

The logo for Fabric Infrastructure and Operations (FIO), consisting of the letters 'FIO' in a bold, white, sans-serif font.

Fabric Infrastructure
and Operations

CERN IT
Department

CERN Benchmarking Cluster

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CERN IT/FIO

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The Goal

- To provide a stable benchmarking environment
- Help the Benchmarking WG establish a standard benchmark
- Help the experiments compare their code to this benchmark

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The Machines

- 11 machines (3 temporary)
 - From Intel Xeon Noconas (2005, Netburst microarchitecture, single core)
 - ... to Intel Xeon Harpertowns (2008, Core microarchitecture, quad core)
- Representative selection of our computer center
- Intel CPUs
 - (except for 2 AMDs)
- 2 GB RAM per core
 - (except for 3 machines)
- All 64bit capable

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All The Machines

- Lxbench01
 - 2x Nocona 2.8 GHz/1 MB, 2x 1GB
- Lxbench02
 - 2x Irwindale 2.8 GHz/2 MB, 4x 1GB DDR333
- Lxb6106
 - 2x Irwindale 2.8 GHz/2 MB, 2x 1GB DDR333
- Lxb7006
 - 2x Irwindale 2.8GHz/2 MB, 2x 1GB DDR-II 400
- Lxbench03
 - 2x Opteron 275 2.2GHz/2 MB, 4x 1GB DDR-II 400

All The Machines, cont.

- Lxbench04
 - 2x Woodcrest 2.66 GHz/4 MB, 8x 1GB DDR-II 533
- Lxb7609
 - 2x Woodcrest 3.00 GHz/4 MB, 4x 2GB DDR-II 667
- Lxbench05
 - 2x Woodcrest 3.00 GHz/4 MB, 8x 1GB DDR-II 533
- Lxbench06
 - 2x Opteron 2218 rev. F 2.6GHz/2 MB, 8x 1GB DDR-II 667
- Lxbench07
 - 2x Clovertown 2.33 GHz/2x 4MB, 8x 2GB DDR-II 667
- Lxbench08
 - 2x Harpertown E5410 2.33 GHz/2x 4M, 8x 2GB DDR-II 667

About SPEC CPU

- Industry standard CPU performance benchmark
 - SPECint and SPECfp
- CPU2000 no longer maintained, CPU2006 new standard
 - Longer running time
 - Higher memory usage (2GB per benchmark in 64-bit)
 - Lower FP content in SPECint (0.1% vs. 1%)
- Two different modes:
 - Speed and Rate

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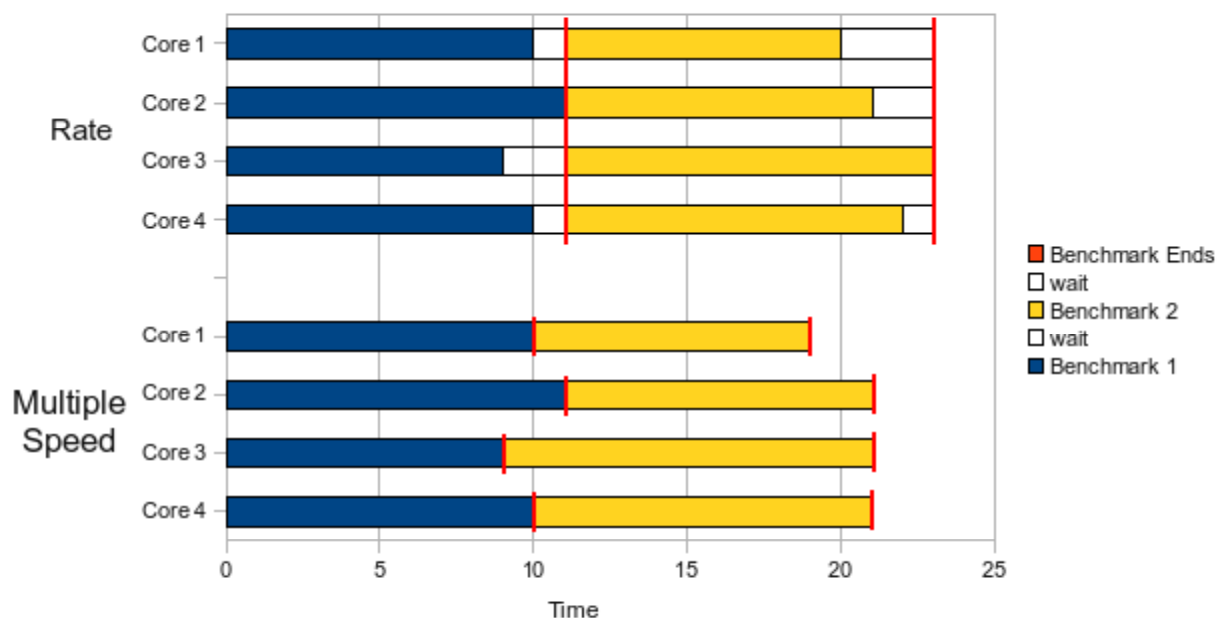
The Benchmarks

