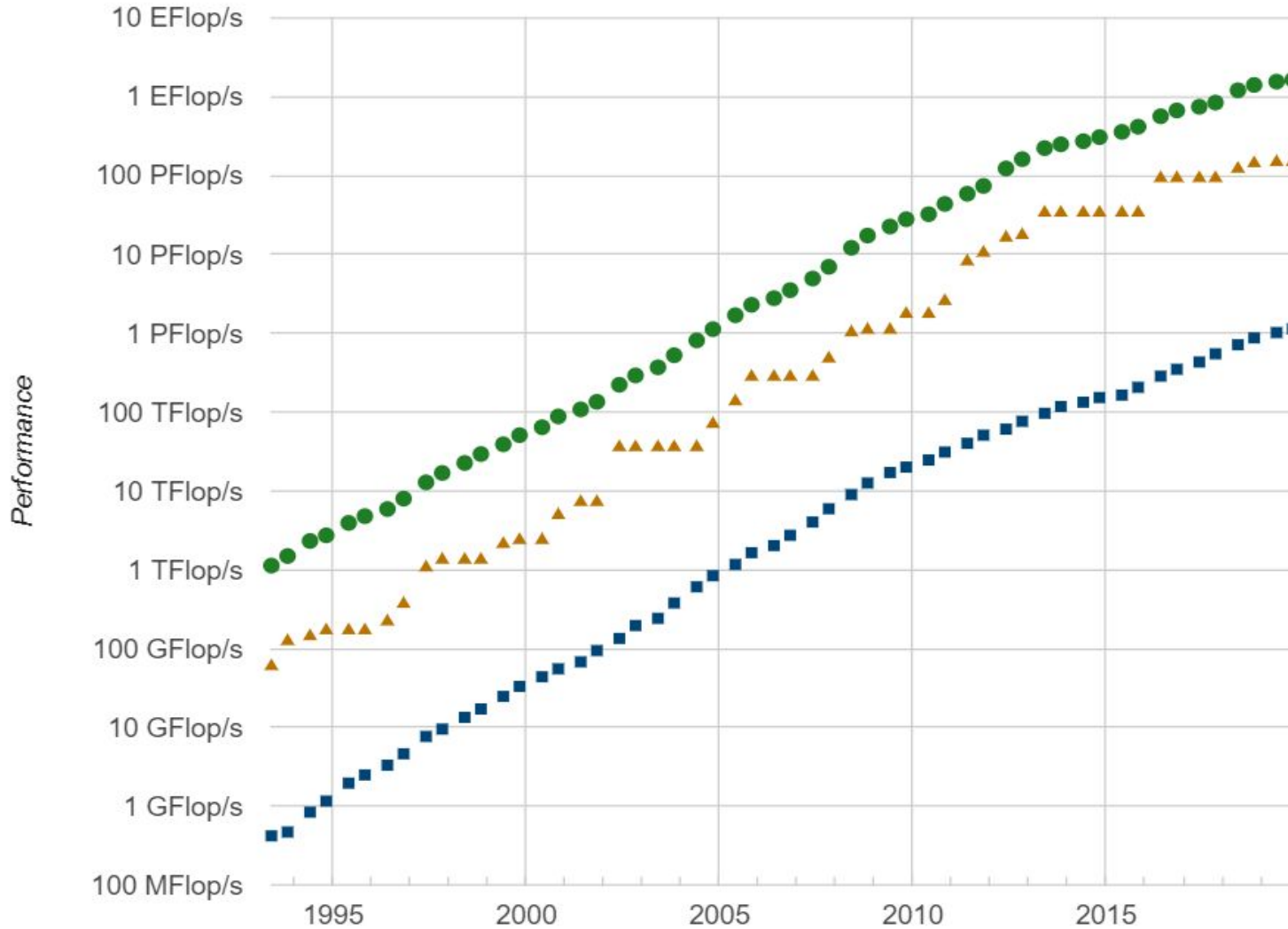


Performance Development



top8: <https://www.top500.org/statistics/sublist/>

R	System	Cores	Rmax Tflops/s	Rpeak Tflops/s	Power kW
1	Summit - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband , IBM DOE/SC/Oak Ridge National Laboratory United States	2,414,592	148,600.0	200,794.9	10,096
2	Sierra - IBM Power System AC922, IBM POWER9 22C 3.1GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband , IBM / NVIDIA / Mellanox DOE/NNSA/LLNL United States	1,572,480	94,640.0	125,712.0	7,438.3
3	Sunway TaihuLight - Sunway MPP, Sunway SW26010 260C 1.45GHz, Sunway , NRCPC National Supercomputing Center in Wuxi China	10,649,600	93,014.6	125,435.9	15,371
4	Tianhe-2A - TH-IVB-FEP Cluster, Intel Xeon E5-2692v2 12C 2.2GHz, TH Express-2, Matrix-2000 , NUDT National Super Computer Center in Guangzhou China	4,981,760	61,444.5	100,678.7	18,482
