

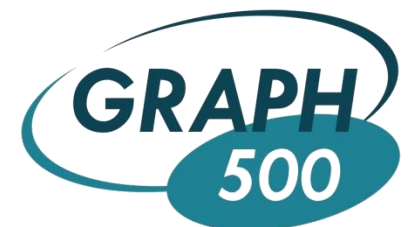


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ISC' 14, Leipzig, Germany

*With support of David Bader, Andrew Lumsdaine, Richard Murphy,  
and Marc Snir*

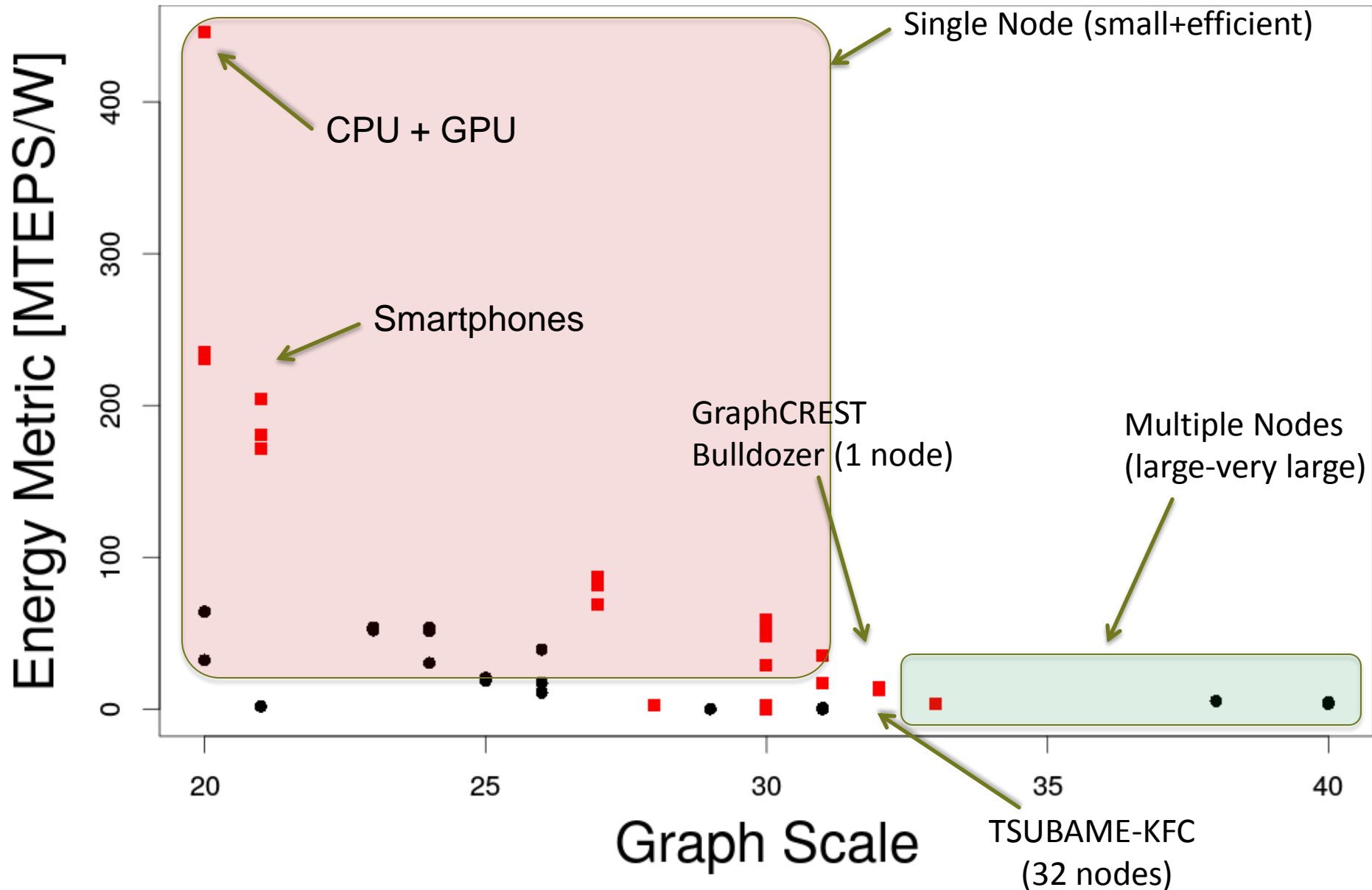


# The Green Graph500 List

- **In close collaboration with Graph500 (same rules)**
  - Will have a separate list and separate awards
  - <http://green.graph500.org/>
- **Measurement techniques compatible with established practice and Green500**