- SPECint2000
 - Conservative flags (-O2 -fPIC -pthread)
 - 64bit
 - Parallel
- SPECint2006
 - 32bit and 64bit
 - Rate and parallel
- SPECfp2006
 - 32bit and 64bit
 - Rate and parallel

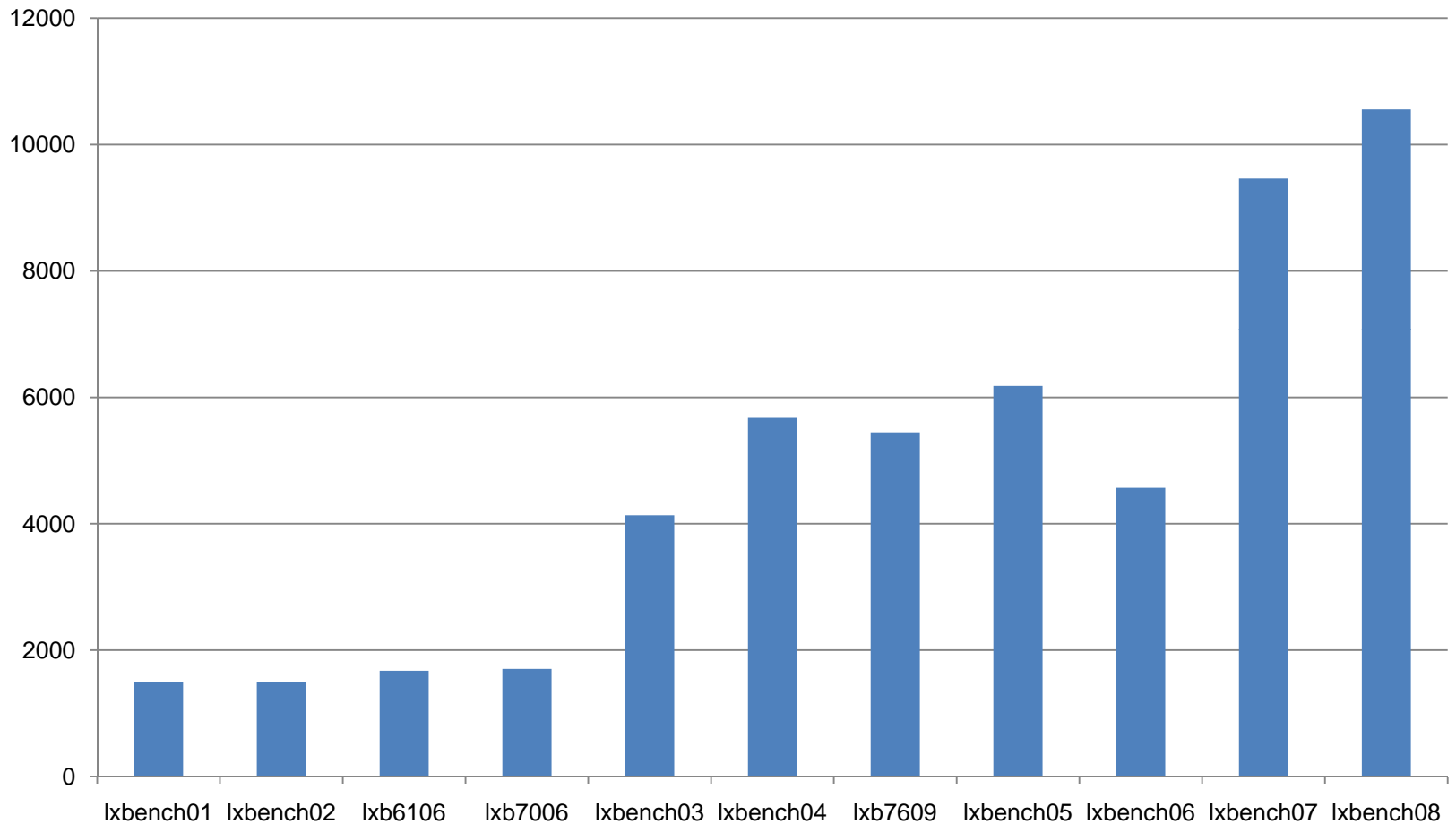
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The Reasons