5	Frontera - Dell C6420, Xeon Platinum 8280 28C 2.7GHz, Mellanox InfiniBand HDR - Dell C6420, Xeon Platinum 8280 28C 2.7GHz, Mellanox InfiniBand HDR, Dell EMC Texas Advanced Computing Center/Univ. of Texas United States	448,448	23,516.4	38,745.9	
6	Piz Daint - Cray XC50, Xeon E5-2690v3 12C 2.6GHz, Aries interconnect , NVIDIA Tesla P100 , Cray/HPE Swiss National Supercomputing Centre (SCS) Switzerland	387,872	21,230.0	27,154.3	2,384.2
7	Trinity - Cray XC40, Xeon E5-2698v3 16C 2.3GHz, Intel Xeon Phi 7250 68C 1.4GHz, Aries interconnect , Cray/HPE DOE/NNSA/LANL/SNL United States	979,072	20,158.7	41,461.2	7,578.1
8	AI Bridging Cloud Infrastructure (ABCI) - PRIMERGY CX2570 M4 - Xeon Gold 6148 20C 2.4GHz, NVIDIA Tesla	391,680	19,880.0	32,576.6	1,649.3

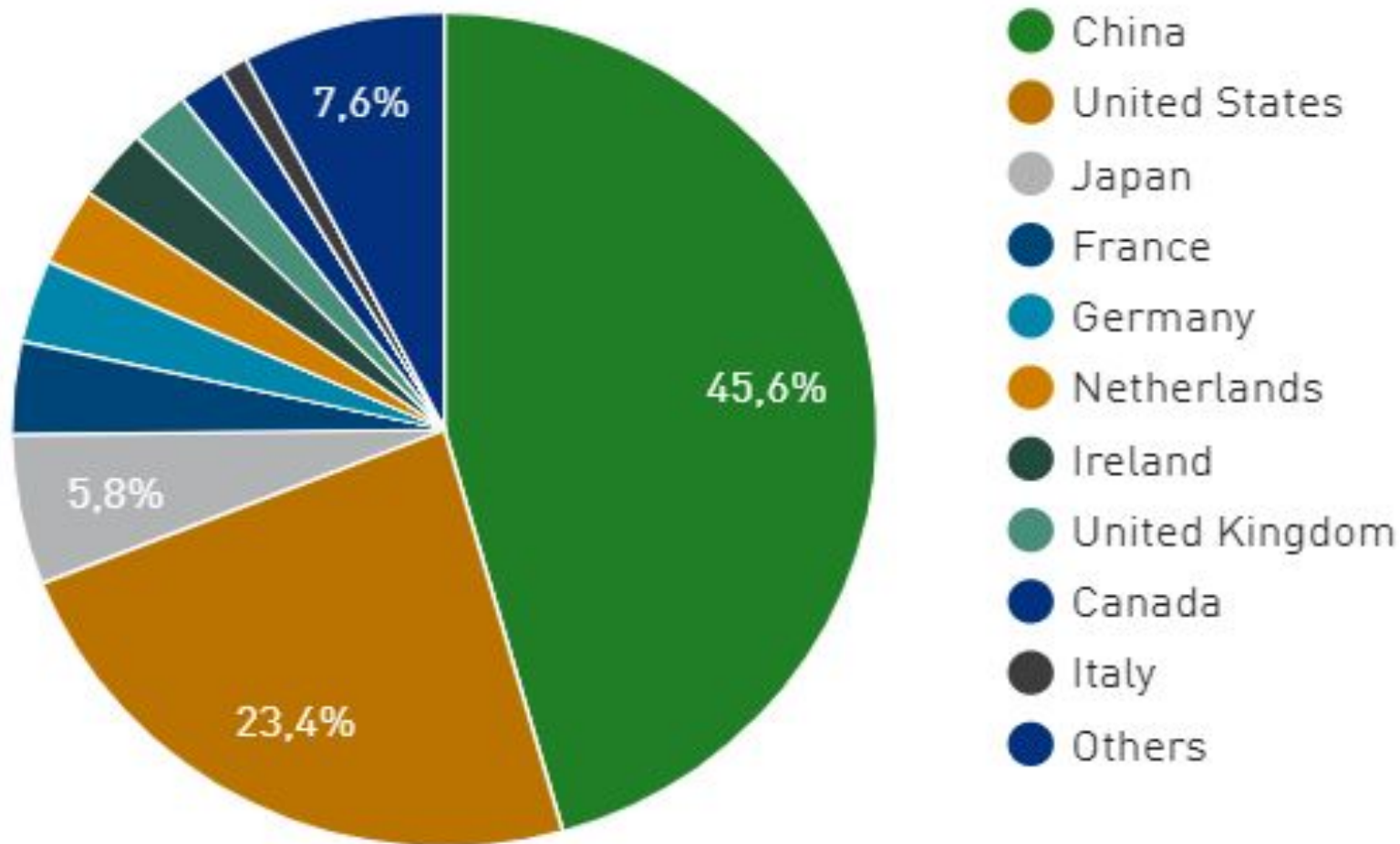
Тесты с использованием Math Kernel Library

