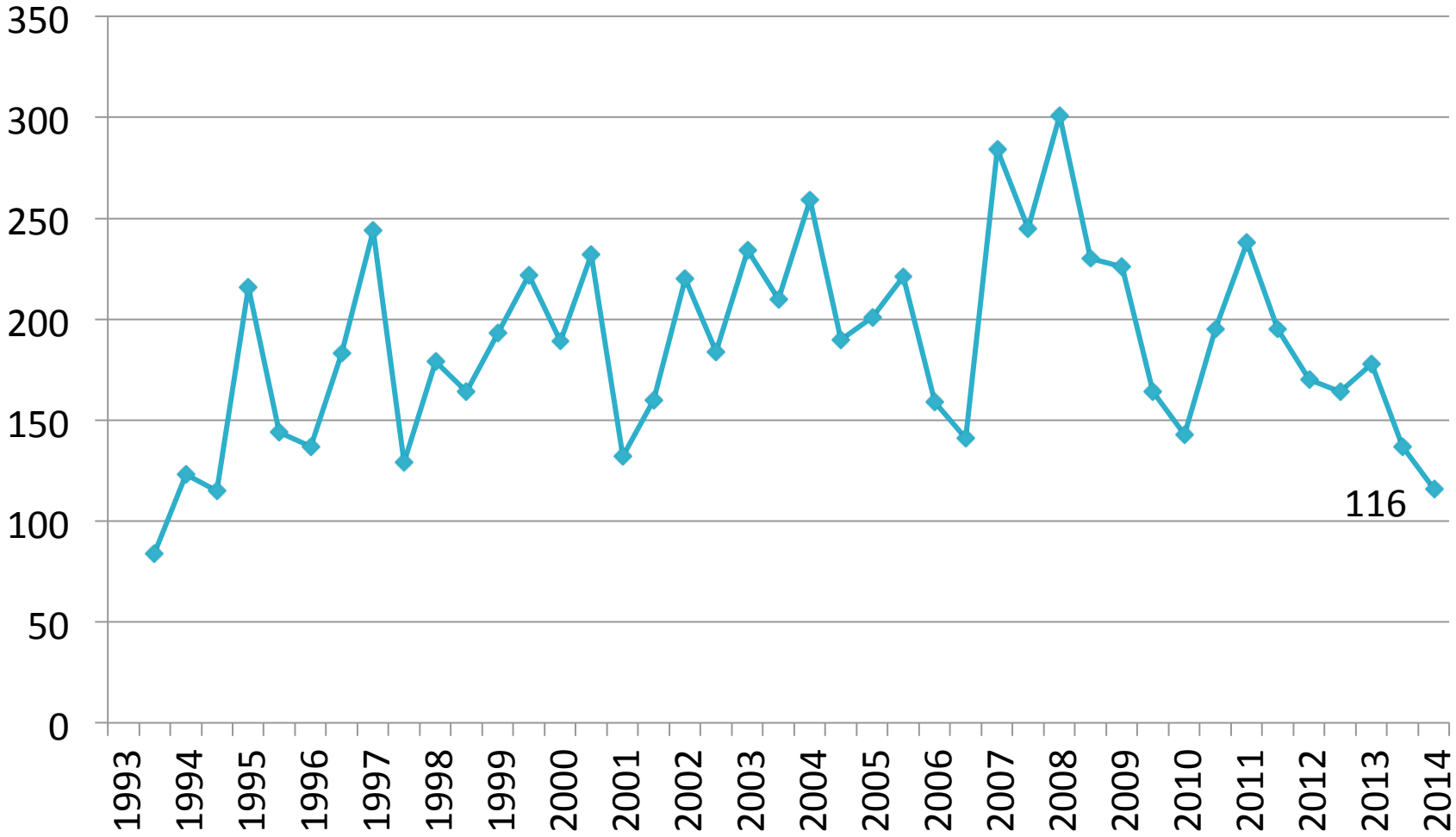
Analysis of the 43rd TOP500 List for Technology and Power Trends

