And The Winners Are...

HPCG

PRESENTED AT **SC14** New Orleans, LA hpc matters. NOVEMBER 19, 2014

NUMBER 3

3

SYSTEM **Titan**
DOE
Oak Ridge National Laboratory

ACHIEVED **0.322**
Pflop/s

Jack Dongarra
JACK DONGARRA

Michael A. Heroux
MICHAEL HEROUX

Piotr Luszczek
PIOTR LUSZCZEK

IN COLLABORATION WITH

ICL **ut**
INNOVATIVE
COMPUTING LABORATORY
THE UNIVERSITY of TENNESSEE

Sandia National Laboratories

SPONSORED BY

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

HPCG

PRESENTED AT **SC14** New Orleans. LA hpc matters. NOVEMBER 19, 2014

2

NUMBER 2

SYSTEM **K computer**
RIKEN
Advanced Institute for
Computational Science

ACHIEVED **0.461**
Pflop/s

JACK DONGARRA

MICHAEL HEROUX

PIOTR LUSZCZEK

IN COLLABORATION WITH

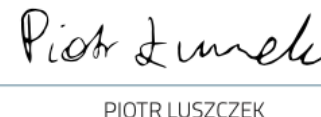**ICL** INNOVATIVE COMPUTING LABORATORY THE UNIVERSITY of TENNESSEE

Sandia National Laboratories

SPONSORED BY

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

HPCG

PRESENTED AT **SC14** New Orleans, hpc LA matters. NOVEMBER 19, 2014

1

NUMBER 1

SYSTEM **Tianhe-2**
NSCC / Guangzhou

ACHIEVED **0.623**
Pflop/s

Jack Dongarra
JACK DONGARRA

Michael A. Heroux
MICHAEL HEROUX

Piotr Luszczek
PIOTR LUSZCZEK

IN COLLABORATION WITH **ICL** **INNOVATIVE** COMPUTING LABORATORY THE UNIVERSITY of TENNESSEE

Sandia National Laboratories

SPONSORED BY DEPARTMENT OF ENERGY UNITED STATES OF AMERICA

HPCG Results, November 2014

| Rank	Site	Computer	Cores	HPL Rmax (Pflops)	HPL Rank	HPCG (Pflops)	HPCG/ HPL	% of Peak
1	NSCC / Guangzhou	Tianhe-2 NUDT, Xeon 12C 2.2GHz + Intel Xeon Phi 57C + Custom	3,120,000	33.9	1	.623	1.8%	1.1%
2	RIKEN Advanced Inst for Comp Sci	K computer Fujitsu SPARC64 VIIIfx 8C + Custom	705,024	10.5	4	.461	4.4%	4.1%
3	DOE/OS Oak Ridge Nat Lab	Titan, Cray XK7 AMD 16C + Nvidia Kepler GPU 14C + Custom	560,640	17.6	2	.322	1.8%	1.2%
4	DOE/OS Argonne Nat Lab	Mira BlueGene/Q, Power BQC 16C 1.60GHz + Custom	786,432	8.59	5	.167	1.9%	1.7%
5	Swiss CSCS	Piz Daint, Cray XC30, Xeon 8C + Nvidia Kepler 14C + Custom	115,984	6.27	6	.105	1.7%	1.3%
6	Leibniz Rechenzentrum	SuperMUC, Intel 8C + IB	147,456	2.90	14	.0833	2.9%	2.6%
7	DOE/OS LBNL	Edison, Cray XC30, Xeon, 12c, 2,4GHz + Custom	133,824	1.65	24	.0786	4.8%	3.1%
8	GSIC Center TiTech	Tsubame 2.5 Xeon 6C, 2.93GHz + Nvidia K20x + IB	76,032	2.78	15	.073	2.6%	1.3%
9	Max-Planck	iDataPlex Xeon 10C, 2.8GHz + IB	65,320	1.28	34	.061	4.8%	4.2%
10	CEA/TGCC-GENCI	Curie tine nodes Bullx B510 Intel Xeon 8C 2.7 GHz + IB	77,184	1.36	33	.051	3.8%	3.1%
11	Exploration and Production Eni S.p.A.	HPC2, Intel Xeon 10C 2.8 GHz + Nvidia Kepler 14C + IB	62,640	3.00	12	.0489	1.6%	1.2%