Linpack benchmark using the Intel MKL optimizations

Processor	Brief Spec	Linpack (GFLOPS)
Core i7 5960X (Haswell E)	8 core @ 3.0GHz AVX2	354
Dual Xeon E5 2687W	16 cores @ 3.2GHz AVX	345
Core i7 5930K (Haswell E)	6 cores @ 3.5GHz AVX2	289
Dual Xeon E5 2650	16 cores @ 2.0GHz AVX	262
Core i7 4770K (Haswell)	4 cores @ 3.5GHz AVX2	182
Xeon E3 1245v3 (Haswell)	4 cores @ 3.4GHz AVX2	170
Core -7 4960X (Ivy Bridge)	6 cores @ 3.6GHz AVX	165
Core i5 3570 (Ivy Bridge)	4 cores @ 3.4GHz AVX	105
Core i7 920	4 cores @ 2.66GHz SSE4.2	40

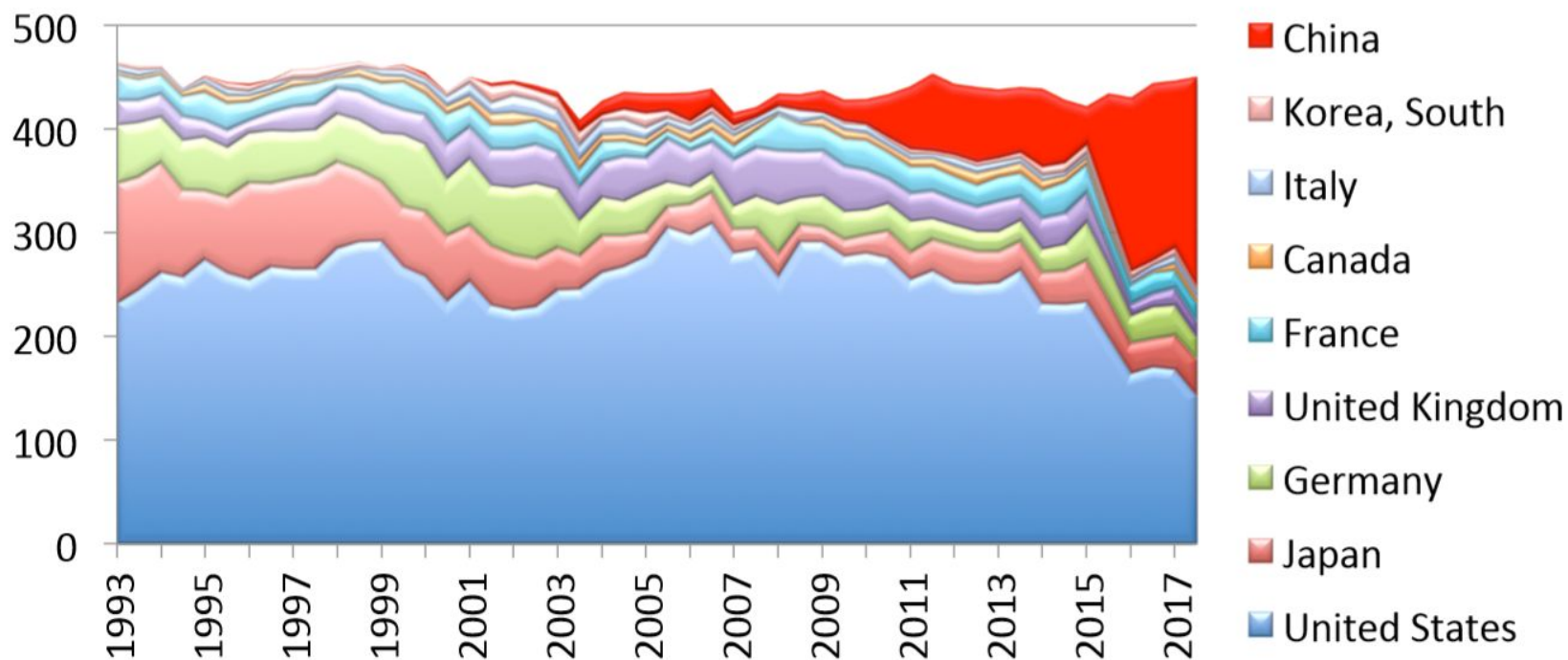
Распределение TOP-500 2019 по странам

Countries System Share



Динамика распределения суперкомпьютеров по странам

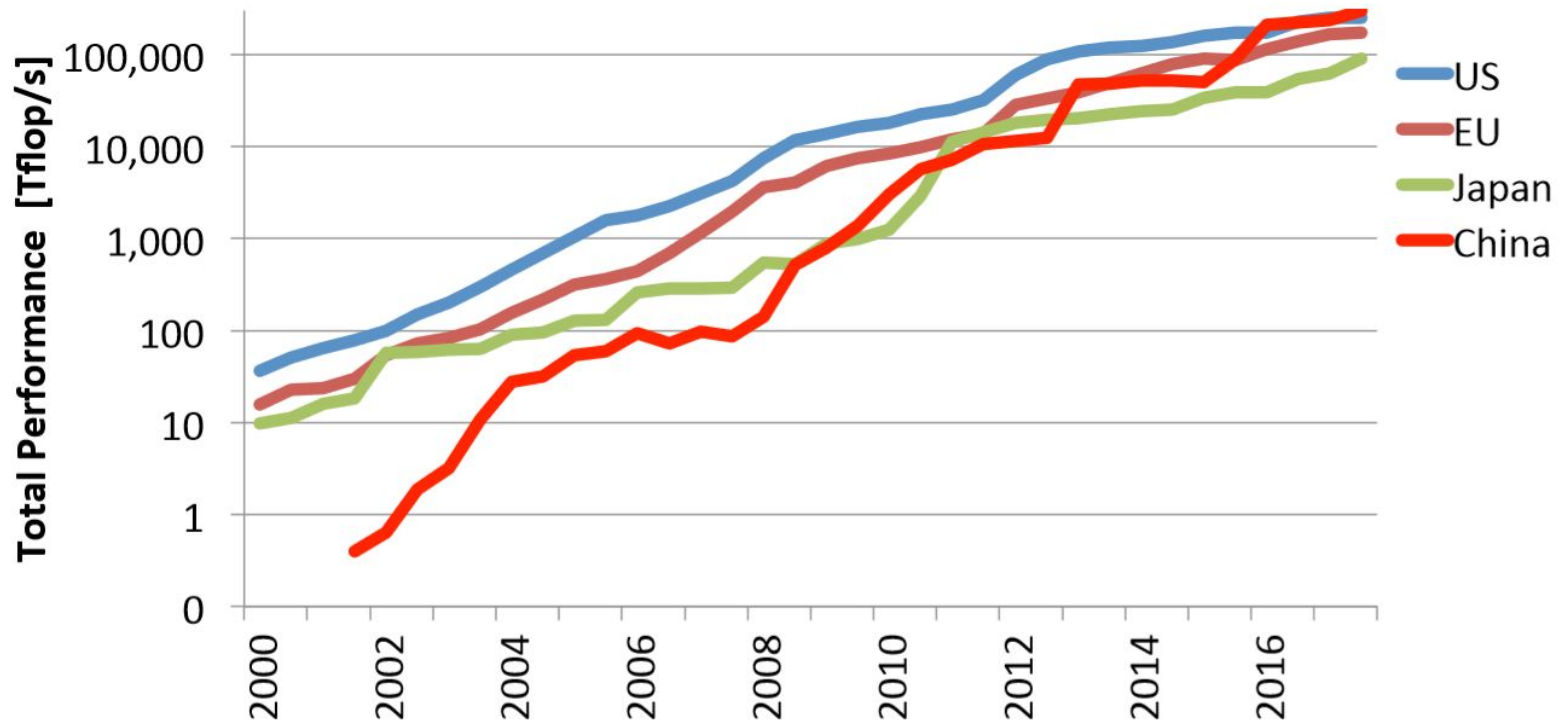
COUNTRIES



Динамика роста суммарной производительности суперкомпьютеров стран-лидеров top500