  - Allows comparisons and cross-analyses
  - Only real measurements, no TDP etc.

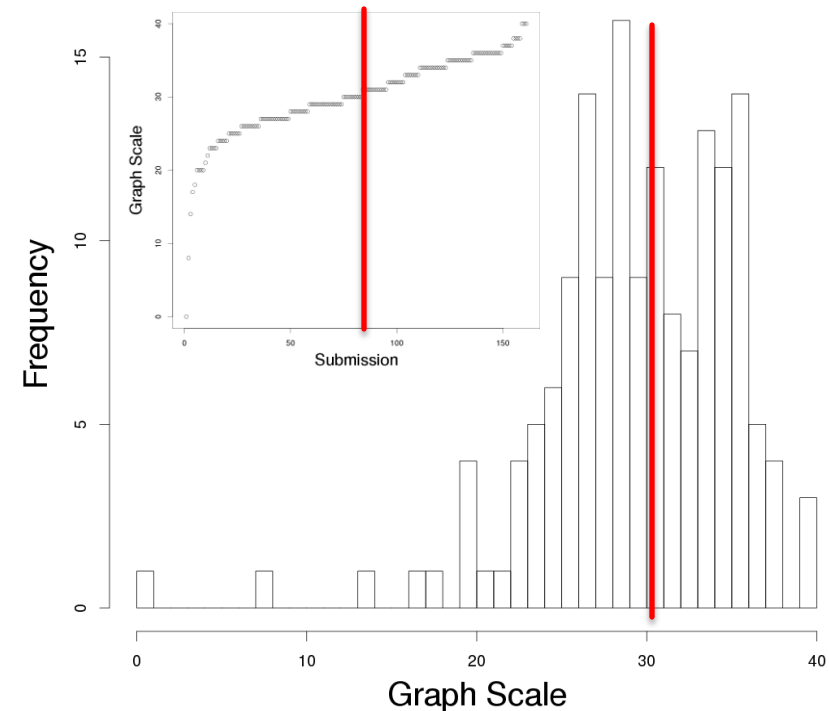
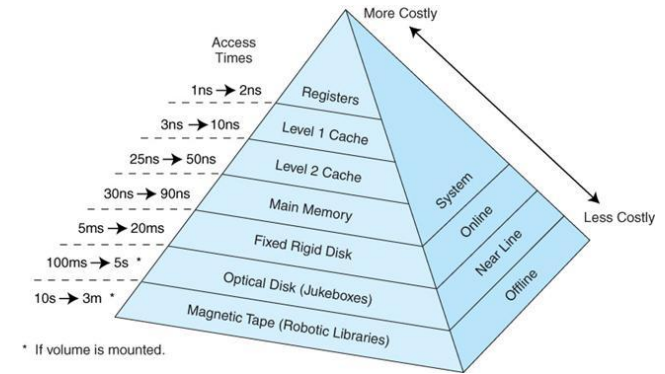


# Received Submissions



# A Natural Split

- **Small Data vs. Big Data**
  - Fundamentally different categories
  - Often: single node vs. multiple nodes
    - *Or: in cache vs. in memory?*
    - *Or: in registers???*
  
- **Graph500 doesn't limit the "minimal submission" (yet)**
  - Median of Graph500 scales
  - Jun. 2014 list: Scale 30 (unchanged)



