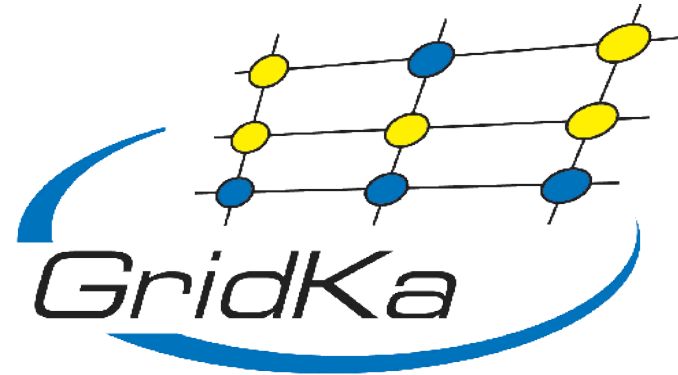


Experiences with the Dual-Core Batch Nodes at



Manfred Alef

Grid Computing Centre Karlsruhe (GridKa)

Forschungszentrum Karlsruhe
Institute for Scientific Computing
Hermann-von-Helmholtz-Platz 1
D-76344 Eggenstein-Leopoldshafen

<http://www.fzk.de>, <http://www.gridka.de>

firstname.lastname@iwr.fzk.de

CPU Procurement:

→ New (#1):

- Sum total SPECint_base2000 (not # of boxes!)
- Allowed CPUs:
 - Intel Xeon, AMD Opteron, Intel Pentium M
 - ≥ 1000 SPECint_base2000 per core
- Technical details (1 GB memory per core, disk, ...)
- Public, EU wide invitation for tenders
(price estimation exceeded critical limit)

CPU Procurements:

- New (#2):
 - Aspects of economy have been considered with the decision (# of rack units, # of boxes/network connections, electric power consumption)

CPU Procurements:

- Tenders sorted by total cost estimation:
 - + Price
 - + Power consumption (3 EUR / W_{\max})
 - + Space, racks (300 EUR / U)
 - + Network ports, administration, ...
(200 EUR / system)

CPU Procurement:

- Bidders had to prove the compute power by benchmarks
 - SPECint_base2000
 - SL3
 - GCC-3.4.3, fixed set of optimizing flags
 - 1 benchmark run per core

CPU Procurement:

→ Tenders:

- Many: dual-socket, dual-core AMD Opteron
- Some: single-socket, dual-core Opteron
- Some: dual-socket, mono-core Opteron

- One: 4x Pentium-M in a single 1U chassis
- One: dual-socket, dual-core Intel Sossaman
(available 2nd quarter 2006, perf. < 1000)

CPU Procurement:

→ Tenders:

- Best price:

Dual-socket, dual-core AMD Opteron 270 (2.0 GHz)
Barebone: MSI MS-9245

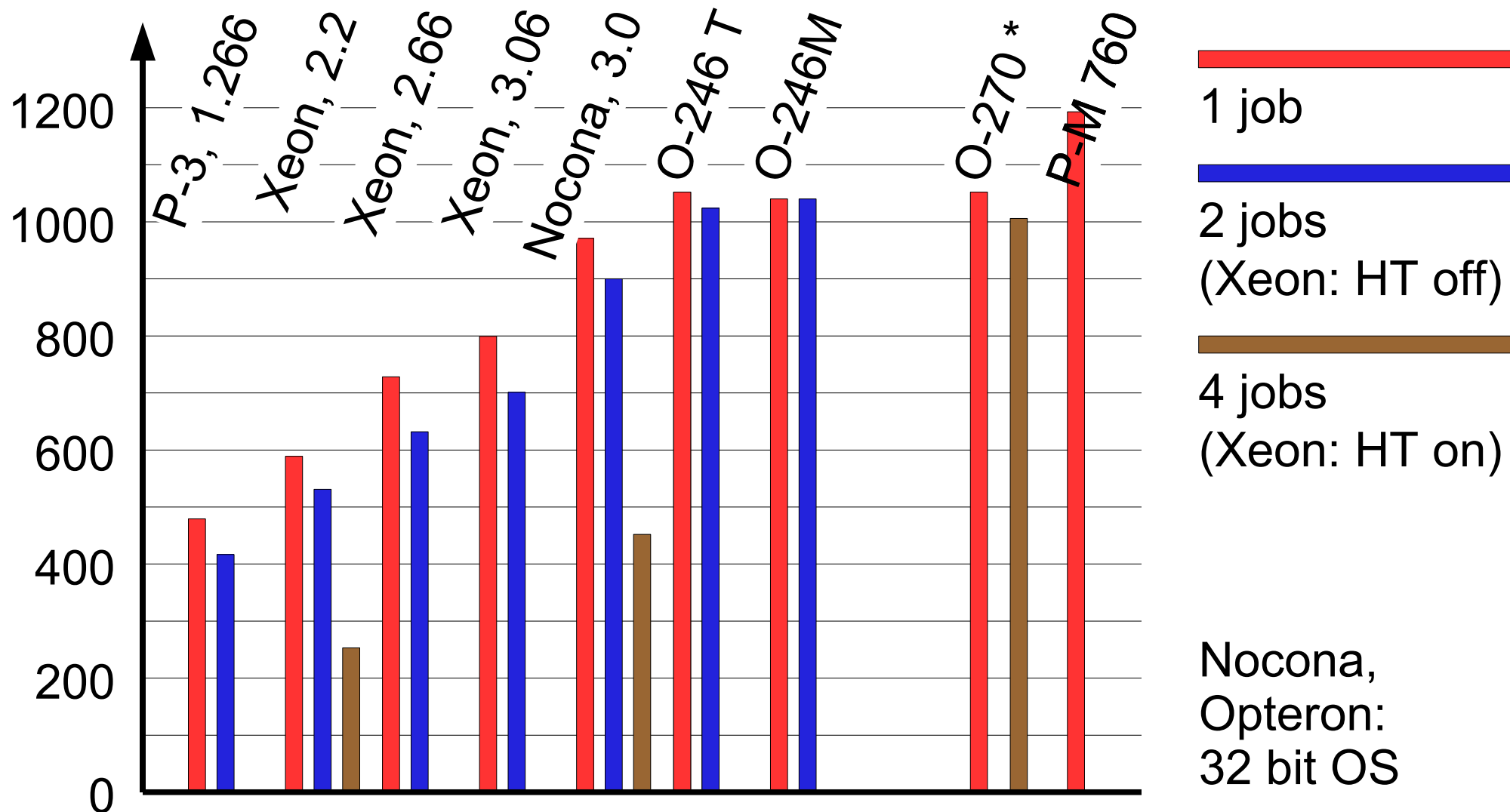
Update of Benchmark results:

- **Basis:**
www.slac.stanford.edu/conf/hepixon05/talks/friday/alef.pdf

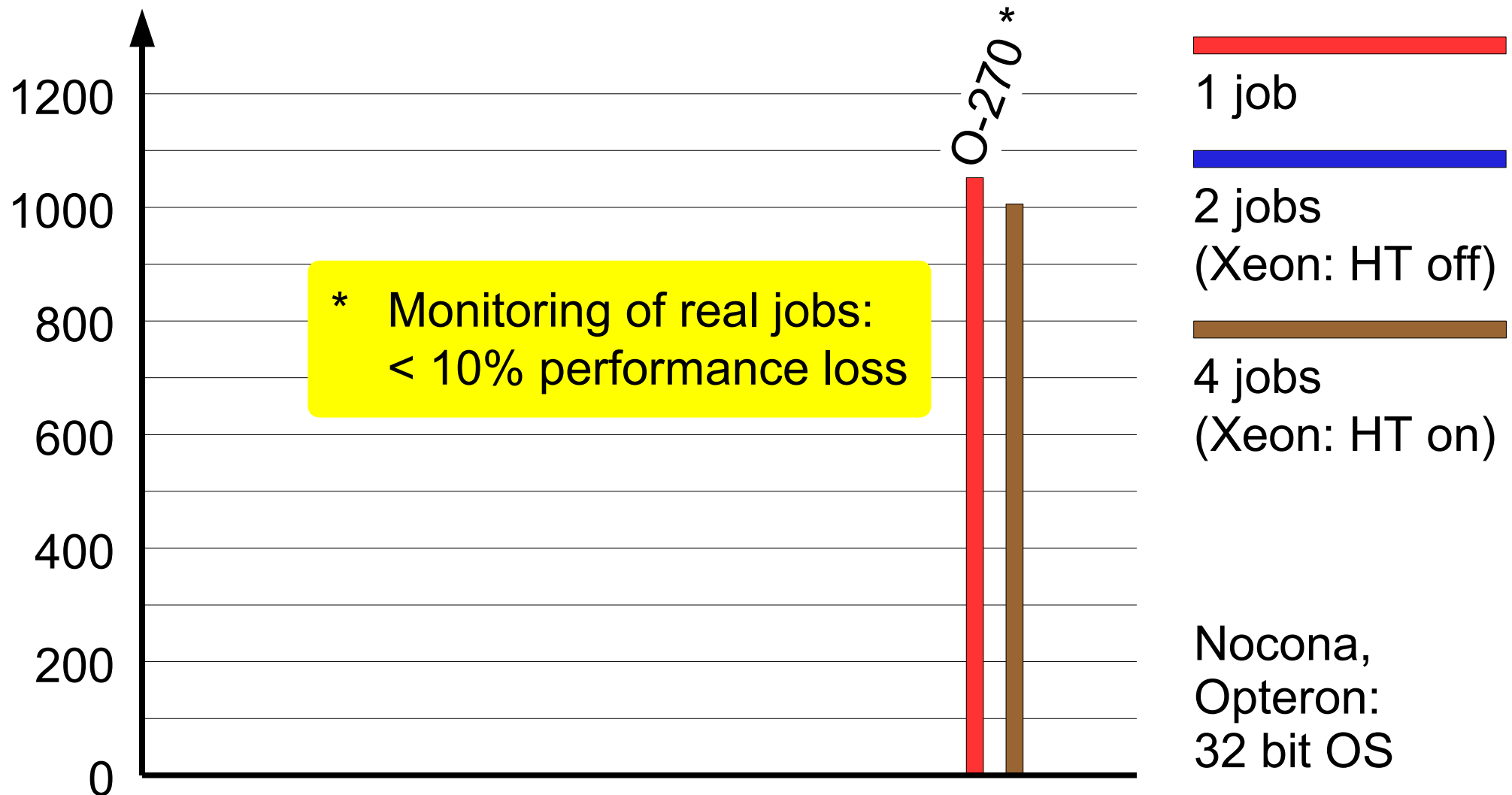
Update of Benchmark results:

- Benchmark metrics:
SPECint_base2000 v1.3
- Operating system:
Scientific Linux
- Compiler, optimizing options:
gcc-3.4.3 -O3 -funroll_loops -march=*CPU_architecture*

CPU Speed (SPECint_base2000 *per Job*)