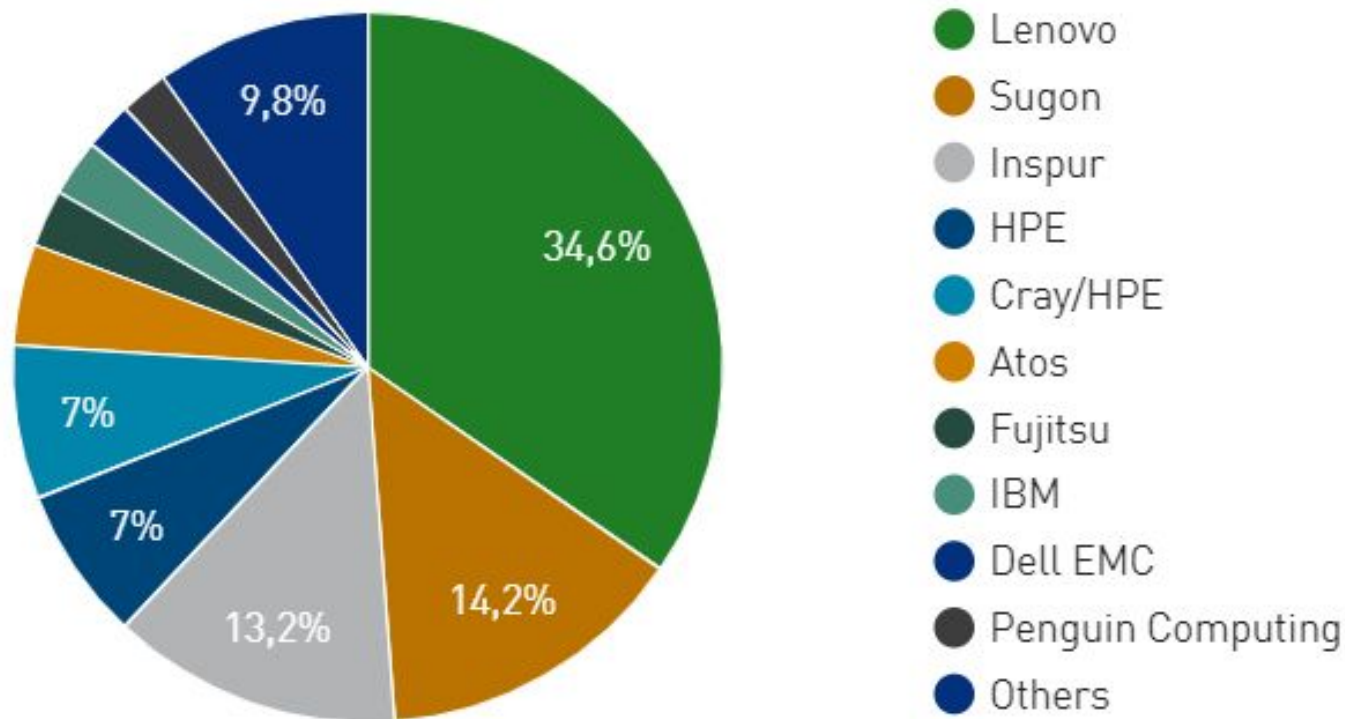
PERFORMANCE OF COUNTRIES

TOP 500



Продавцы самых