# The Small Data List

Rank	MTEPS/W	Site	Machine	G500 rank	Scale	GTEPS	Nodes
<u>1</u>	445.92	George Washington University	Colonial		20	122.18	1
<u>2</u>	235.15	Kyushu University	GraphCREST-Xperia-Z1-SO-01F		20	1.03	1
<u>3</u>	230.41	Kyushu University	GraphCREST-Xperia-A-SO-04E		20	0.74	1
<u>4</u>	204.38	Tokyo Tech	EBD-GoldenBox-Prototype		21	1.64	1
<u>5</u>	180.76	Kyushu University	GraphCREST-Xperia-A-SO-04E		21	0.59	1
<u>6</u>	171.77	Kyushu University	GraphCREST-Xperia-Z1-SO-01F		21	0.91	1
<u>7</u>	153.17	Chuo University	GraphCREST-Xperia-A-SO-04E		20	0.478	1

# The Big Data List

Rank	MTEPS/W	Site	Machine	G500 rank	Scale	GTEPS	Nodes
<u>1</u>	59.12	Kyushu University	GraphCREST-SandybridgeEP-2.4GHz		30	28.48	1
<u>2</u>	48.29	Kyushu University	GraphCREST-Sandybridge-EP-2.7GHz		30	31.95	1
<u>3</u>	35.21	Tokyo Tech	GraphCREST-Custom #1		31	13.8	1
<u>4</u>	28.88	Tokyo Tech	MEM-CREST Node #2		30	7.98	1
<u>5</u>	17.24	Kyushu University	GraphCREST-Bulldozer		31	13.63	1
<u>6</u>	14.06	Tokyo Tech	TSUBAME-KFC		32	104.31	32
<u>7</u>	12.48	The Institute of Statistical Mathematics	ismuv2k2		32	131.43	1

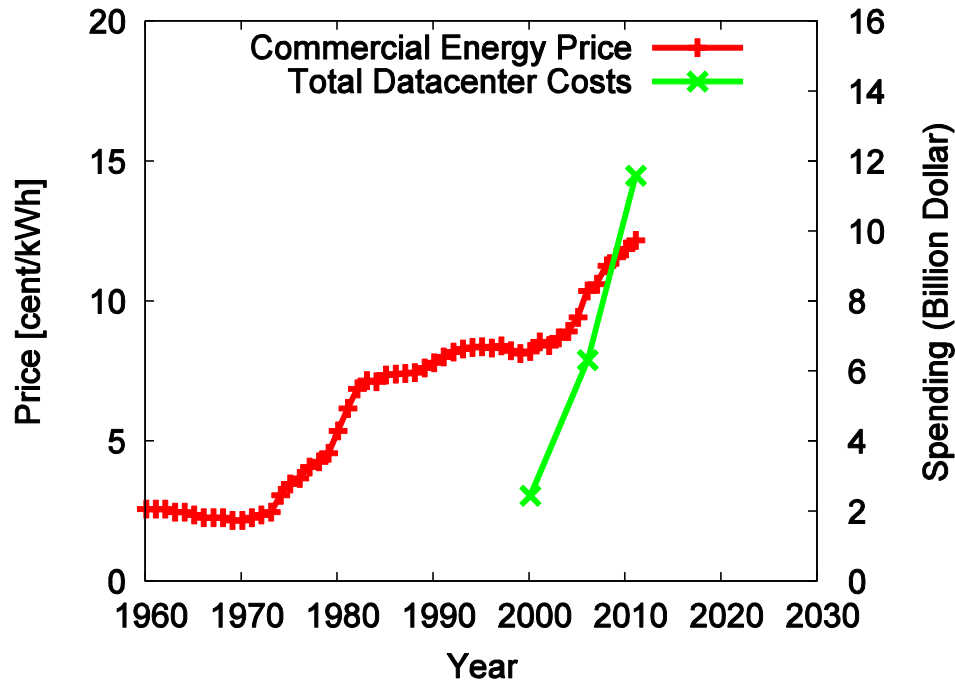
# The Future of the List

- **Next list: Nov. 2014**
  - Submission deadline: aligned with Graph500
- **Submission details:**
  - Through Graph500, provide output data and energy information, or power trace
- **Watch** <http://green.graph500.org/>
- **Thanks for Support:**
  - Thanks to David Bader, Andrew Lumsdaine, Richard Murphy, and Marc Snir