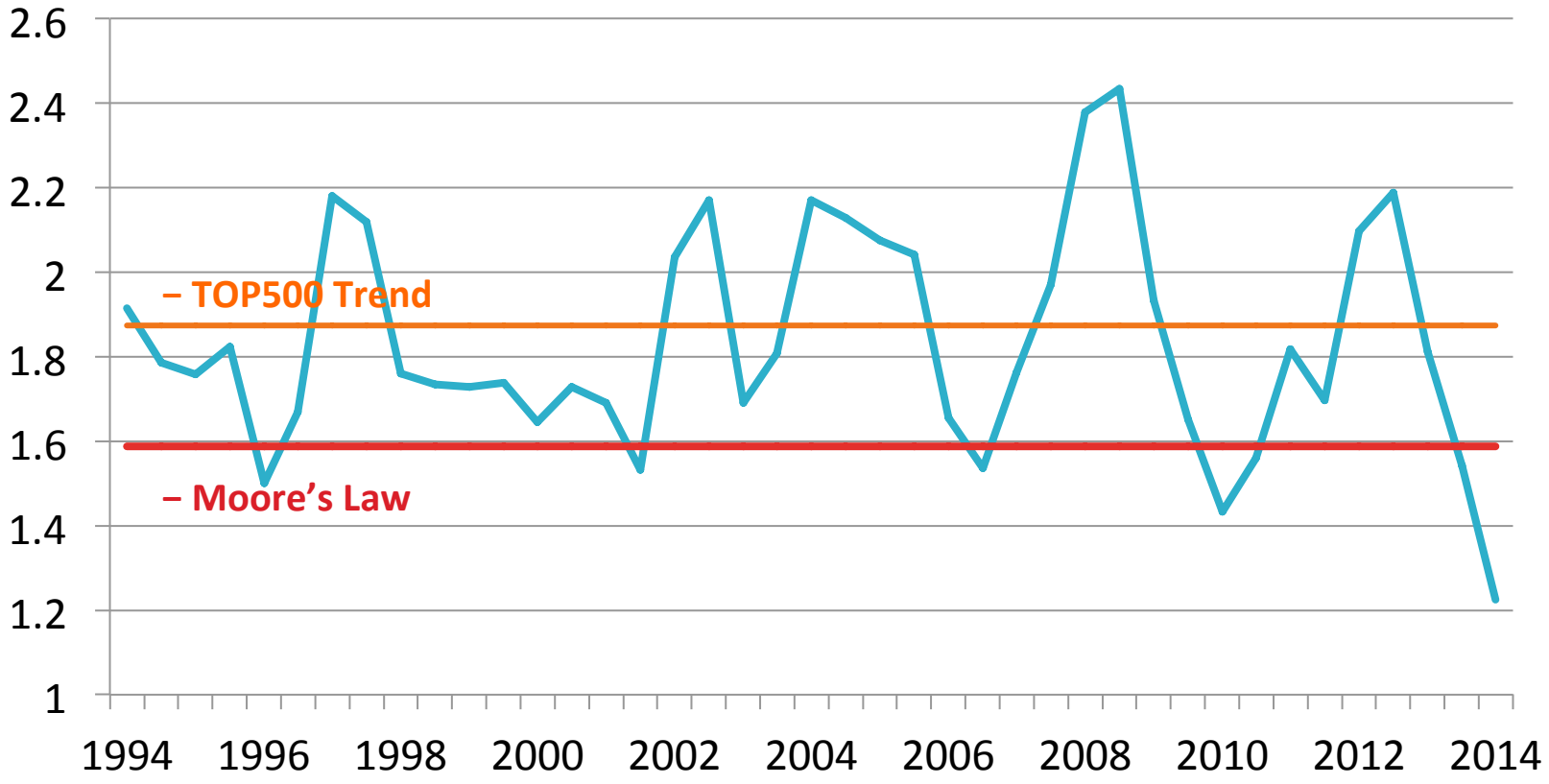
ISC'14, Leipzig, Germany

#	Site	Manufacturer	Computer	Country	Cores	Rmax [Pflops]	Power [MW]
1	National University of Defense Technology	NUDT	Tianhe-2 NUDT TH-IVB-FEP, Xeon 12C 2.2GHz, IntelXeon Phi	China	3,120,000	33.9	17.8
2	Oak Ridge National Laboratory	Cray	Titan Cray XK7, Opteron 16C 2.2GHz, Gemini, NVIDIA K20x	USA	560,640	17.6	8.21
3	Lawrence Livermore National Laboratory	IBM	Sequoia BlueGene/Q, Power BQC 16C 1.6GHz, Custom	USA	1,572,864	17.2	7.89
4	RIKEN Advanced Institute for Computational Science	Fujitsu	K Computer SPARC64 VIIIfx 2.0GHz, Tofu Interconnect	Japan	795,024	10.5	12.7
5	Argonne National Laboratory	IBM	Mira BlueGene/Q, Power BQC 16C 1.6GHz, Custom	USA	786,432	8.59	3.95