мощных компьютеров

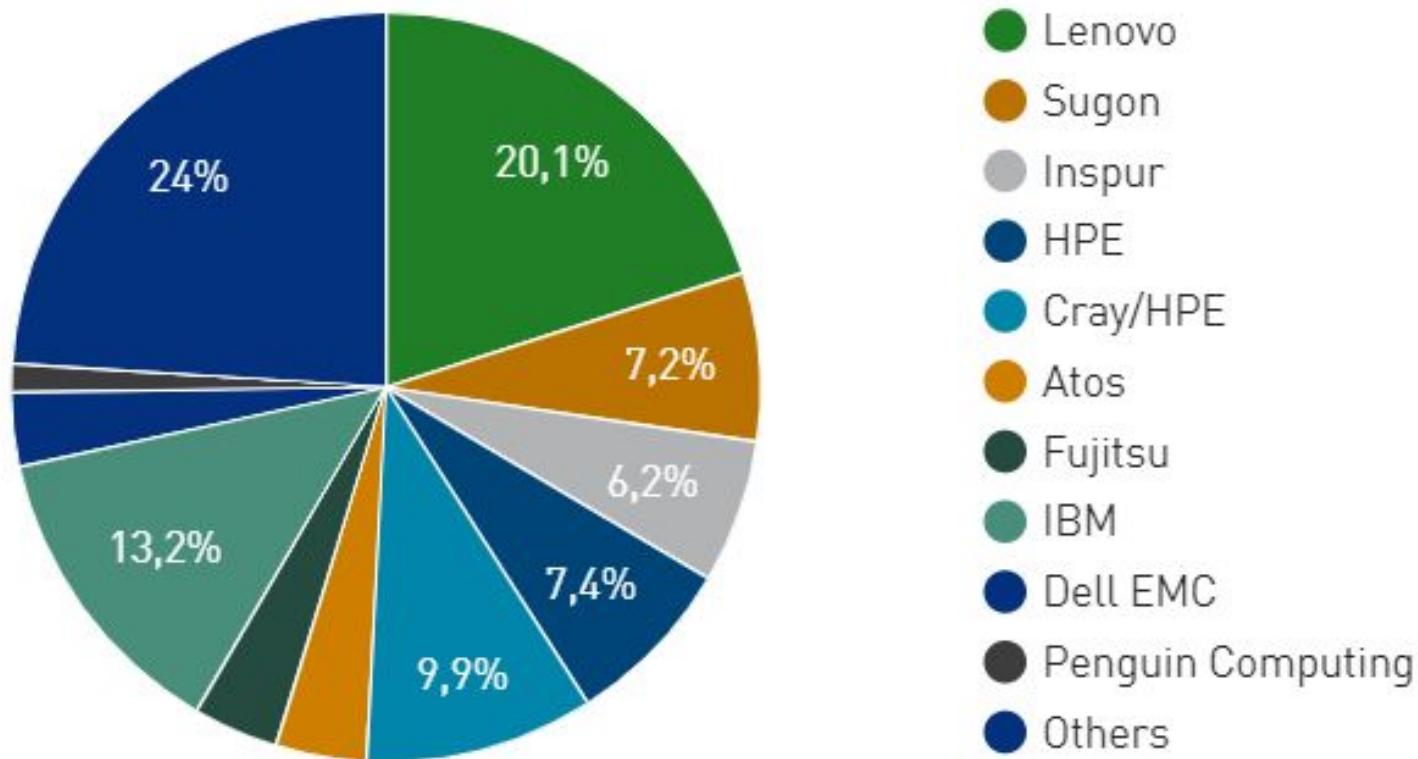
Vendors System Share