HPCG Results, November 2014

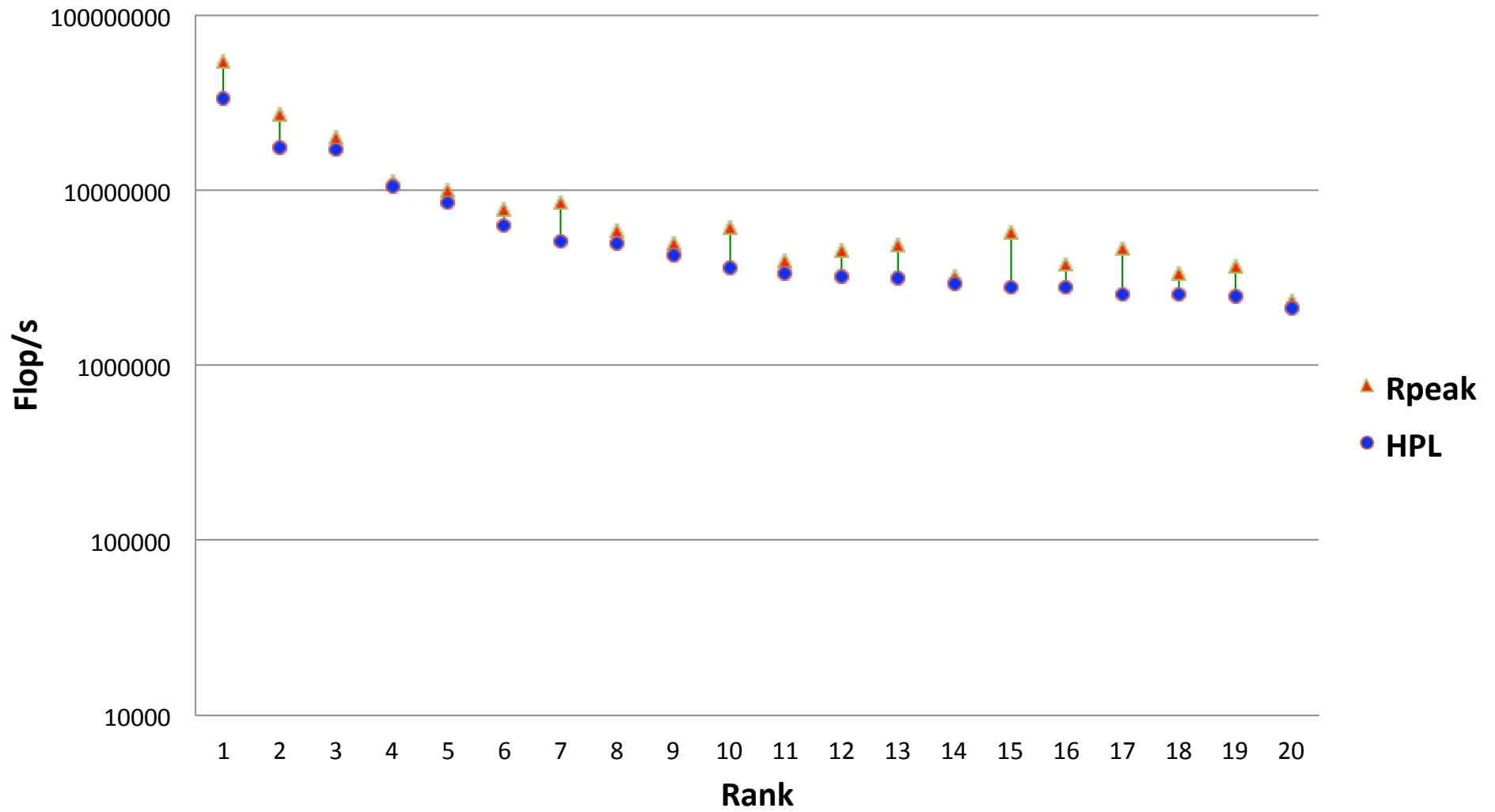| Rank	Site	Computer	Cores	HPL Rmax (Pflops)	HPL Rank	HPCG (Pflops)	HPCG/ HPL	% of Peak
12	Grand Equipement National de Calcul Intensif	Occigen Bullx Xeon 12C 2.6Ghz + Inf	50,544	2.07		.0448	2.8%	2.2%
13	U of Tokyo	Occigen Bullx Xeon 12C 2.6Ghz + Inf	76,800	1.043	36	.0448	4.3%	3.9%
14	Texas Advanced Computing Center	Stampede, Dell Intel (8c) + Intel Xeon Phi (61c) + IB	157,696 (462,462)	1.762 (5.168)	7	.044	2.5% (.9%)*	1.5% (.5%)*
15	IFERC	Helios Bullx B510 Intel Xeon 8C 2.7 GHz + IB	70,560	1.24	30	.0426	3.4%	2.8%
16	HWC U of Stuttgart	Hornet Cray Xeon 2.5GHz	94,656	2.763		.0391	1.4%	1.0%
17	SURF Sara	Cartesius2 Bullx Intel Xeon	25,920	.848		.0195	2.3%	1.8%
18	Cyberscience Tohoku U	NEC SX-ACE 4C + custom	2,048	.123	*	.0135	10.9%	10.3%
19	Meteo France	Beaufix Bullx B710 Intel Xeon 12C 2.7 GHz + IB	24,192	.469	79	.0110	2.3%	2.1%
20	Meteo France	Prolix Bullx B710 Intel Xeon 2.7 GHz 12C + IB	23,760	.465	80	.0100	2.1%	1.9%
21	Bull Angers	Manny Bullx B720 Xeon 12C 2.6 GHz + IB	12,960	.430		.0097	2.3%	1.8%
22	U of Toulouse	CALMIP Bullx DLC Intel Xeon 10C 2.8 GHz + IB	12,240	.255	184	.00725	2.8%	2.6%
23	Cambridge U	Wilkes, Intel Xeon 6C 2.6 GHz + Nvidia Kepler 14C + IB	5120	.240	241	.00385	1.6%	1.0%
24	TiTech	TUSBAME-KFC Intel Xeon 6C 2.1 GHz + IB	2720	.239	392	.0037	2.5%	1.7%
25	SURRF Sara	Cartesius Bullx Xero, 8C 2.5GHz + IB	3036	.154	499	.0025	1.7%	1.2%