6	Swiss National Supercomputing Centre (CSCS)	Cray	Piz Daint Cray XC30, Xeon E5 8C 2.6GHz, Aries, NVIDIA K20x	Switzer-land	115,984	6.27	2.33
7	Texas Advanced Computing Center/UT	Dell	Stampede PowerEdge C8220, Xeon E5 8C 2.7GHz, Intel Xeon Phi	USA	462,462	5.17	4.51
8	Forschungszentrum Juelich (FZJ)	IBM	JuQUEEN BlueGene/Q, Power BQC 16C 1.6GHz, Custom	Germany	458,752	5.01	2.30
9	Lawrence Livermore National Laboratory	IBM	Vulcan BlueGene/Q, Power BQC 16C 1.6GHz, Custom	USA	393,216	4.29	1.97
10	Government	Cray	Cray XC30, Xeon E5 12C 2.7GHz, Aries	USA	225,984	3.14	

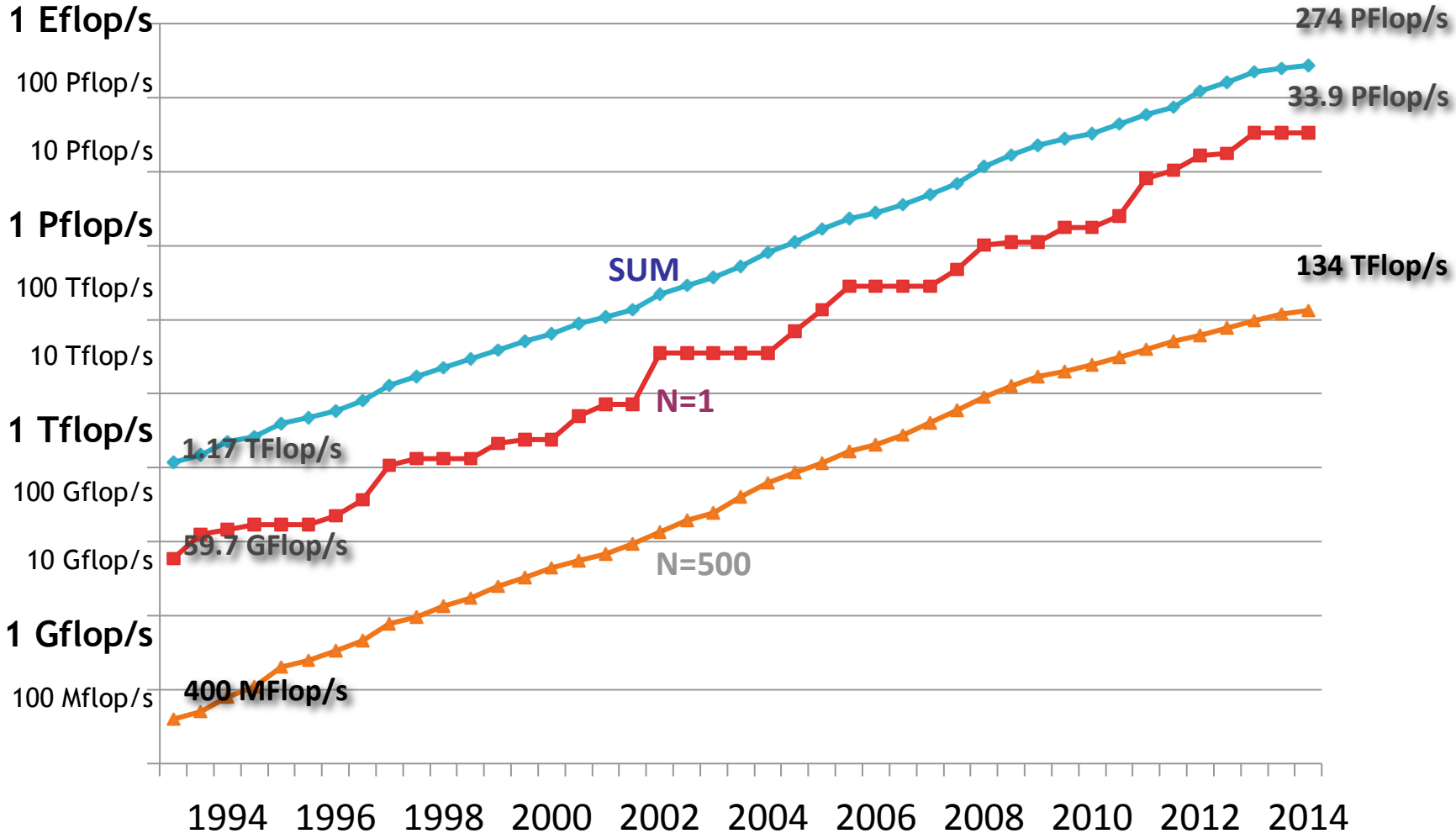
Replacement Rate



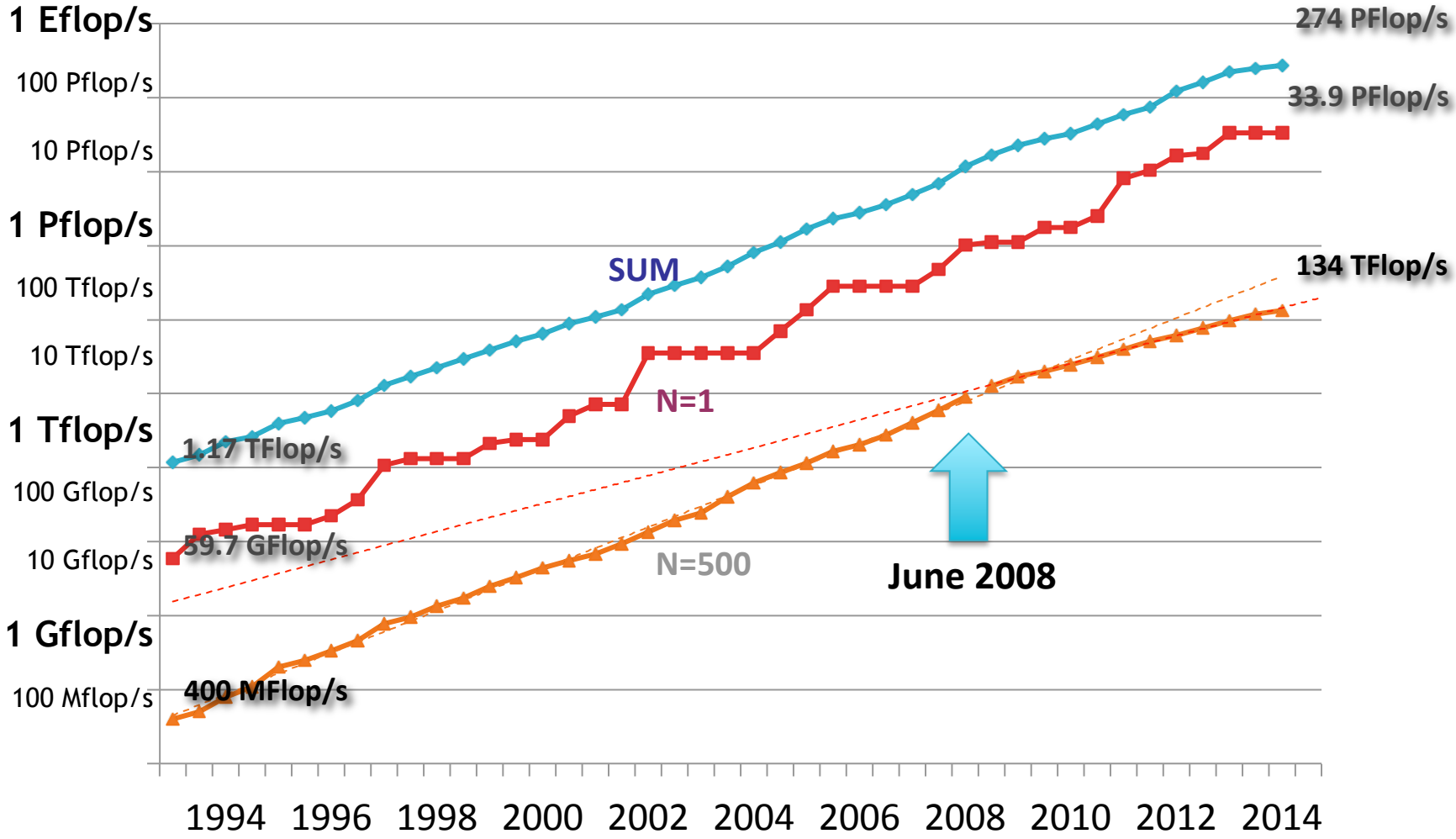
Annual Performance Increase of the TOP500