Китай: Lenovo, Sugon, Inspur

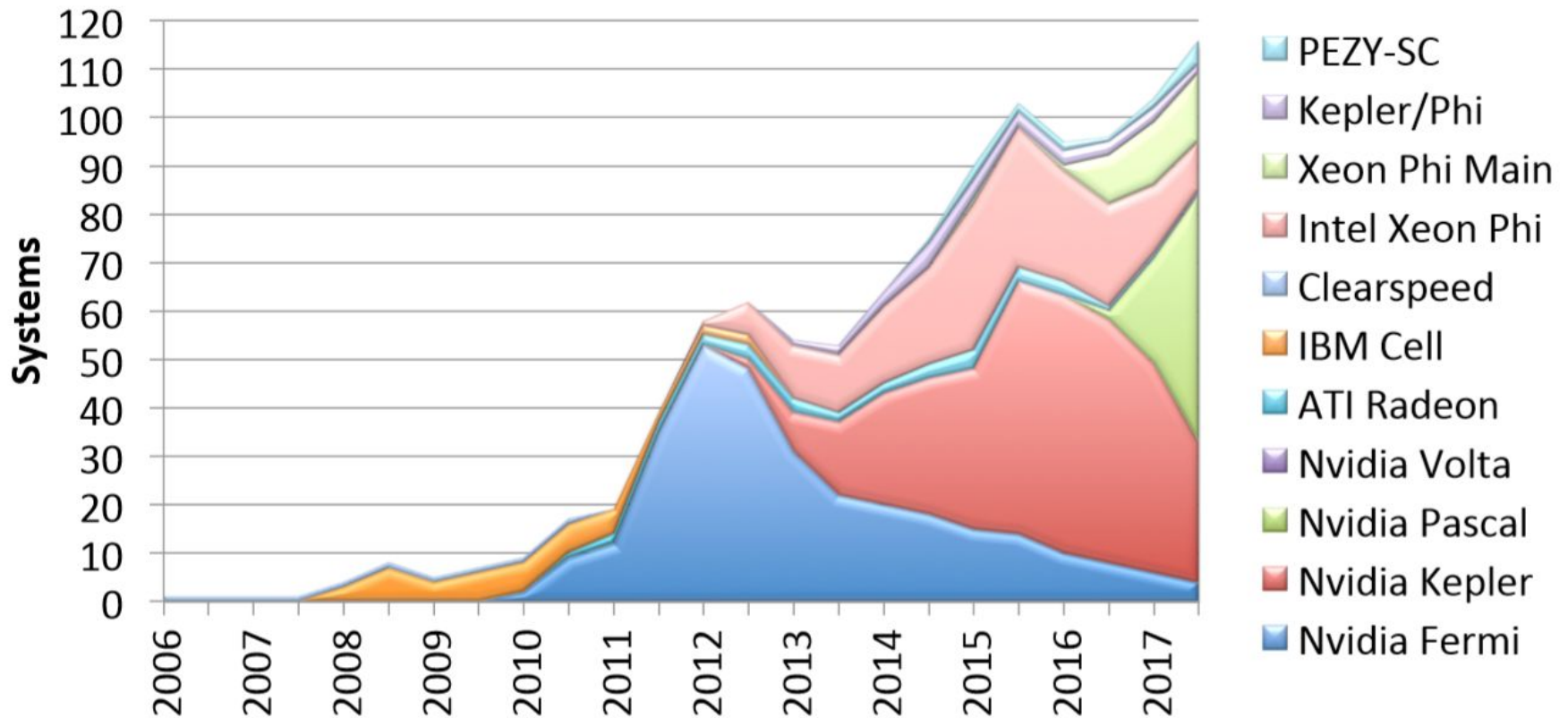
Продавцы top50 (мощность компьютеров)