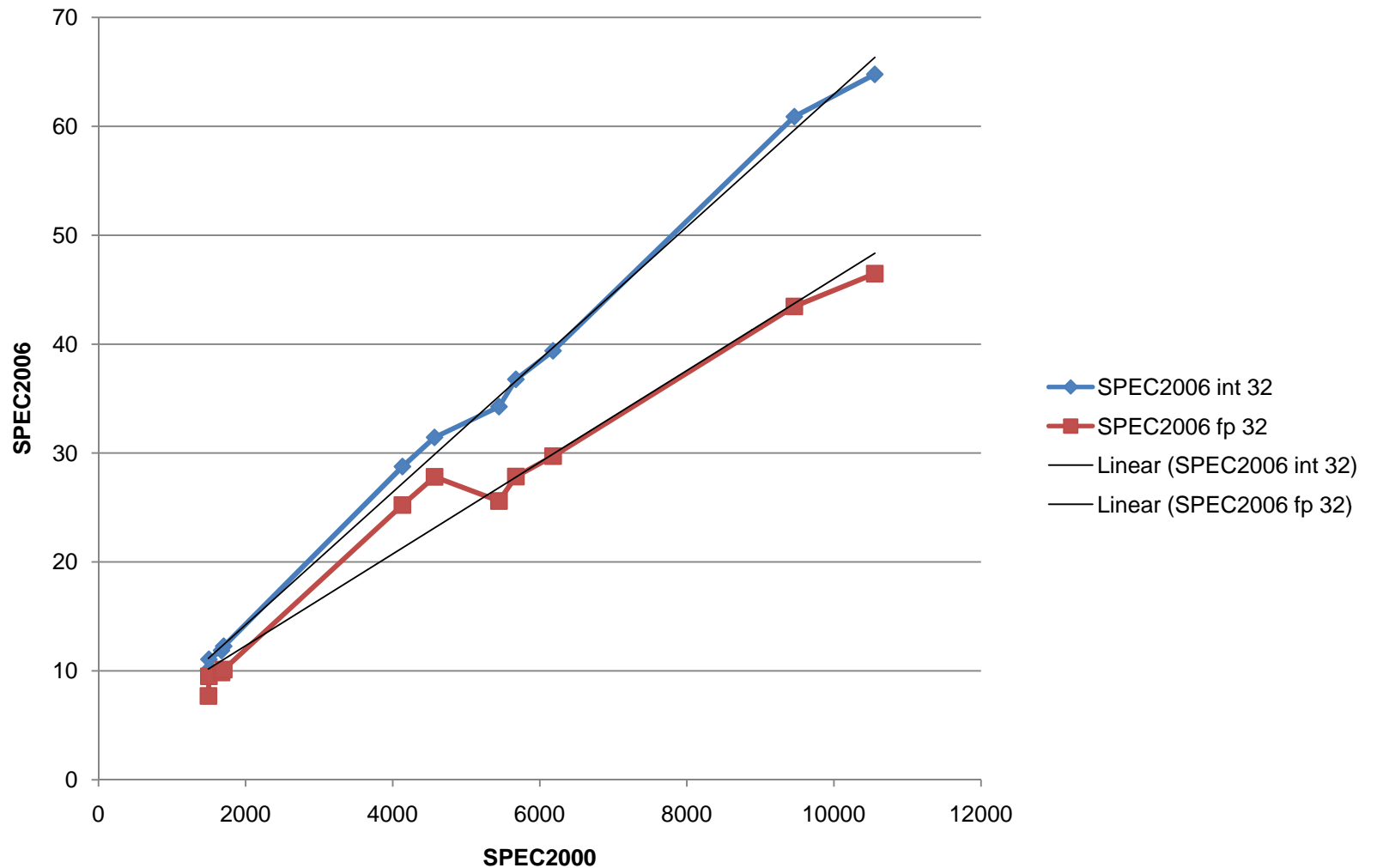
- SPEC.org results aren't representative
- Flags as recommended by LCG/SPI
- 32-bit vs. 64-bit
- Speed vs. rate vs. parallel



