458c3a0
Cpu18ClkTck : 000000005458c3a0
Cpu19ClkTck : 000000005458c3a0
Cpu20ClkTck : 000000005458c3a0
Cpu21ClkTck : 000000005458c3a0
Cpu22ClkTck : 000000005458c3a0
Cpu23ClkTck : 000000005458c3a0
Cpu24ClkTck : 000000005458c3a0
Cpu25ClkTck : 000000005458c3a0
Cpu26ClkTck : 000000005458c3a0
Cpu27ClkTck : 000000005458c3a0
Cpu28ClkTck : 000000005458c3a0
Cpu29ClkTck : 000000005458c3a0
Cpu30ClkTck : 000000005458c3a0
Cpu31ClkTck : 000000005458c3a0
Cpu32ClkTck : 000000005458c3a0
Cpu33ClkTck : 000000005458c3a0
Cpu34ClkTck : 000000005458c3a0
Cpu35ClkTck : 000000005458c3a0
Cpu36ClkTck : 000000005458c3a0
Cpu37ClkTck : 000000005458c3a0
Cpu38ClkTck : 000000005458c3a0
Cpu39ClkTck : 000000005458c3a0
Cpu40ClkTck : 000000005458c3a0
Cpu41ClkTck : 000000005458c3a0
Cpu42ClkTck : 000000005458c3a0
Cpu43ClkTck : 000000005458c3a0
Cpu44ClkTck : 000000005458c3a0
Cpu45ClkTck : 000000005458c3a0
Cpu46ClkTck : 000000005458c3a0
Cpu47ClkTck : 000000005458c3a0
Cpu48ClkTck : 000000005458c3a0
Cpu49ClkTck : 000000005458c3a0

```

Dataflow in Practice: Computing Recursive Fibonacci in Parallel Using Transparent Dataflow Programming Model for Multicore and Many-core

```

Cpu50ClkTck : 000000005458c3a0
Cpu51ClkTck : 000000005458c3a0
Cpu52ClkTck : 000000005458c3a0
Cpu53ClkTck : 000000005458c3a0
Cpu54ClkTck : 000000005458c3a0
Cpu55ClkTck : 000000005458c3a0
Cpu56ClkTck : 000000005458c3a0
Cpu57ClkTck : 000000005458c3a0
Cpu58ClkTck : 000000005458c3a0
Cpu59ClkTck : 000000005458c3a0
Cpu60ClkTck : 000000005458c3a0
Cpu61ClkTck : 000000005458c3a0
Cpu62ClkTck : 000000005458c3a0
Cpu63ClkTck : 000000005458c3a0
MMU Type   : Hypervisor (sun4v)
MMU PGSZs  : 8K, 64K, 4MB, 256MB

```

```

State:
CPU0: online
CPU1: online
CPU2: online
CPU3: online
CPU4: online
CPU5: online
CPU6: online
CPU7: online
CPU8: online
CPU9: online
CPU10: online
CPU11: online
CPU12: online
CPU13: online
CPU14: online
CPU15: online
CPU16: online
CPU17: online
CPU18: online
CPU19: online
CPU20: online
CPU21: online
CPU22: online
CPU23: online
CPU24: online
CPU25: online
CPU26: online
CPU27: online
CPU28: online
CPU29: online
CPU30: online
CPU31: online
CPU32: online
CPU33: online
CPU34: online
CPU35: online
CPU36: online
CPU37: online
CPU38: online
CPU39: online
CPU40: online
CPU41: online
CPU42: online
CPU43: online
CPU44: online
CPU45: online
CPU46: online
CPU47: online
CPU48: online
CPU49: online
CPU50: online
CPU51: online
CPU52: online
CPU53: online
CPU54: online
CPU55: online
CPU56: online
CPU57: online
CPU58: online
CPU59: online
CPU60: online
CPU61: online
CPU62: online
CPU63: online

```

fib.fastlisp

```

Time spent to check and prepare the task approx.:
  Used by process: 0.064581sec.
  Used by system: 0.003759sec.
  Total used time: 6.834000000000E-02sec.
Real absolute time: 6.831002235413E-02sec.
*** Resetting time counters (second event controlpoint)... ***
=====
12586269025
=====
Time spent to run the task:
  Used by process: 1352.351024sec.
  Used by system: 0.000000sec.
  Total used time: 1.352351024000E+03sec.
Real absolute time: 1.351703443050E+03sec.

```

BMDFMsrv.cfg

```
# BMDFMsrv.cfg
```

```

SHMEM_POOL_SIZE      =8000000000 # Shared memory pool size          [Bytes]
SHMEM_POOL_MNTADDR  = 9999999999 # ShMemPool mount address (0=auto)
SHMEM_POOL_PERMS    =      432 # ShMemPool permissions (0660=="rw-rw----")
SHMEM_POOL_BANKS    =      100 # Number of banks in pool
POSIX_SEMA4_SYNC    = RW+Count # Replace None/RW/RW+Count SVR4 with POSIX sema4
ARRAYBLOCK_SIZE     =      80 # Array block size          [Entities]
OQ_FUNC_ARG_COUNT   =      80 # OQ function argument count  [Entities]

Q_OQ                 =      5000 # Operation Queue (OQ) size    [Entities]
Q_DB                 =      500 # Data Buffer (DB) size        [Entities]
Q_IORBP              =      100 # I/O Ring Buffer Port (IORBP) size [Entities]
N_IORBP              =      10 # Number of the IORBPs
N_TRACEPORT         =       5 # Number of the Trace Ports (TPs)

N_CPUPROC            =      128 # Number of the CPU PROCs
N_OQPROC             =      128 # Number of the OQ PROCs
N_IORBPPROC         =      128 # Number of the IORBP PROCs

CPUPROC_MTHREAD     =      Yes # CPU PROC is multithreaded
OQPROC_MTHREAD      =      Yes # OQ PROC is multithreaded
IORBPPROC_MTHREAD   =      Yes # IORBP PROC is multithreaded
BMDFMLDR_MTHREAD    =      Yes # BMDFMLdr is multithreaded

T_STATISTIC         =       1 # Time to scan DFM for statistic [Seconds]
PROC_HEARTBEATS     =      Yes # Heartbeats for the CPU, OQ && IORBP PROCs
DFSTLHAZARD_DETECT =      Yes # Detection of dataflow stall hazards
ALLOW_DROP_NONPROD =      No # Allow dropping nonproductive instructions
PROC_CPU_LOGS       =      No # Logs registration for the CPU && IORBP PROCs
HARD_ARRAY_SYNCHRO =      No # Hard synchronization of the arrays
EXT_IN_OUT_SYNCHRO =      Yes # I/O synchronization of external task
OQ_DB_SEM_LIMIT     =       0 # Max number of OQ&&DB semaphores (0=unlim.)

# <EOF>

```

fib.BMDFMLdr

. . .

```

Time spent to check and prepare the task approx.:
  Used by process: 0.308090sec.
  Used by system: 0.039575sec.
  Total used time: 3.476650000000E-01sec.
Real absolute time: 3.466250896454E-01sec.
*** Resetting time counters (second event controlpoint)... ***
=====
The task is being carried out on SocketN# 0.
=====
12586269025
=====
Time spent to run the task (by PARENT loader and CHILD listener):
  Used by process: 0.168065sec.
  Used by system: 0.132273sec.
  Total used time: 3.003380000000E-01sec.
Real absolute time: 4.439354491234E+01sec.
Task has been detached (logged out) from the BM_DFM Server.
The BM_DFM Task Loader/Listener pair has done its job decently and gracefully.

```

<EOF>