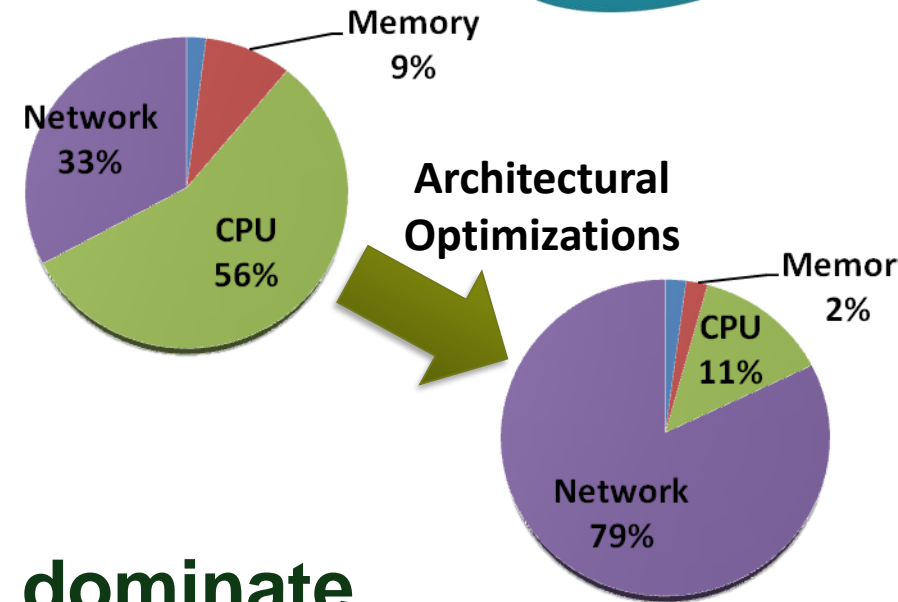
# Backup



# Motivation



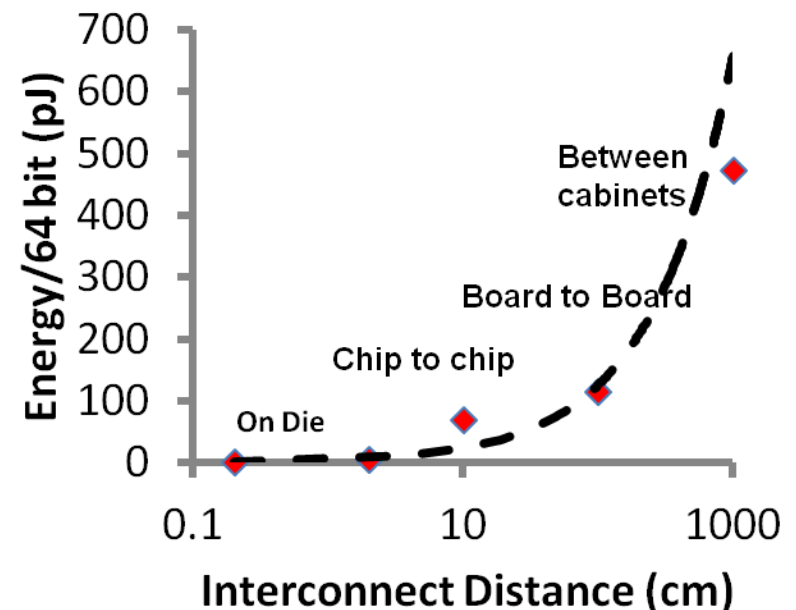
## GRAPH 500



- **Big Data analysis may dominate datacenter cost**
  - Encourage vendors to provide “greener” hardware