SPECint2000 Results



SPEC2000 vs. SPEC2006



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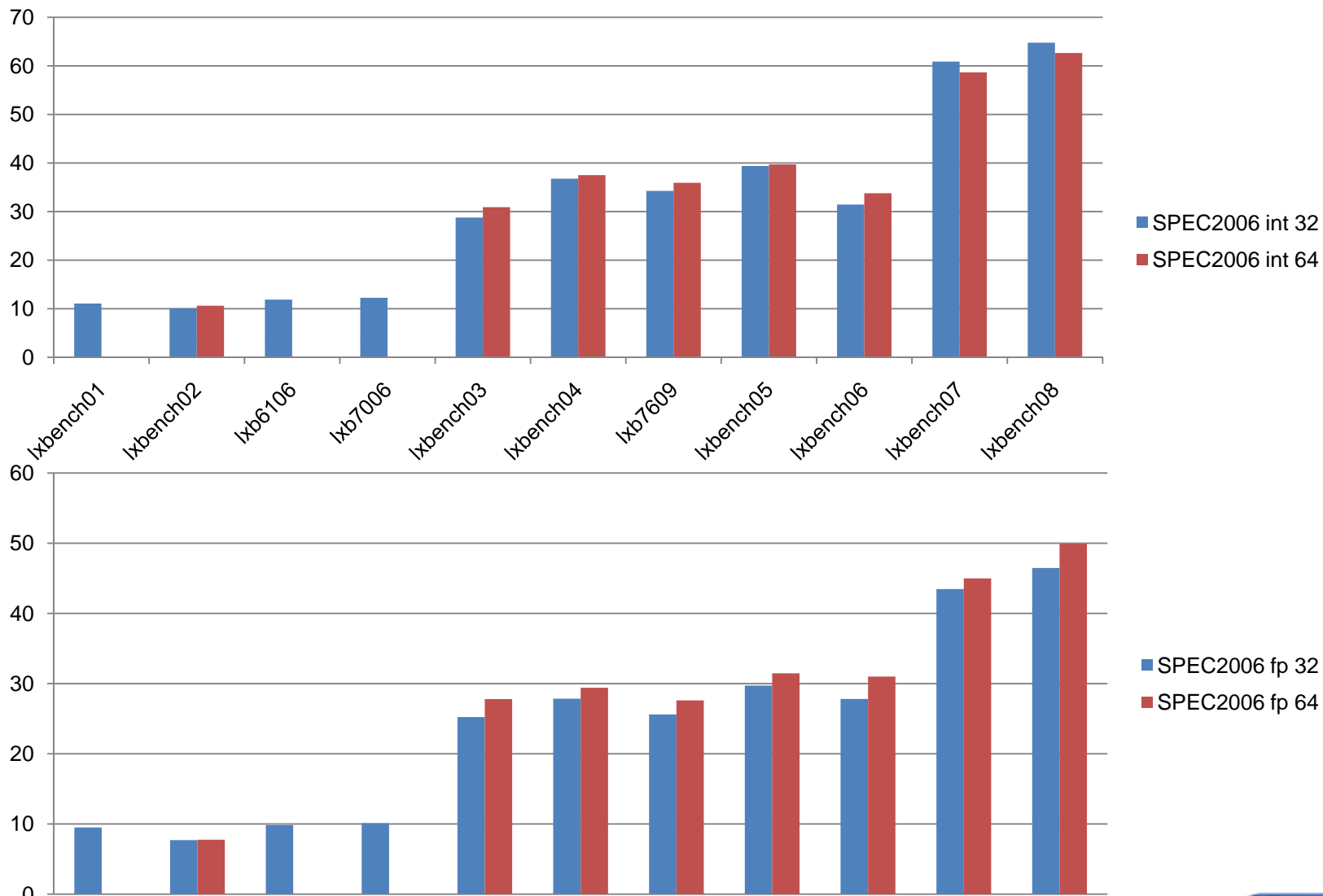