Performance Development

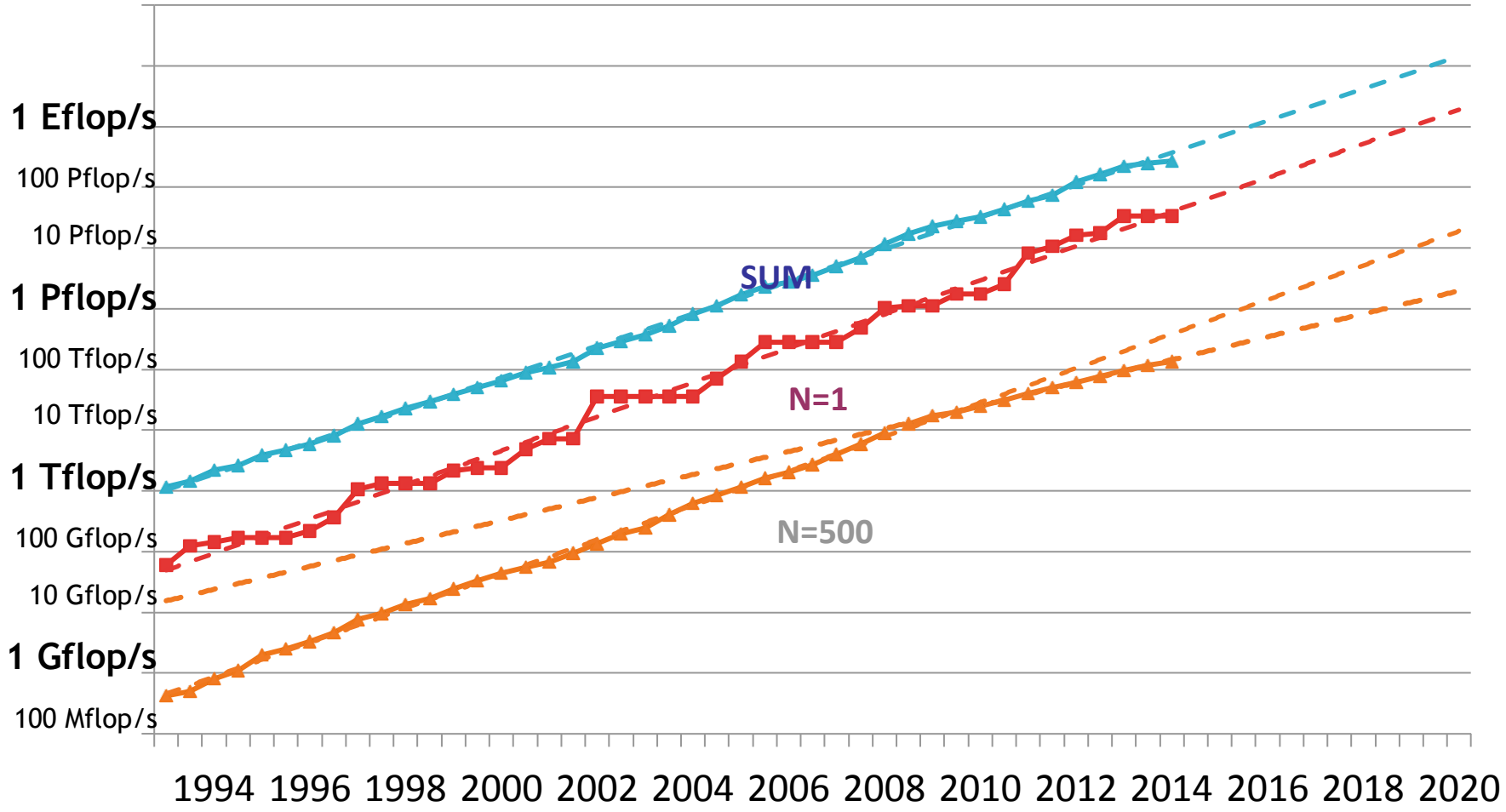


Performance Development

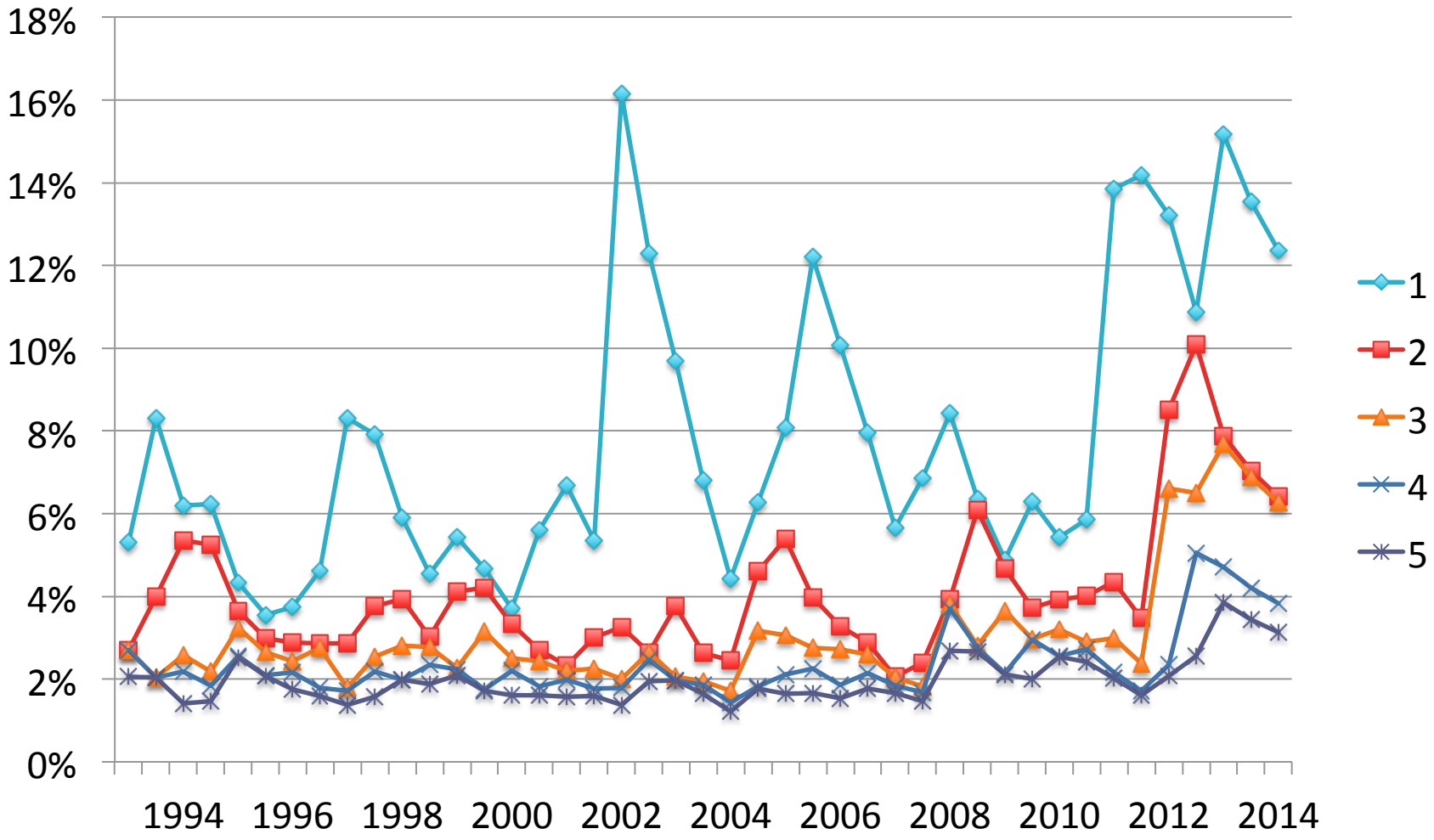


TOP500® SUPERCOMPUTER SITES

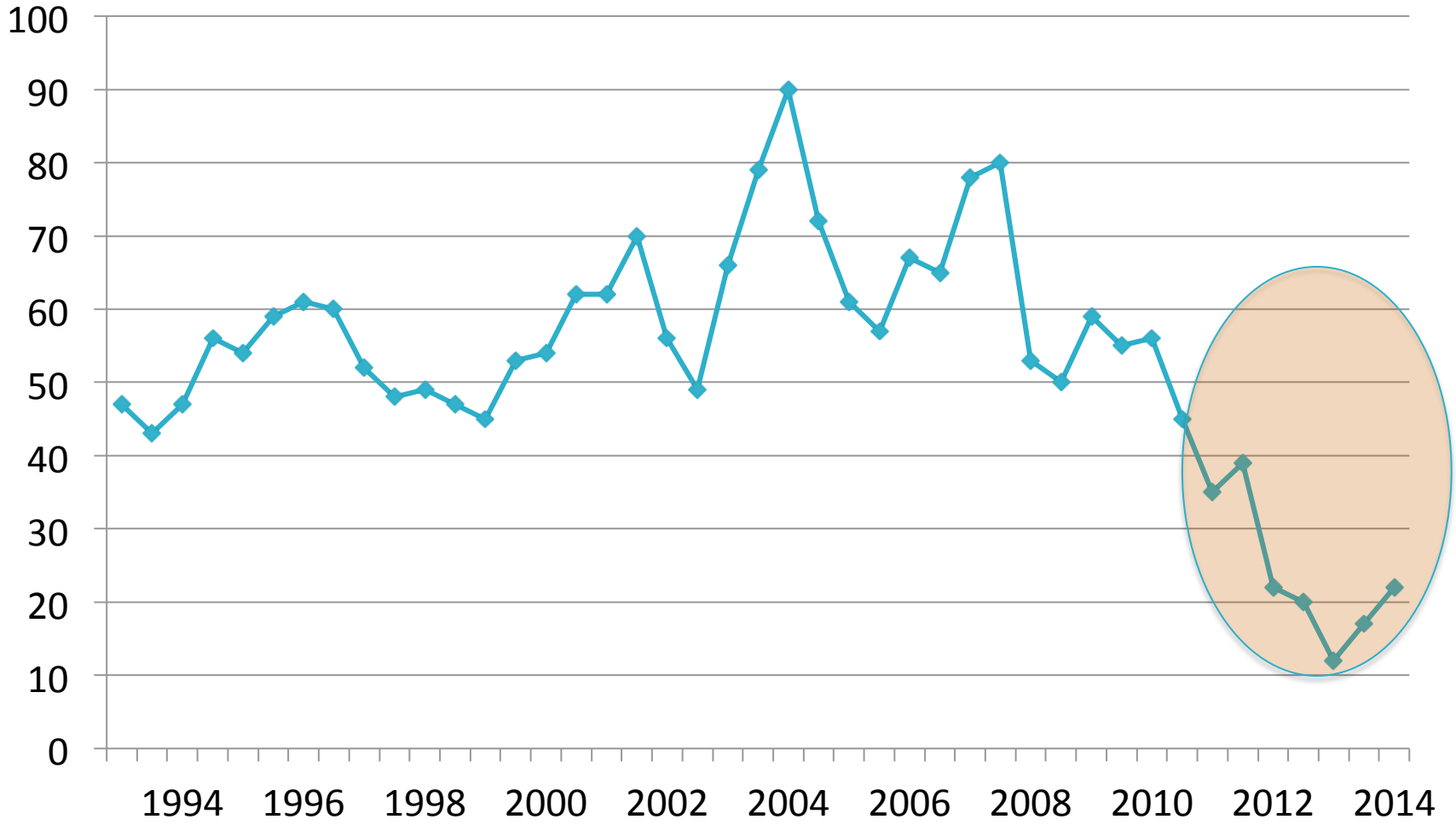