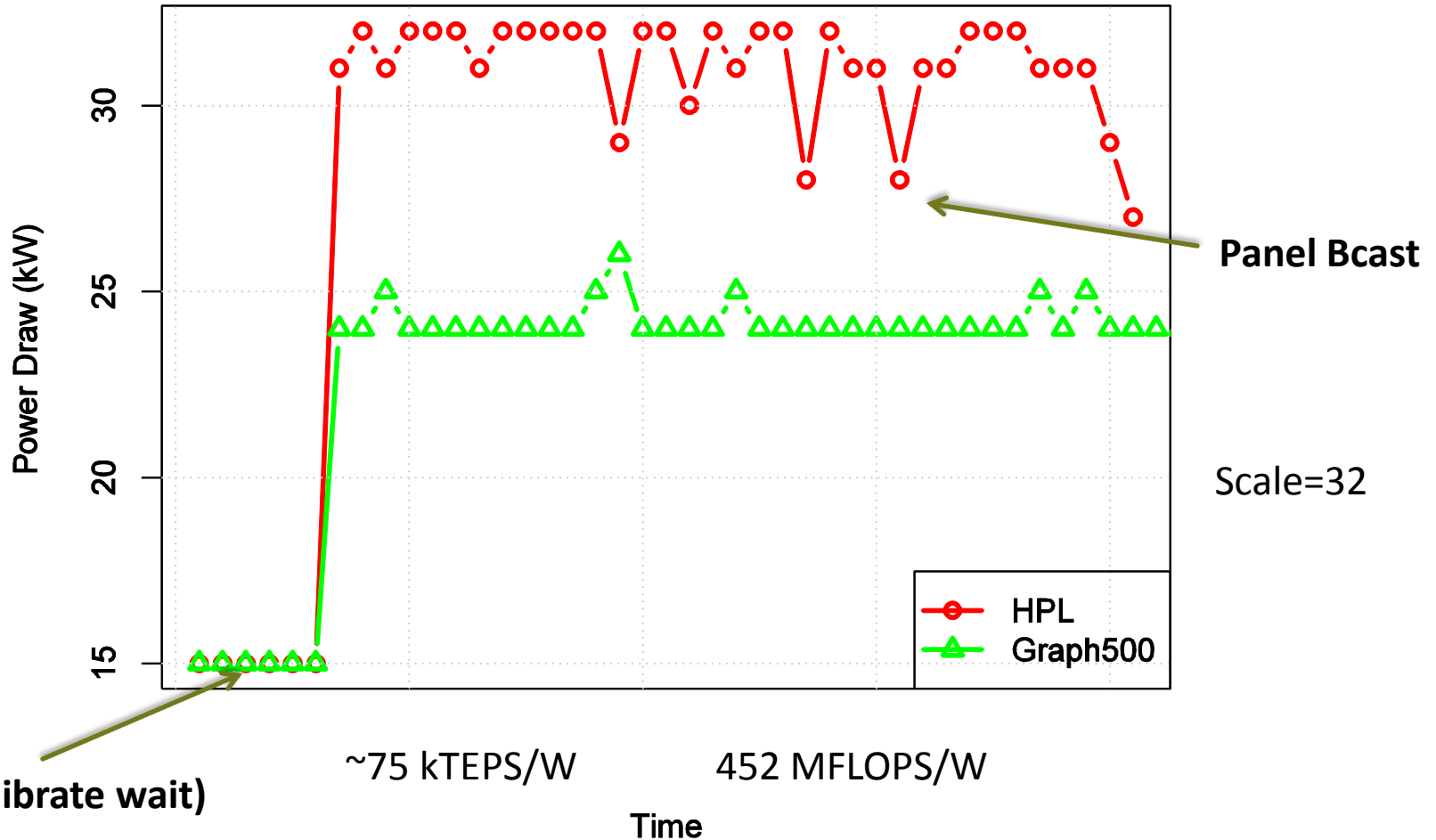
# Why not just Green500?

- **Green500 is centered around HPL**
  - HPL: extremely structured, FP/Cache intensive
  - Graph500: unstructured, no good separators, (main) memory and network intensive
- **Completely different optimization goals!**
  - Need to be addressed by vendors!
  - Maybe specialized machines?



Source: S. Borkar, Hot Interconnects 2011, Keynote

# Real Comparative Measurements



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