



57700.27—  
2020

1 « -  
 -  
 » ( « - »)

2 700 «  
 »

3 13 2020 . 1078-

4

29 2015 . 162- « 26  
 ». -  
 ( 1  
 ) « », -  
 « », -  
 ( ) «  
 ». ,  
 -  
 (www.gost.ru)

1	.....	1
2	.....	1
3	.....	2
	.....	11
	.....	14



High-performance computing systems.  
Terms and definitions

— 2021—06—01

1

-

-

( )

57700.18

57700.26.

2

:

15971

33707

57700.18

57700.26

« -

1

-

,

-

( ).

## 3

- 1 : , - high-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  
 -

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

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.	— « »	
42	: ,	- link
43	:	- communication channel
44	: ,	- interconnect subsystem topology
45	( ) :	- hop
46	: ,	- node



47	:	-	bisection
48	:	-	route
(	)	(	).
49	:	-	distance
(	)	-	
50	:	-	average distance
51	«	(	)—
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
61	:	,	(Light Weight Process)
61	:	,	parallel computing
62	:	-	serial computing

- 63 : , batch job
- 64 : , \* resource manager
- 65 : message passing parallelization model
- 66 : - shared memory parallelization model
- 67 : \* hybrid parallelization model
- 68 : - message passing interface (MPI)
- 69 : OpenMP
- 70 : - decomposition
- 71 : functional decomposition
- 72 : - geometric decomposition
- 73 : - race condition
- 74 : - data parallelism
- 75 : - functional parallelism
- 76 : ( ), data dependence



90	( ):	* latency
1	.	*
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 occupied space
95	:	-
96	:	- connectivity
	—	-
97	:	, full bisection
98	:	- bisection bandwidth
	( )	-
99	( ):	- bisection width
	,	.
100	:	diameter
	,	-
	« ( ) — (	-
)».		

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

107 : , - load balance

( , ).  
108 (D): - load disbalance

$t_{\min}$   $t_{ma}^*$  ( , ) -  
/ ( , )  
— ( ~ Anin

(. — /- ( , ).

	19
	5
	24
	22
,	24
,	22
,	23
,	21
	23
	21
	35
	34
	107
	84
	47
	97
	3
	7
	83
	2
	1
	61
	62
	70
	72
	71
	6
	100
	108
	49
	50
	79
	78
	76
	77
	63
	90
	55
	106
	69
	68
	43
	40
	59
	101
	90
	42

48  
53  
105  
4  
102  
102  
103  
103  
67  
66  
65  
4  
85  
57  
74  
75  
64  
95  
19  
11  
12  
14  
16  
16  
15  
13  
18  
17  
54  
41  
60  
86  
87  
89  
88  
58  
30  
31  
56  
96  
82  
39  
81  
80  
80  
3  
7  
6  
9



8  
2  
4  
52  
51

)&<3<5 1 & ' > > < < 4 0)> - \* >4

accelerator	36
anti dependence	78
archive	19
arithmetic accelerator	37
average distance	50
bandwidth	91
barrier synchronization	81
batch job	63
benchmark	86
bisection	47
bisection bandwidth	98
bisection width	99
communication channel	43
computing node	29
computing subsystem	12
computing system	2
connectivity	96
cooling system	27
core	32
critical section	82
data dependence	76
data parallelism	74
decomposition	70
diameter	100
disk array	53
distance	49
efficiency	104
engineering systems	25
file subsystem	18
file system	51
Flynn's taxonomy	20
full bisection	97
functional decomposition	71
functional node	10
functional parallelism	75
general-purpose high-performance computing system	8
general-purpose processor	31
geometric decomposition	72
granularity	106
graphics processing unit (GPU)	38
hardware	28
heterogeneous high-performance computing system	7
high-performance computing (HPC)	1
high-performance computing system (HPCS)	3
high-performance computing system architecture	5
homogeneous high-performance computing system	6
hop	45

hot replacement	55
hot reserve	56
hybrid computing node	33
hybrid parallelization model	67
interconnect	39
interconnections subsystem	16
interconnections subsystem topology	44
just a bunch of disks (JBOD)	54
latency	90
link	42
load balance	107
load balancing	84
load disbalance	108
management and administration subsystem	13
mapping	85
message passing interface (MPI)	68
message passing parallelization model	65
MIMD (Multiple Instruction stream. Multiple Data stream) architecture	24
MISD (Multiple Instruction stream. Single Data stream) architecture	22
multiprocessor computer	4
node	46
NUMA architecture	35
occupied space	95
OpenMP	69
output dependence	79
parallel computing	61
parallel tile system	52
performance	87
port	41
power consumption	94
power efficiency	93
power supply system	26
power usage effectiveness (PUE)	92
process	58
process's context	59
processor (CPU)	30
race condition	73
real performance	89
resource manager	64
route	48
scalability	105
serial computing	62
service subsystem	15
shared memory parallelization model	66
SIMD (Single Instruction stream. Multiple Datastream) architecture	23
SISD (Single Instruction stream. Single Data stream) architecture	21
SMP architecture	34
special-purpose high-performance computing system	9
speedup	101

storage subsystem	17
strong scaling method	102
subsystem	11
switch	40
synchronization	80
system software	57
theoretical peak performance	88
thread {Light Weight Process}	60
true dependence	77
user access subsystem	14
vectorizing	83
weak scaling method	103

**35.240.50**

« 16.11.2020. 26.11.2020. 60>64 .  
 . . 2.32. .. . 2.00.  
,  
« \*

117416 . - . 31. . 2.  
www.gostinfo.ru nfo@goslnto.ru