Vendors Performance Share

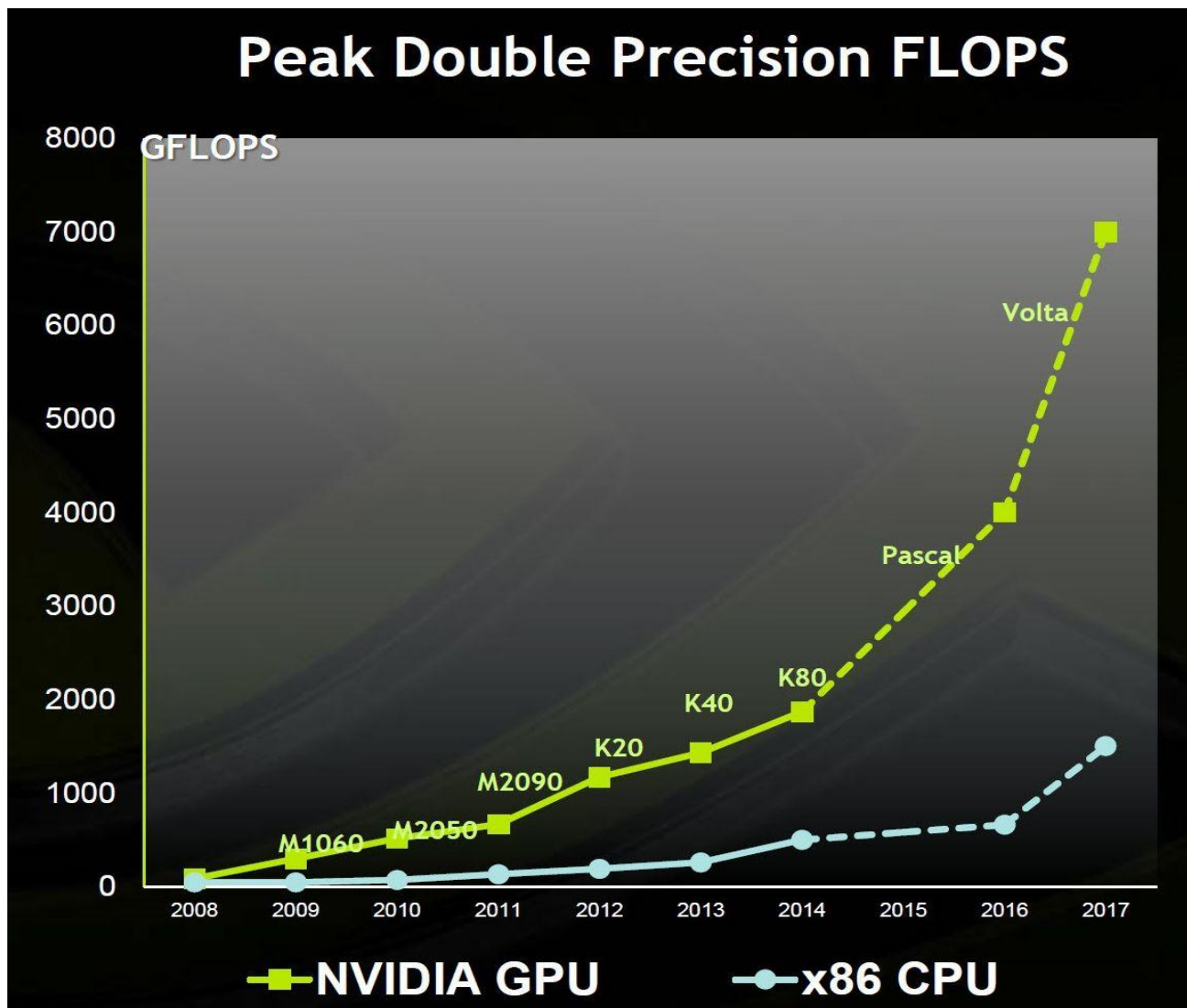


Применение ускорителей

ACCELERATORS



Сравнение роста производительности CPU и GPU (Volta – 21 млрд. транзисторов, 18-ядерный I9-7980XE – 6 млрд)



Результаты теста Linpack для процессоров широкая потребность

№	Наименование	Цена (руб.)	GFlops
1	CPU Intel Core i9-7940X 3.1 GHz/14core/14+19.25Mb/165W/	97374	148.50
3	CPU Intel Core i9-7900X 3.3 GHz/10core/10+13.75Mb/140W/8 GT/s	66130	126.90
6	CPU AMD Ryzen 1950X 3.4 GHz/16core/8+32Mb/180W	76829	124.10
10	CPU Intel Core i7-6950X 3.0 GHz/10core/2+25Mb/140W	108983	112.90
11	CPU Intel Core i7-7820X 3.6 GHz/8core/8+11Mb/140W/8 GT/s	41545	109.36
13	CPU Intel Core i7-7820X 3.6 GHz/8core/8+11Mb/140W/8 GT/s	42171	107.26
17	CPU Intel Core i7-6900K 3.2 GHz/8core/2+20Mb/140W	56341	97.22
18	CPU Intel Core i7-6900K 3.2 GHz/8core/2+20Mb/140W	66813	97.22
25	CPU AMD Ryzen 1900X 3.8 GHz/ 8core/4+16Mb/180W	36707	85.82
26	CPU Intel Core i7-7800X 3.5 GHz/6core/6+8.25Mb/140W/8 GT/s	25724	84.31
27	CPU Intel Core i7-7800X 3.5 GHz/6core/6+8.25Mb/140W/8 GT/s	27147	84.31
30	CPU Intel Core i7-6850K 3.6 GHz/6core/1.5+15Mb/140W	28228	81.72
33	CPU Intel Core i7-5960X 3.0 GHz/8core/2+20Mb/140W/5 GT/s	45472	81.38
35	CPU Intel Core i5-8600K 3.6 GHz/6core/ 1.5+9Mb/95W/8 GT/s	19008	80.65
•	CPU Intel Core i5-2500 3.3 GHz/4core/ 1+6Mb/95W/5 GT/s (2011 год)	6500	80.6 AVX 43.8 без AVX