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(www.gost.ru)

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**High-performance computing systems.
Terms and definitions**

— 2021—06—01

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1 : , - hhgh-performance
( ) * computing ( )
, .
, .

2 ; : - - computing system
, - -
.

3 ; : high-performance
- computing system (HPCS)
.

4 (- multiprocessor system
); : . ,
-
.

5 - high-performance
: . - computing system
( ), , - architecture
.

6 - homogeneous high-
( ): . - performance computing
. . system

7 - heterogeneous high-
( ): . - performance computing
( ) . system

8 - general-purpose high-
: . performance computing
, system
.

9 - special-purpose high-
: . . performance computing
system

10 : functional node of the
- - high-performance
. computing system

—
: , , .
. .

11 : , - subsystem
.

12 : . computing subsystem
.

13 : management and
. administration subsystem
.

14 : . user access subsystem
.

15 : . - service subsystem
- -
.

2

16 ( )'. interconnect subsystem
.
( ) .
17 : . storage subsystem
.
.
18 : - file subsystem
, , -
, .
19 ( ): archive
, , -
, , .
20 : -Flynn's taxonomy
,
.

—

(Michael J.Flynn).

21 , SISD (Single Instruction
; : . - stream, Single Data
, - stream) architecture
.
22 , - MISD (Multiple Instruction
; : . - stream. Single Data
, stream) architecture
-
.
23 , - SIMD (Single Instruction
; : . stream. Multiple Data
- stream) architecture
.
24 , MIMD (Multiple Instructions
; : . - stream, Multiple Data
, stream) architecture
.
25 : , - engineering systems
. , -
, .
26 : power supply system
, -
.
27 : , cooling system

.

28 : hardware
.
29 : - computing node
, . -
-
.

№	Термин	English
30	: , ( ), .	processor (CPU)
31	: , .	general-purpose processor
32	: , ( ) .	core
33	: , ( ).	hybrid computing node
34	: , ( ) , ( ) .	SMP architecture
35	: , ( ) , ( ).	NUMA architecture
36	: , .	accelerator
37	: , , .	arithmetic accelerator
38	: , .	graphics processing unit (GPU)
39	: , .	interconnect
40	: , .	switch
41	: . .	port

— « » 15971.

№	Термин	English
42	: , .	link
43	: , .	communication channel
44	: , , .	interconnect subsystem topology
45	( ): ( ) .	hop
46	: , .	node

4

47 : - bisection
.

48 : - route
,
( ) ( ).

49 : , - distance
( ) -
( ) .

50 : - average distance
« ( ) — ( )».

51 : , file system
, , -
.

52 : - parallel file system
,
.

53 : , -disk array
(/
), , .
-

54 : , - just a bunch of disks
, , - (JBOD)
.

55 : hot replacement
,
( ) . -

56 : . hot reserve
.

57 ; : - system software
. , , , -
.

58 : , - process
, -
.

59 : , process's context
, ,
, ,
., , -
.

60 : , thread
· (Light Weight Process)

61 : , parallel computing
-
, -
.

62 : - serial computing
. -
.

63	:	,	batch job

,

.

64	:	,	* resource manager

.

65	:	message passing parallelization model

,

, ,

, , *

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66	:	- shared memory parallelization model

,

, *

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67	:	* hybrid parallelization model

,

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— ,

*»!. -

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68	:	- message passing interface

, - (MPI)

,

. .

69	:	OpenMP

, -

, -

, -

.

70	:	, - decomposition

.

71	:	functional decomposition

.

72	:	- geometric decomposition

. -

.

73	:	,	- race condition

( ) ,

.

74	:	,	- data parallelism

. -

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— « » 15971.

75	:	,	- functional parallelism

.

76	:	( ),	data dependence

.

77   :   **true dependence**
(   ),   (   )   -
.   (   ).

78   :   (   ), **anti dependence**
           (   )   ,   -
                (   ).

79   :   (   ),   **output dependence**
         (   )
.

80   [   ]:   ,   **synchronization**
         (,   ),   -
             (   ).

81   :   ,   (   ),   **barrier synchronization**
            ,   ,   -
          (   )   .

82   :   ,   **critical section**
           (   ),   -

.

83   :   -   **vectorizing**
.   -
                 .

         —   «   »   33707.

84   :   -   **load balancing**
          (,   ),
       .

85   :   -   **mapping**
                        -
         ,
.

86   :   ,   -   **benchmark**

.   :   ,   -
          ,   -
     ,   ,   -
.

87   :   **performance**

    ,   :   (FLOPS).
         —   «   »   15971.

88   :   **theoretical peak**
                   -    **performance**
.   .

89   :   ,   -   **real performance**
                 .

     e —   -
          .

90   *(   ):*   *   latency

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1   *

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2
(. MPI)
    -                   -   -
.   ,
.

91   :   ,   bandwidth
,   ,   ,   -
(/ , bps;   / . Kbps;   / . Mbps;   / .
Gbps).

92   :   -   power usage effectiveness
,   ,   -   (PUE)
.

93   :   -   power efficiency
.

94   -   power consumption of
:   ,   the high-performance
.   computing system

95   :   ,   occupied space
.

96   :   ,   -   connectivity
.

      —   -
,
.

97   :   ,   full bisection
               -
.

98   :   -   bisection bandwidth
(   )
.

99   *(   ):*   -   bisection width
,
,
.

100   :   diameter
,   -
«   (   ) —   (-
)».

101   :   ,   - speedup

(   )   (   )   -
                                                         -

                                              .

    1   , -
              .
    2   -
                          .
102   (   ): strong scaling method
                    ,
                                                         -
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    1   , -
              .
    2   -
                          .
    3   -
                          .
103   (   ): weak scaling method
                    ,
                              (   )   -
                                                         -
          .
    1   , -
              .
    2   -
                              ,
              ,
              .
    3   -
                              ,
          ,   ,
              .
104   :   - efficiency
              ,   (   )   -
                    ,   -
                              ,
100 %.
              —   -
          ,   .
105   :   - scalability
          ,
                    (   )
              .
106   :   ,   granularity
              ,   .

107 : , - load balance

(,).

108 (D): - load disbalance

$?_{min}$ $t_{ma}{}^{*}$ (,) -

/ (,)

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