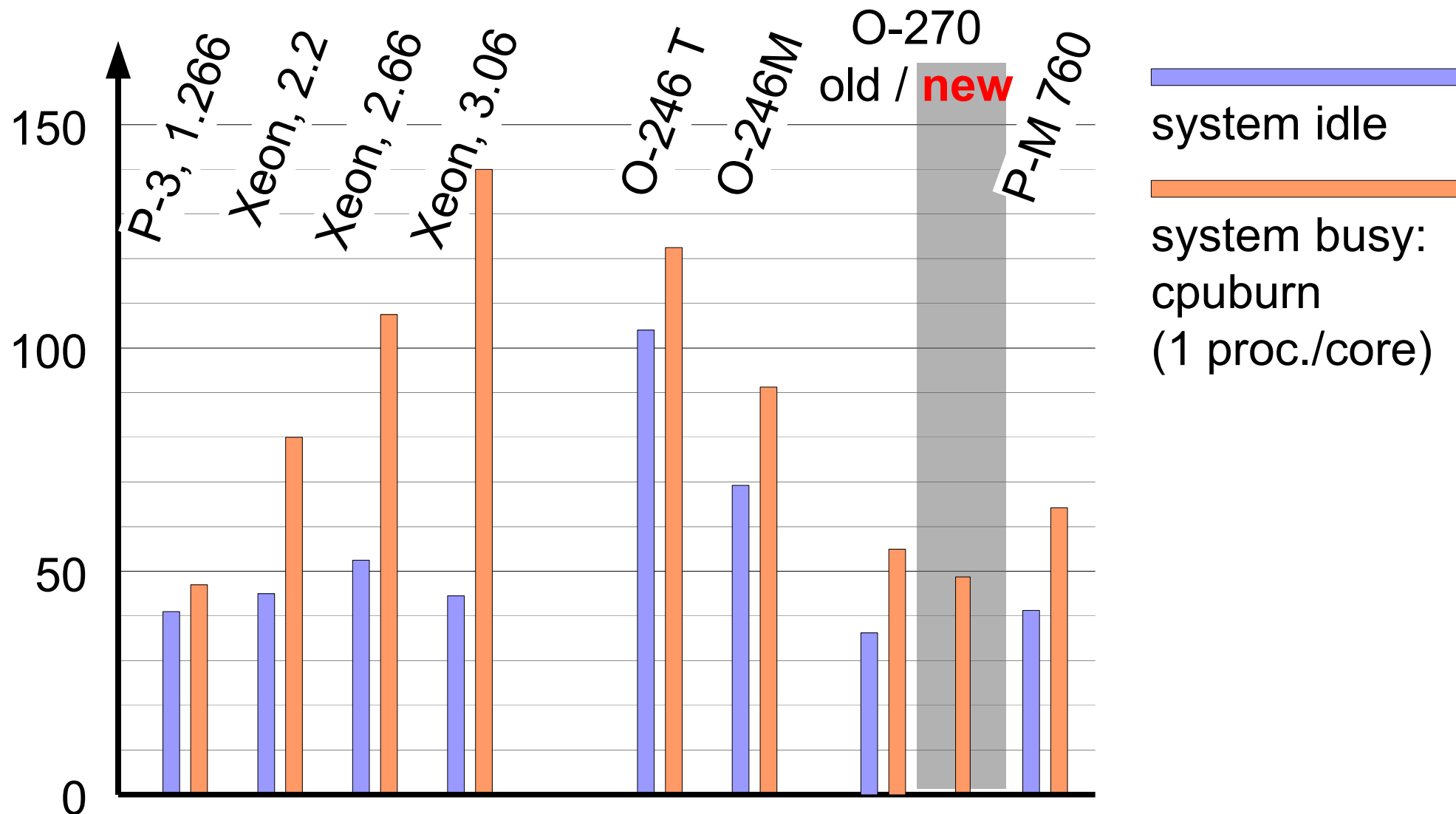


CPU Speed (SPECint_base2000 per Job)