Projected Performance Development



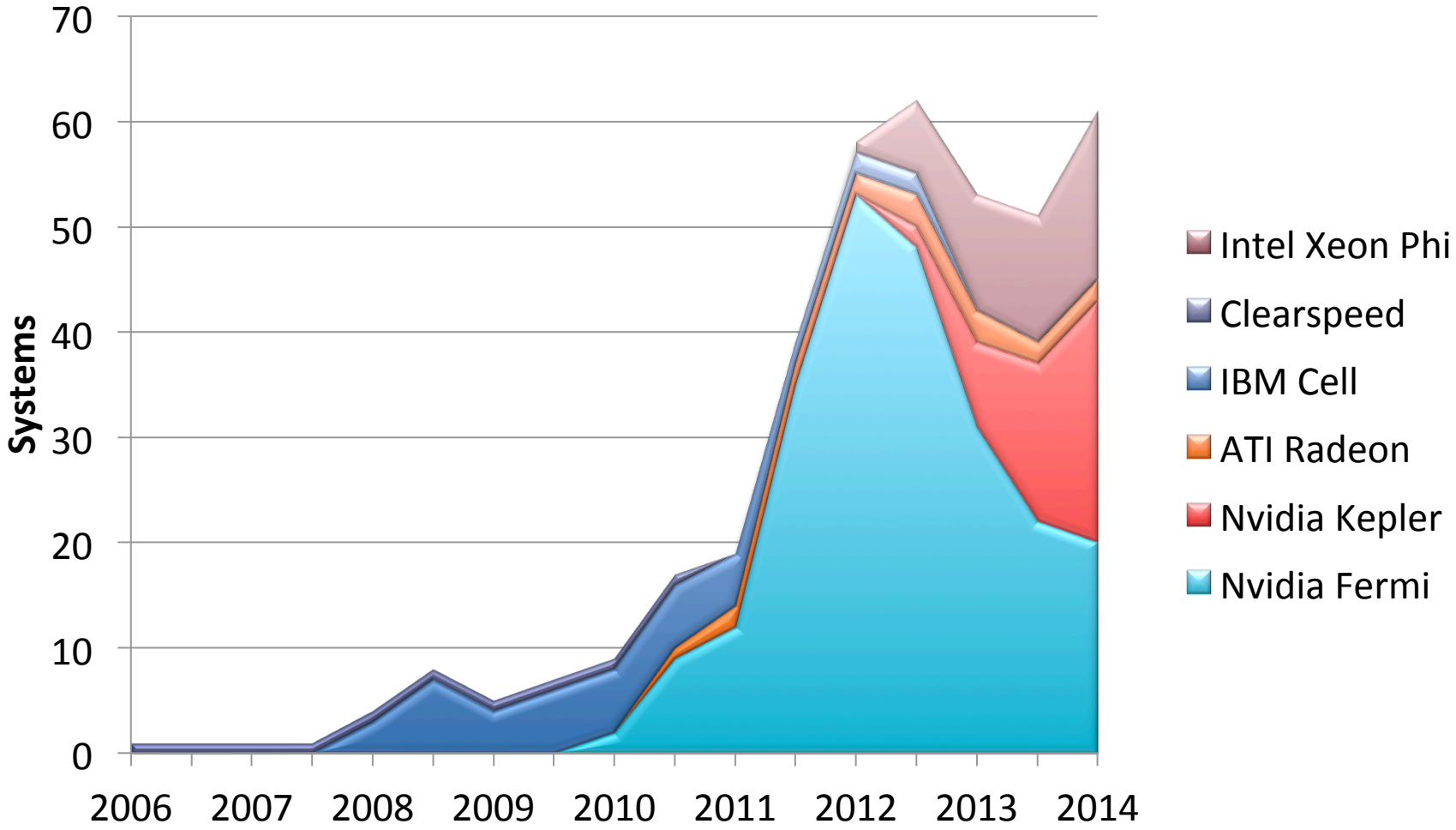
Performance Fraction of TOP5 Systems



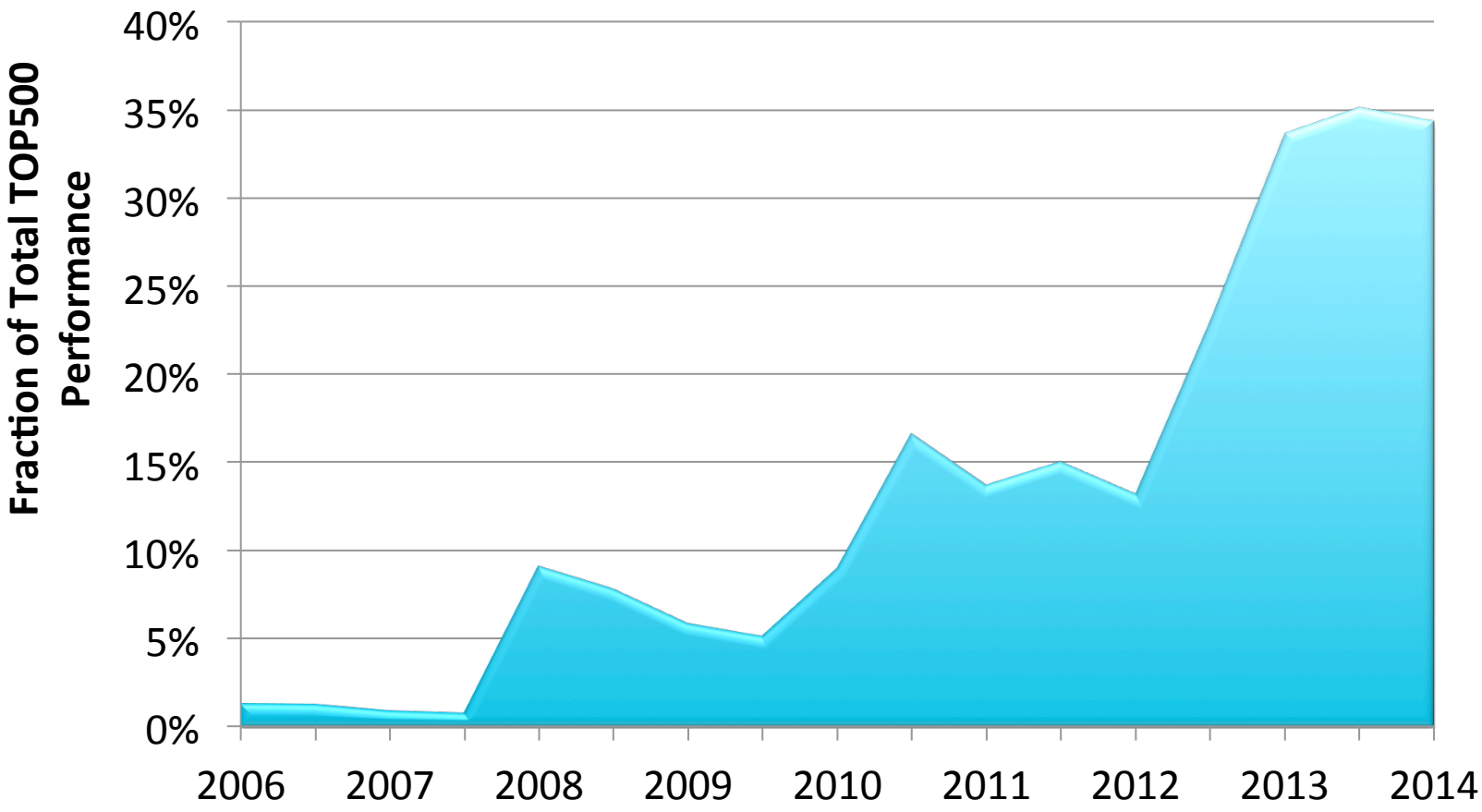
Rank at which
Half of total Performance is accumulated