Performance by Country
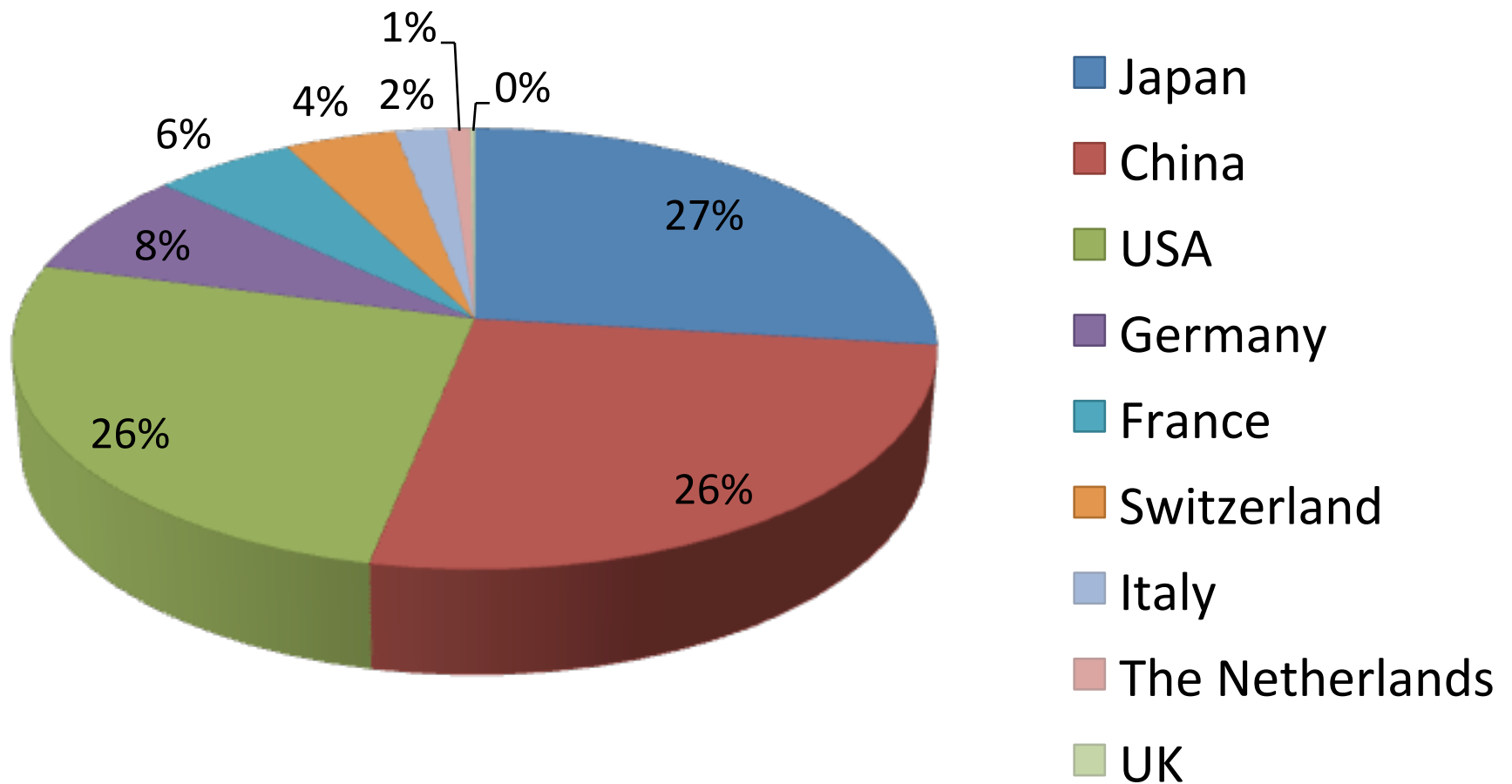
Performance by Interconnect
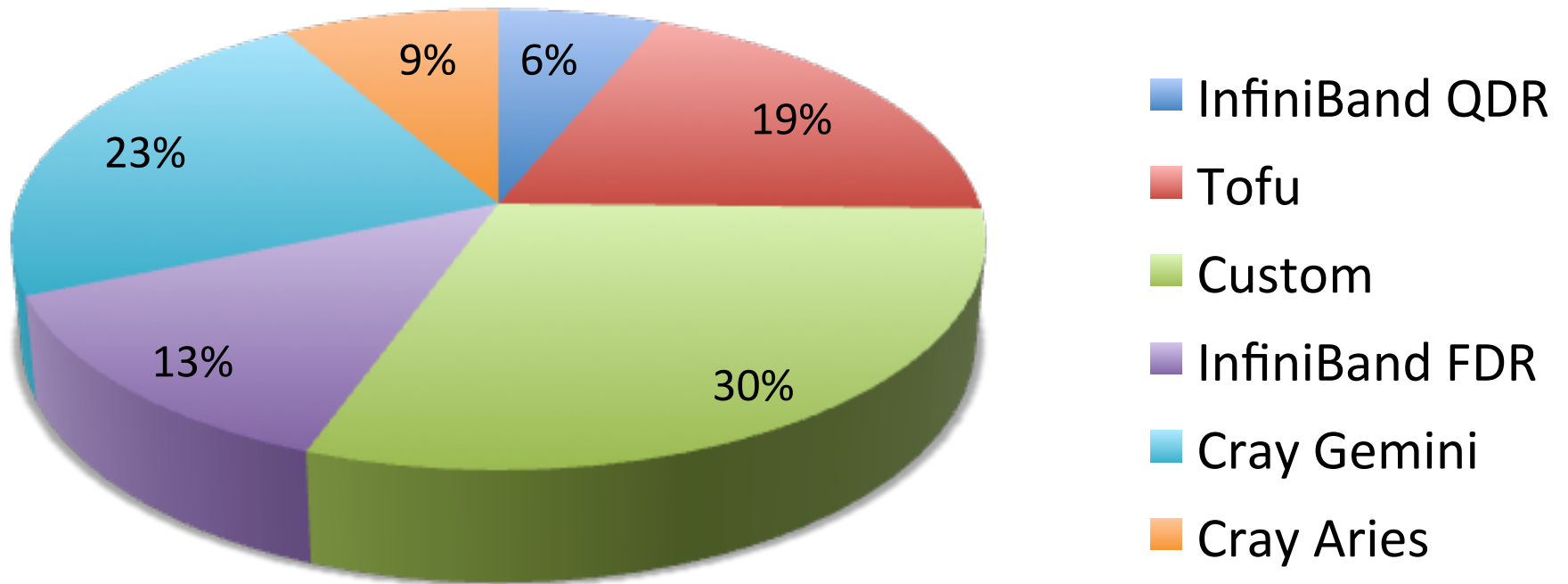
Performance by Architecture
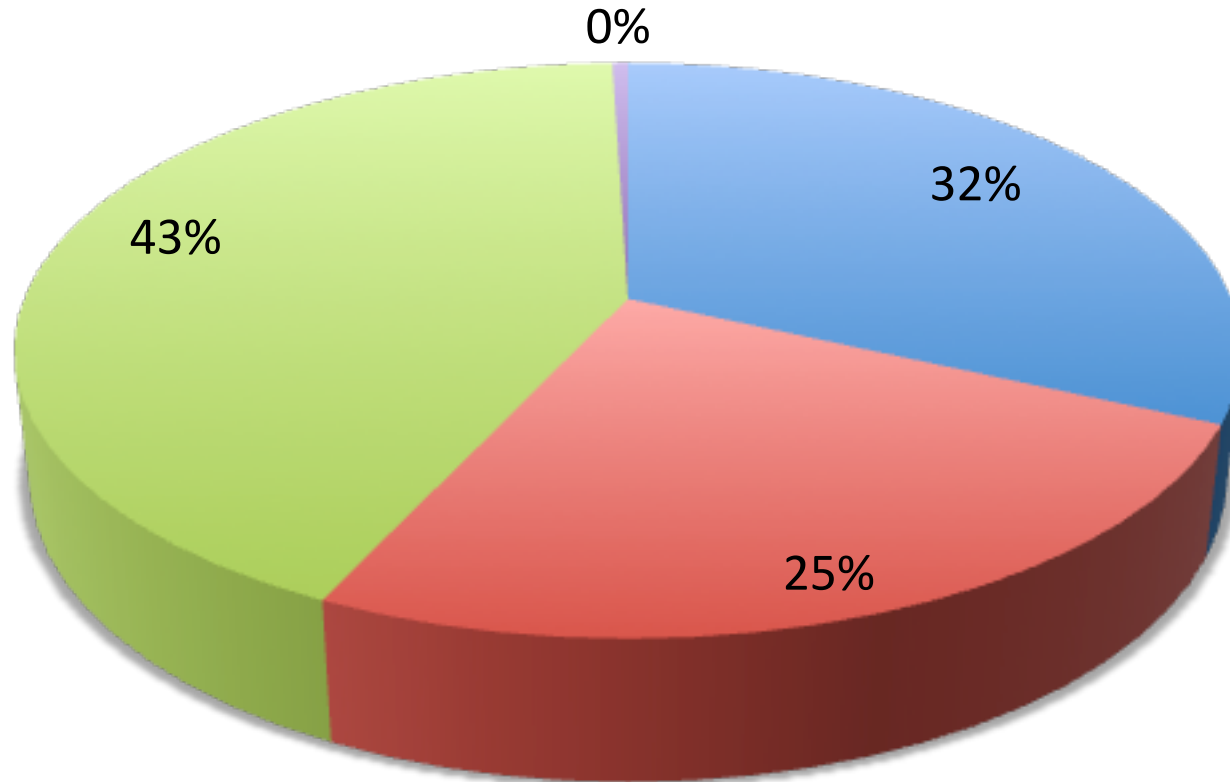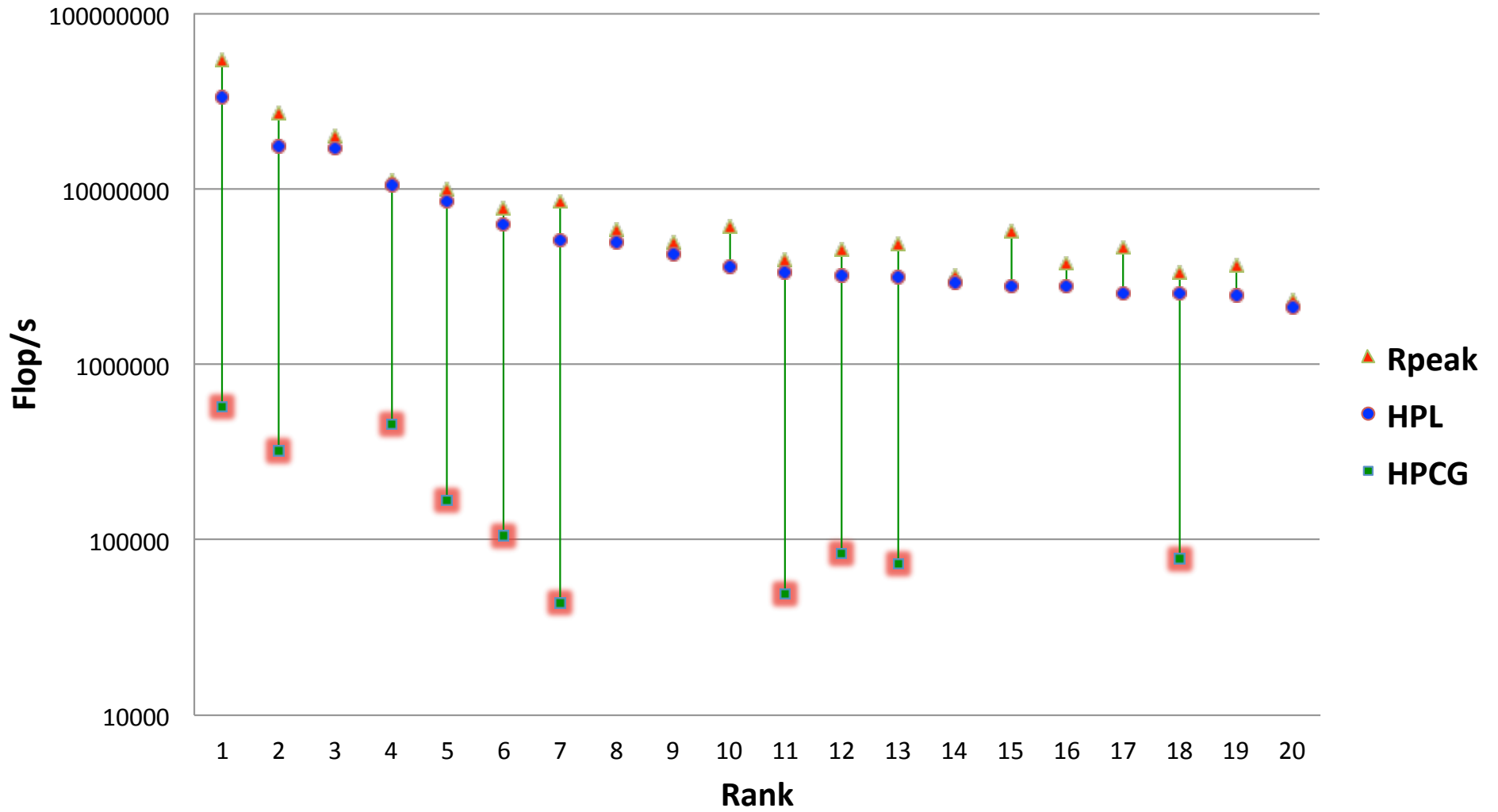
Comparison HPL & HPCG
Peak, HPL, HPCG

HPCG Tech Reports

Toward a New Metric for Ranking High Performance Computing Systems

- Jack Dongarra and Michael Heroux

HPCG Technical Specification

- Jack Dongarra, Michael Heroux, Piotr Luszczek

- http://www.hpcg-benchmark.org/

SANDIA REPORT
SAND2013- 8752
Unlimited Release
Printed October 2013

HPCG Technical Specification

Michael A. Heroux, Sandia National Laboratories[1]
Jack Dongarra and Piotr Luszczek, University of Tennessee

Prepared by
Sandia National Laboratories

SANDIA REPORT
SAND2013-4744
Unlimited Release
Printed June 2013

Toward a New Metric for Ranking High Performance Computing Systems

Jack Dongarra, University of Tennessee
Michael A. Heroux, Sandia National Laboratories[1]

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation,
a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's
National Nuclear Security Administration under contract DE-AC04-94AL85000.

Approved for public release; further dissemination unlimited.

Sandia National Laboratories

[1] Corresponding Author, maherou@sandia.gov