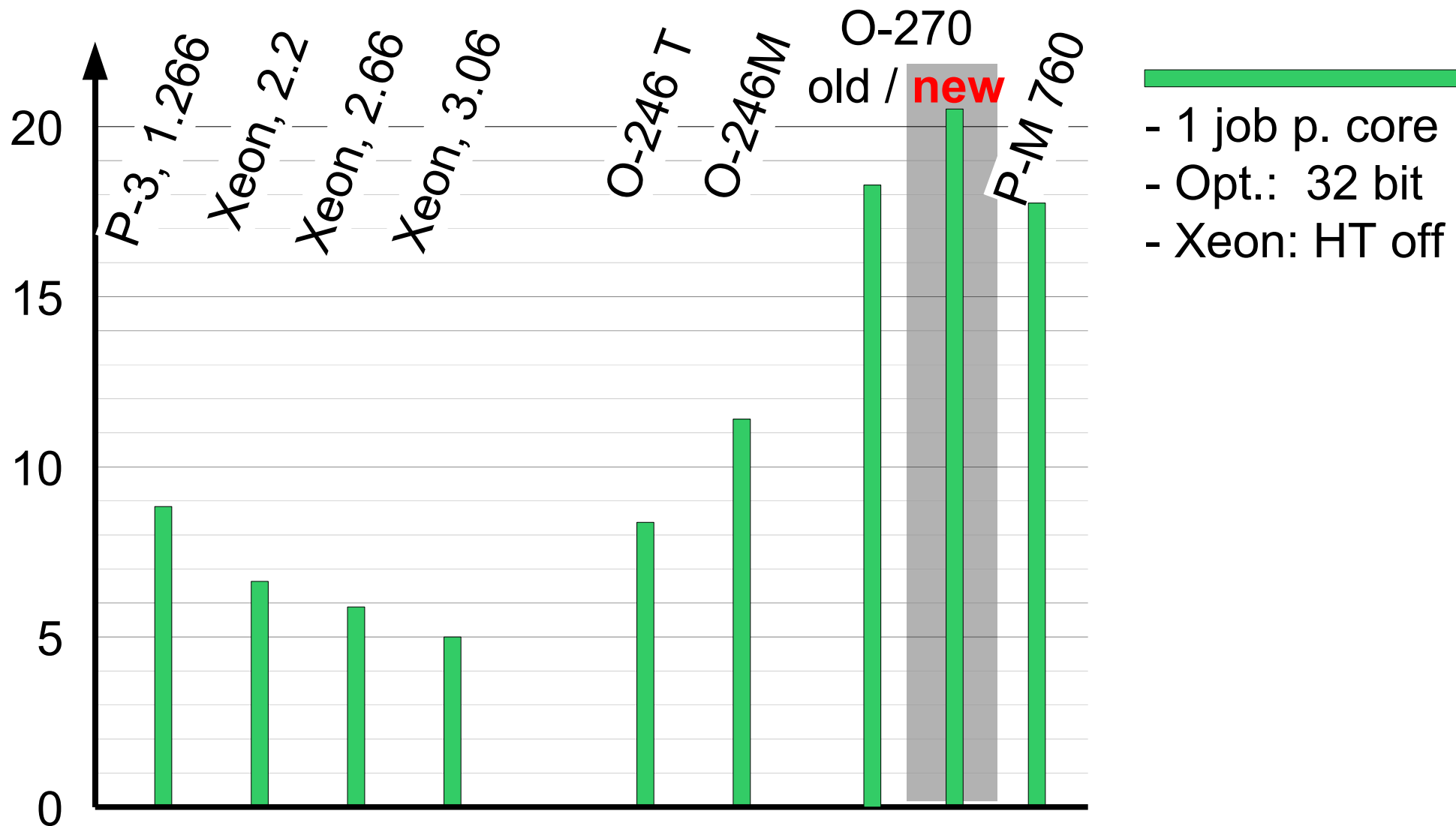


Power Consumption and Heat Dissipation:

Electric Power Consumption (Whole System, W per CPU Core)



Thermic Efficiency (SPECint_base2000 per W)



Conclusions:

Conclusions:

- Dual-core Opteron systems:
 - High performance,
< 10% performance loss
 - Low electric power consumption

Comments, Questions?