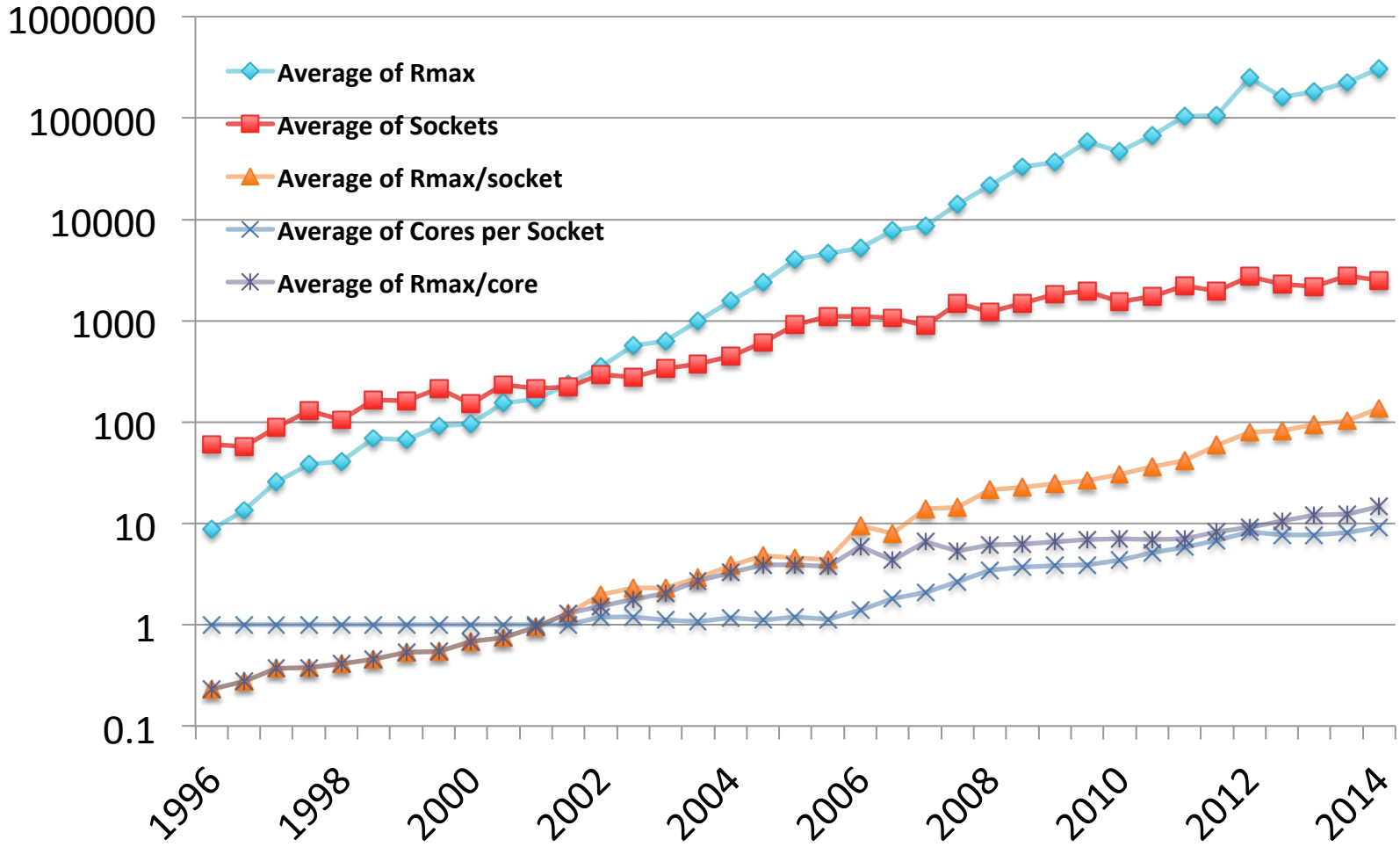
Accelerators



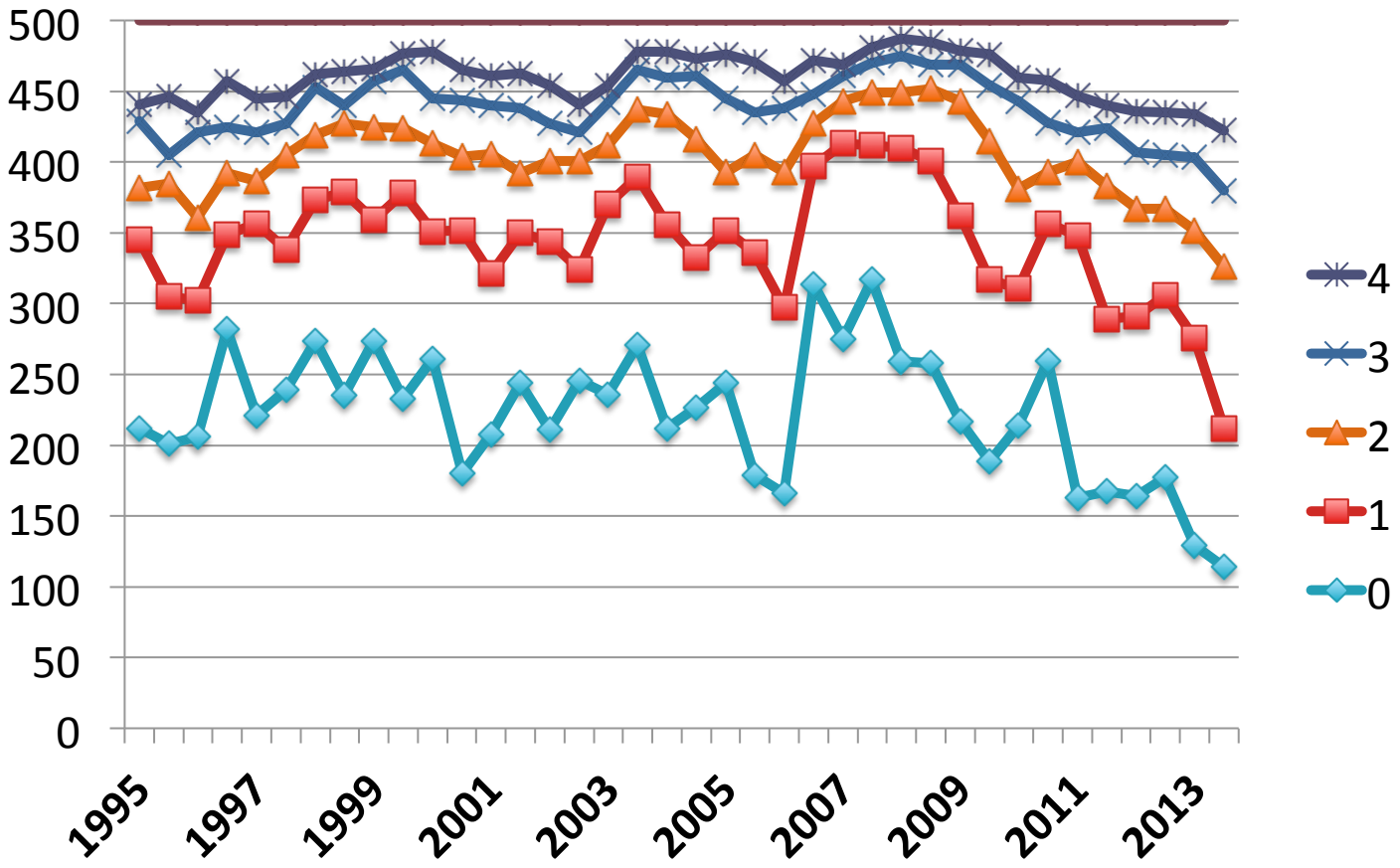
Performance Share of Accelerators



