

		5	2016—2020	
2016		4		12
15	2017	4		15
15	2018	4		20
20-40				6.25

1 1

1.1

1-2

3

5

5

1

1

1-2

2

2

2

1.

1.1

1.2 NVM TB

I/O

RDMA

TB

8

10μs

8

40GB/s ops 5000 /s ops

1000 /s ZB 1-3

1.3

CPU

CPU

CPU-GPU

CPU-GPU

GPU SM

kernel

8

16

GPU

CPU/GPU

GPU

2

CPU

5

1.4

6K6 E Ä, ' < • ? ÇGý+^ 3 Ý : * < ž, ° Ç C x ž Ő Á ^ ©Kd>, P
, ° ÇAx1Í315 c 6 ‹ Ê+^PÂA÷, ^ ® Á ÇAx1Í Ê+^CUE³ A, DGý
+^X86 : * < ž, ° Ç C x ž / Ê = = - . % , } 0 Ä 3 Ý : * < ž, °
Ç>û = ^ ÇAx1Í>, P, ° Ê+^73 Ñ >+iB-31 MI _, >ž 6 ^Q "j
© œ eAđ ½ >

1.6 | ¢P§ B, ° Ç | ¢ c ù °731x* < ¶ e D © & ' §] ©Kd
¶ e2± µ

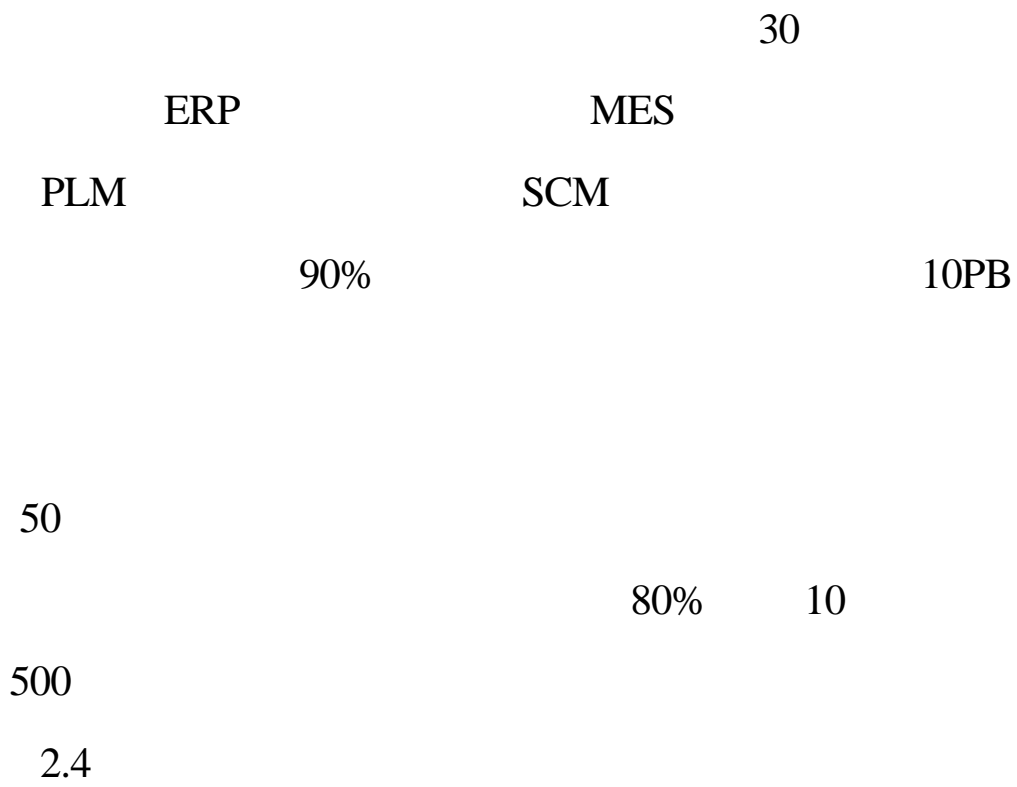
.J0¬ » ĩ Æ.J0¬C»]?ú W Ç | ¢ c ùF >, | ¢, °1x* < ĩ# Ç
.J0¬ 0 ÄF >, | ¢, ° Ç | ¢ c ùF >, Aú f DN°#• ¶ e, Ô)æ | ¢
P§ B, ° Ç | ¢ c ùF >, 2ô ü LAú f DN°#• Ç.J0¬ | ¢P§ B, °]?ú
W Ç | ¢ c ùCz\$Æ °73B9 Ü D1x* < ¶ e ÇM~ G ® ÁN¼, .J0¬ Ê
+^ 2 G, ° Ç ' #w °731x* < DB9 Ü ¶ e, ÑQ 73 ~ =Q C xC^
H, ° Ç ' #w Ê+^ C x Ç.JI Ç | ¢ c ù °73G 5" =F 5*1x* < D
C x73 Ñ LÒ315, ¬ 6 ‹p99 Ê+^ >

69 n = = Æ ~ F °73 L, ° Ç | ¢ c ù315 F >, Aú f =>, pN°
#• =Cz\$ÆB9 Ü = ' #w1x* < D315 F 5*, ° ©Kd ¶ e %31 Ç Ç ' ,
#w Â Ç C xB-"x, ° Ū)½" % f q#w"j © } 20% @, % Cé+^
m ^, L* Â F b1• P ĩM~, ° \$ 8 LM6"x Ç.JI, ° Ç | ¢ c ù °73
1x* <315 ^ | w = &H 4Ý C x ž?ú W, ° Ç | ¢ c ù 6 ‹p99 Ê
+^ Ç+iB-31 MI _, >ž 6 ^Q "j © œ eAđ ½, ¬ Â F9 " 3ì
= ü ´F7 x0u µ L 3L{ = ü ~ >

2.

2.1

1000
2 100
3
1000 100
10
70% 70%
50%
2.3



-

10

80%

80%

3-5

2.5

100

100

1

1000

10

20%

10

100

— 10 —

3.

3.1

50%

1

80%

5

90%
90% 3
3

	Android	Linux
OpenStack /		
10	100	1000

4.2

20m²

60fps

90%

90%

5

3

95%

150