32-bit vs. 64-bit

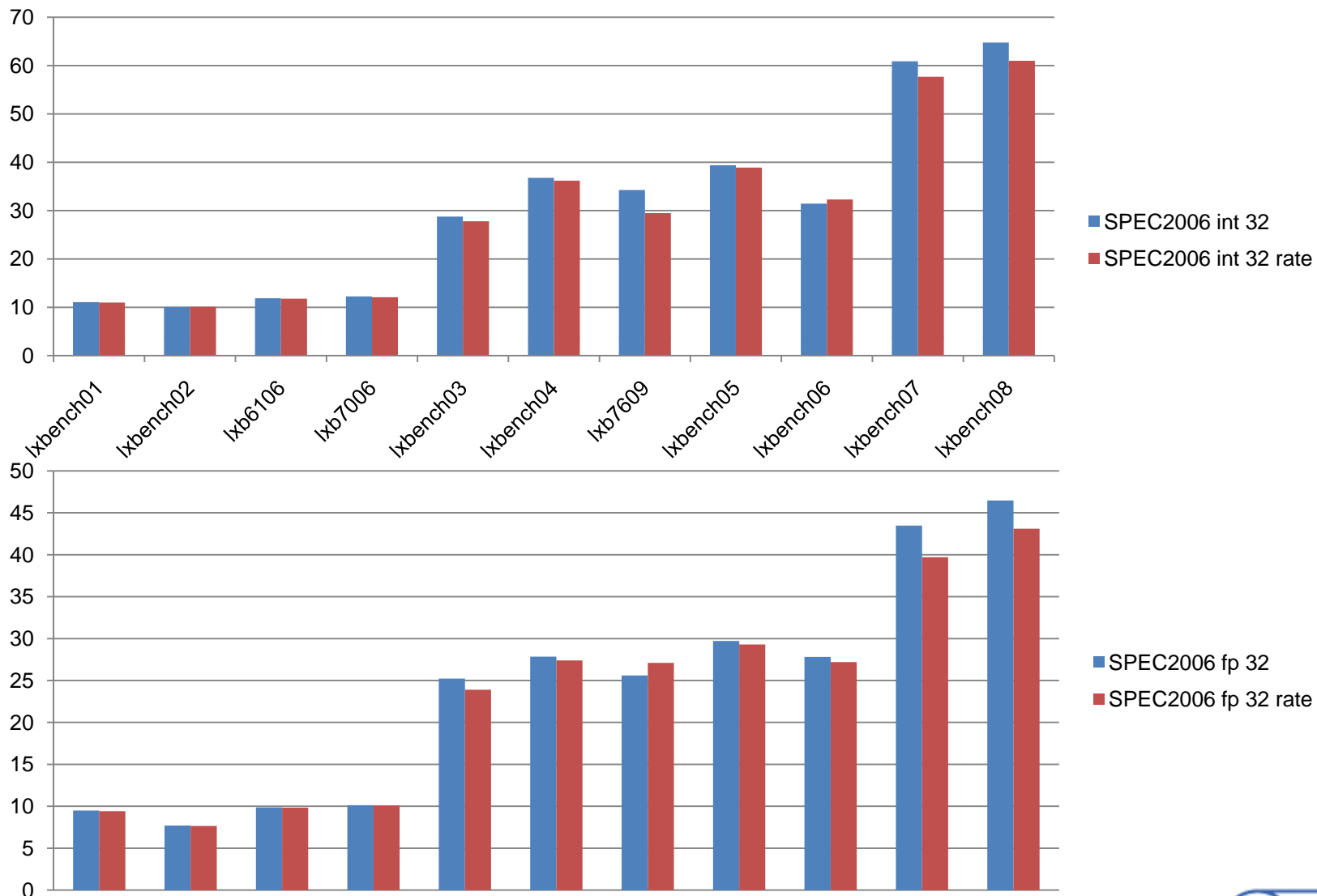


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Rate vs. Parallel



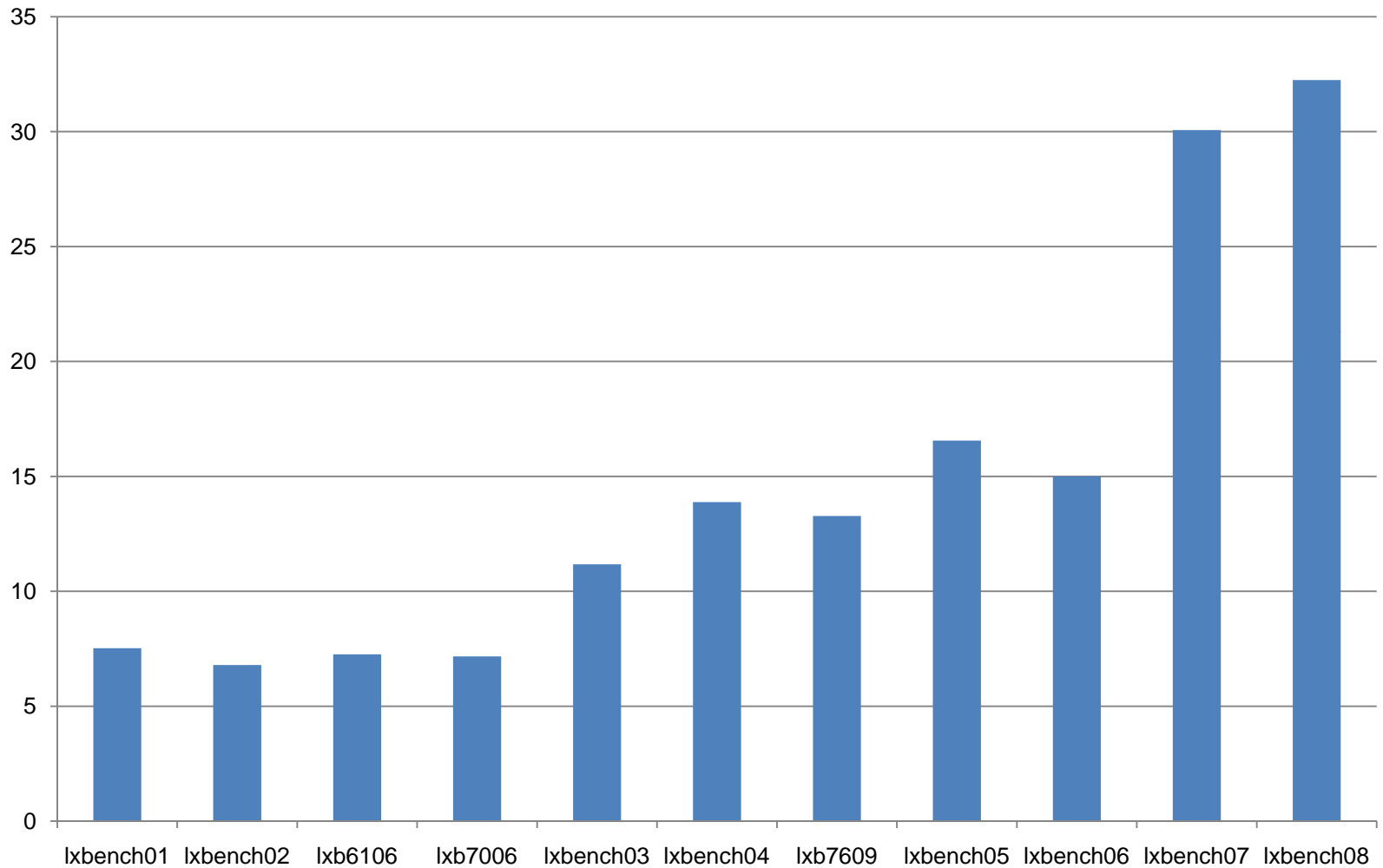
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Power Consumption

- Increasingly important issue
- Idle and loaded measurements
 - Load: 50% cpuburn, 50% lapack
 - 80-20 average
- Measured at the primary AC circuit
- High-precision power meters

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SPECint2000 per VA



Not bored yet?

Main page:

<https://twiki.cern.ch/twiki/bin/view/FIOgroup/TsiBenchmarking>

All results:

<https://twiki.cern.ch/twiki/bin/view/FIOgroup/TsiLxbenchResults>

Description of the machines:

<https://twiki.cern.ch/twiki/bin/view/FIOgroup/TsiLxbench>

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