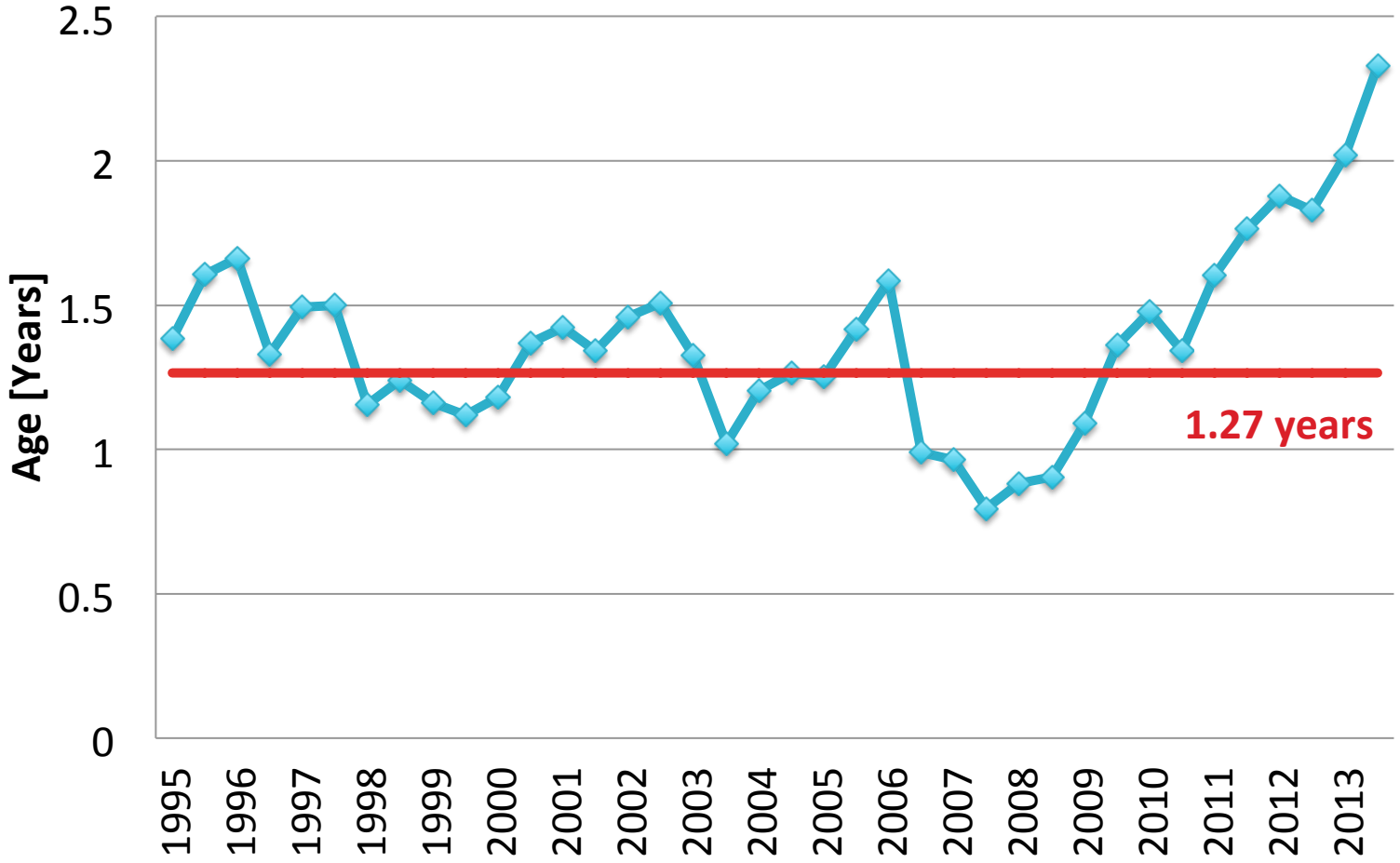
Technological Trends



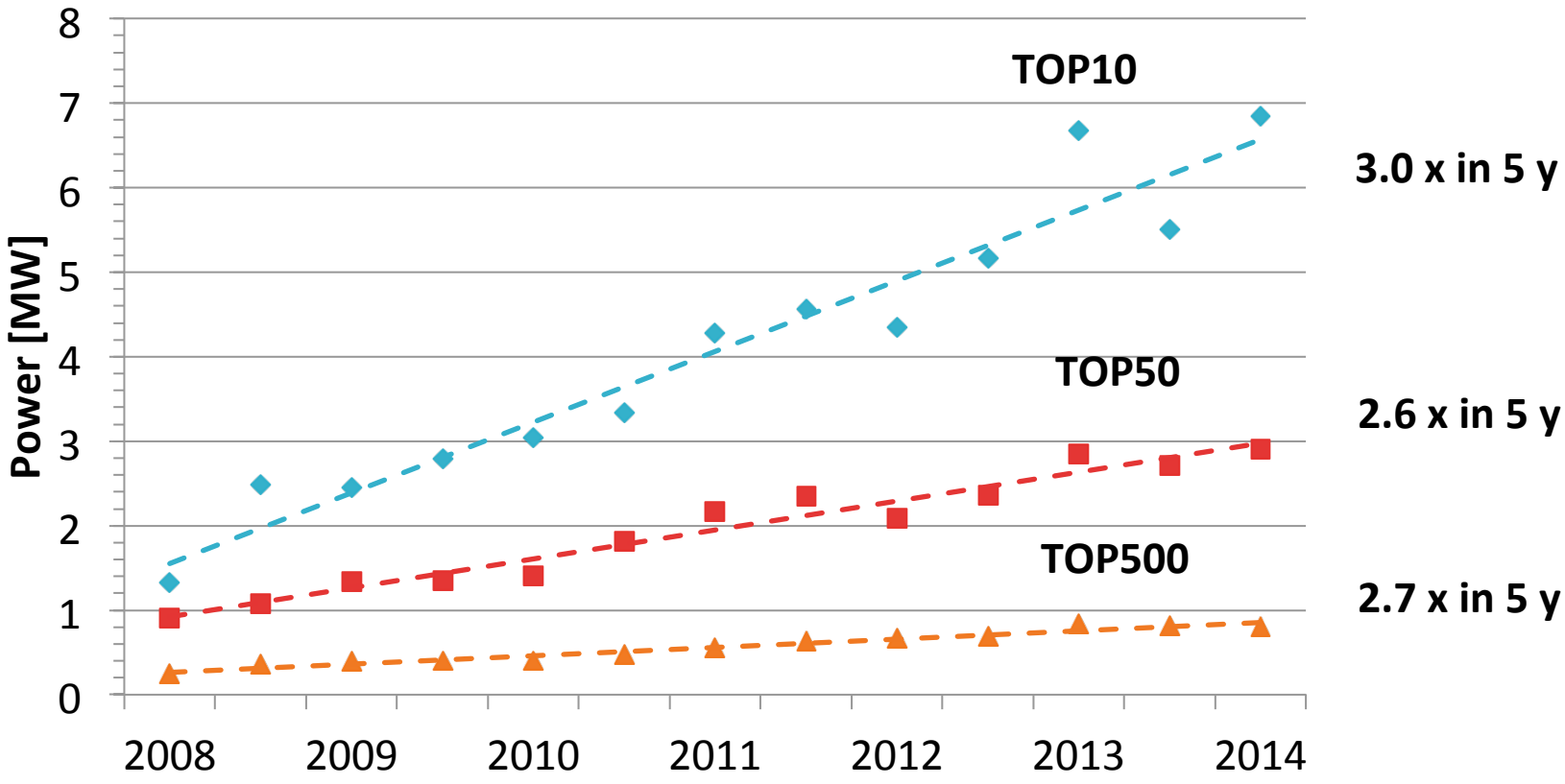
System Age (in List Count)



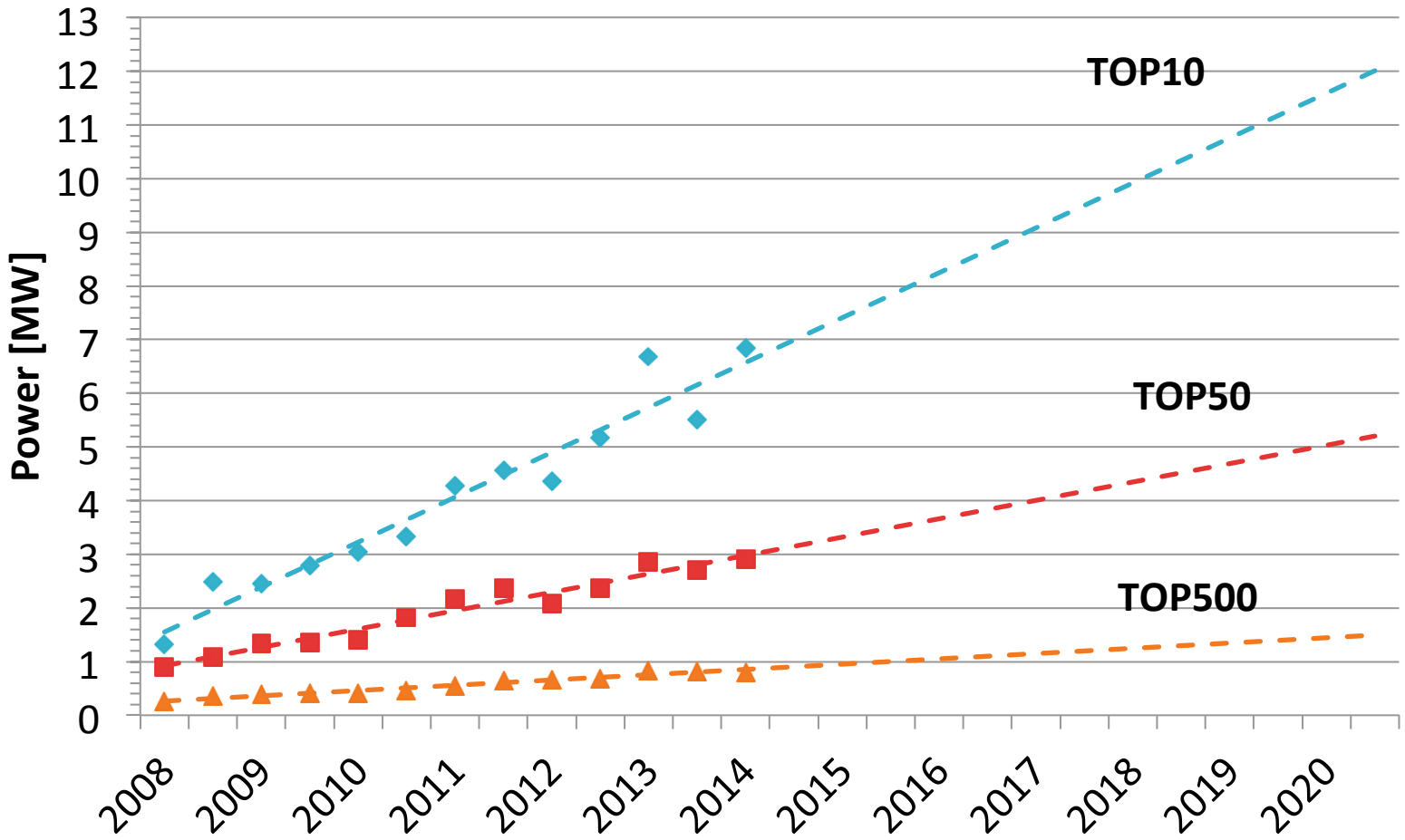
Average System Age



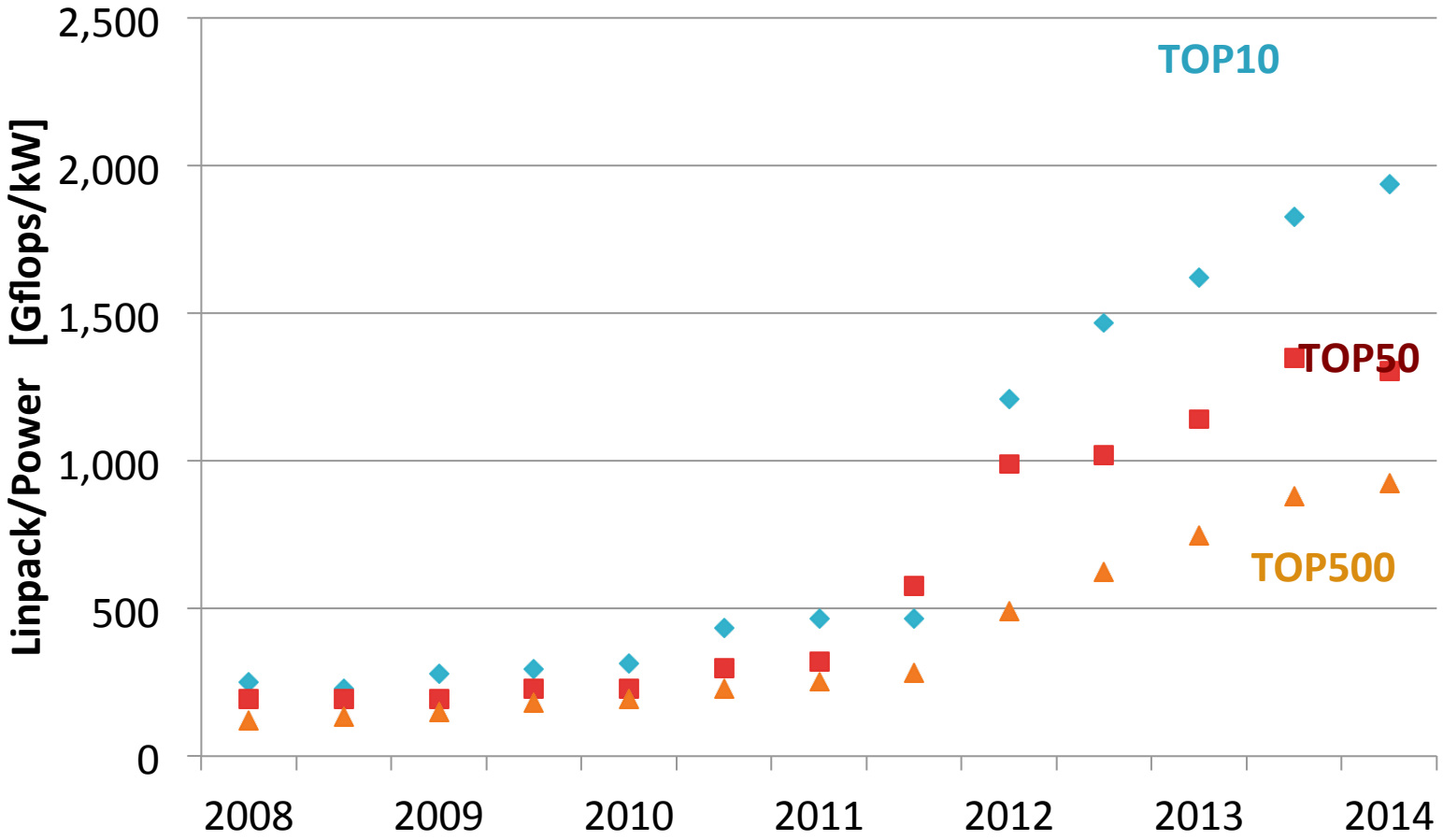
Power Consumption



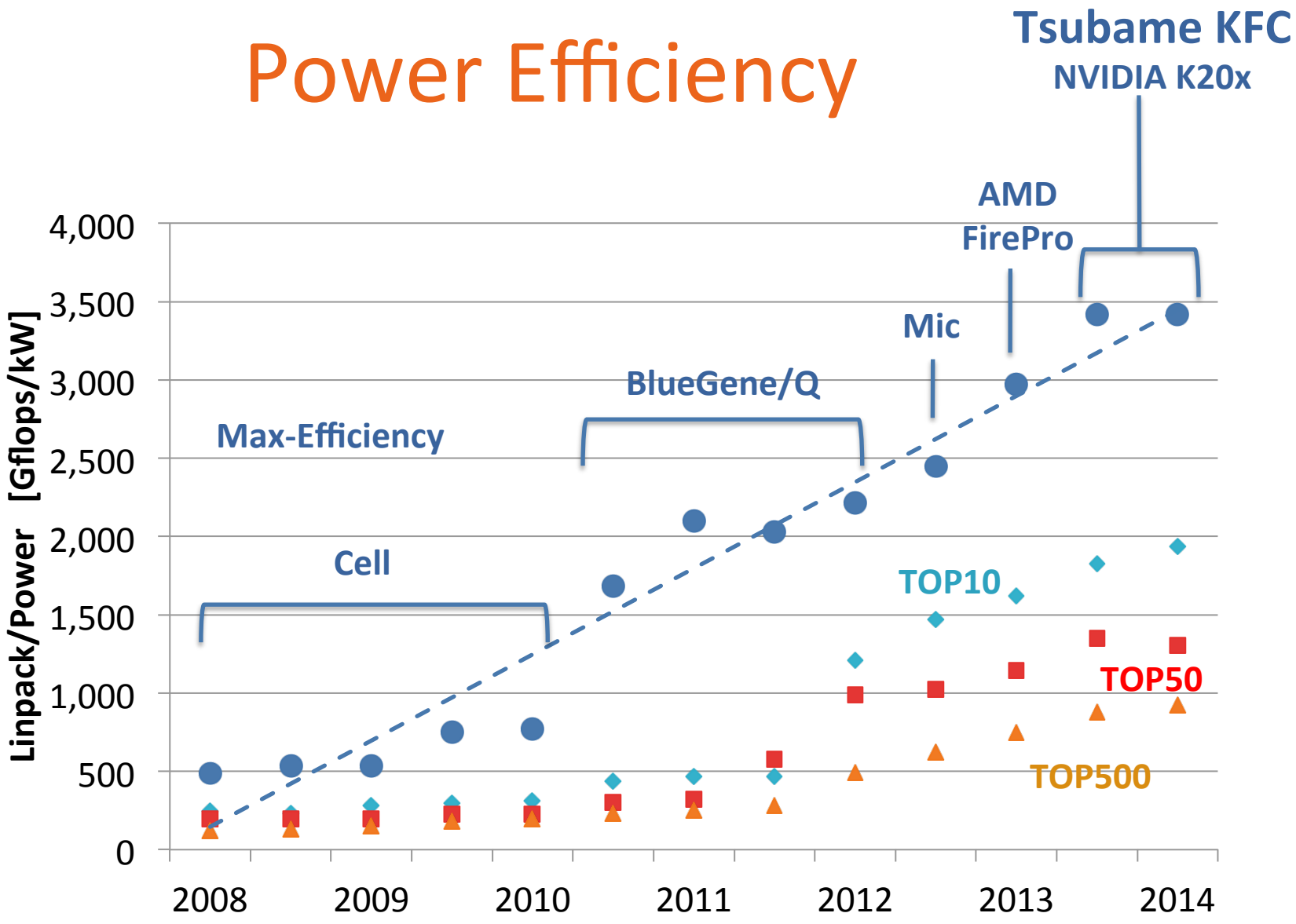
Power Consumption



Power Efficiency



Power Efficiency



Most Power Efficient Architectures

Computer	Rmax/ Power
Tsubame KFC, NEC, Xeon 6C 2.1GHz, Infiniband FDR, **NVIDIA K20x**	**3,418**
Romeo, Bull Cluster, Xeon 8C 2.6GHz, Infiniband FDR, **NVIDIA K20x**	**3,131**
HA-PACS TCA, Cray Cluster, Xeon 10C 2.8GHz, QDX, **NVIDIA K20x**	**2,980**
SANAM, Adtech, ASUS, Xeon 8C 2.0GHz, Infiniband FDR, **AMD FirePro**	**2,973**
HPC2, iDataPlex DX360, Xeon 10C 2.8GHz, Infiniband FDR, **NVIDIA K20x**	**2,702**
Piz Daint, Cray XC30, Xeon 8C 2.6GHz, Aries, **NVIDIA K20x**	**2,697**
Shadow, Cray CS300-LC, Xeon E5-2680v2 10C 2.8GHz, Infiniband FDR, **Xeon Phi 5110P**	**2,495**
BlueGene/Q, Power BQC 16C 1.60 GHz, Custom	**2,300**
HPCC, Cluster Platform SL250s, Xeon 8C 2.4GHz, FDR, **NVIDIA K20m**	**2,243**

[Mflops/Watt]