

Server Hardware In 2031: Implications for Dependable Computing An unscientific outlook

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1981-2006 trends: Based on them, what is the 2031 forecast?

Improvement rates 1981-2006:

Performance per CPU – 66x

CPUs/ SMP – 27x

MTTF per SMP – 200-600x

MTTF/max performance – 350,000- 1,000,000x

2031 Forecast:

Largest SMP – 1458 CPUs

SMP performance – 32,000,000,000,000 instructions per second

MTTF – 6,000 – 18, 000 years

This extrapolation is unlikely!

Alternatively, normalize to maximum 1981 performance: 10 Million instructions/second

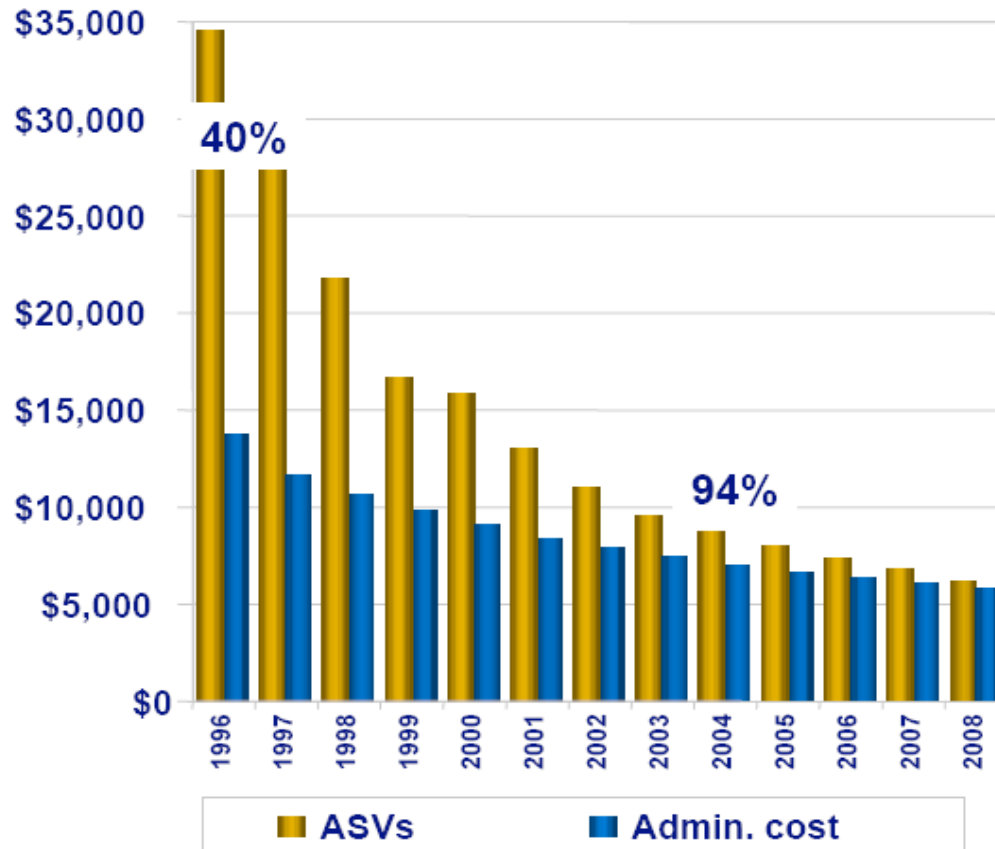
- Cost

- 1981: \$US 8 million
- 2006: \$US 12.5 thousand
- 2031: \$US 19.50

- MTTF

- 1981: 2 months
- 2006: 53 thousand years (based on 2006 actual)
- 2031: 34 million years “

Cost extrapolation probably in the right area but not MTTF!



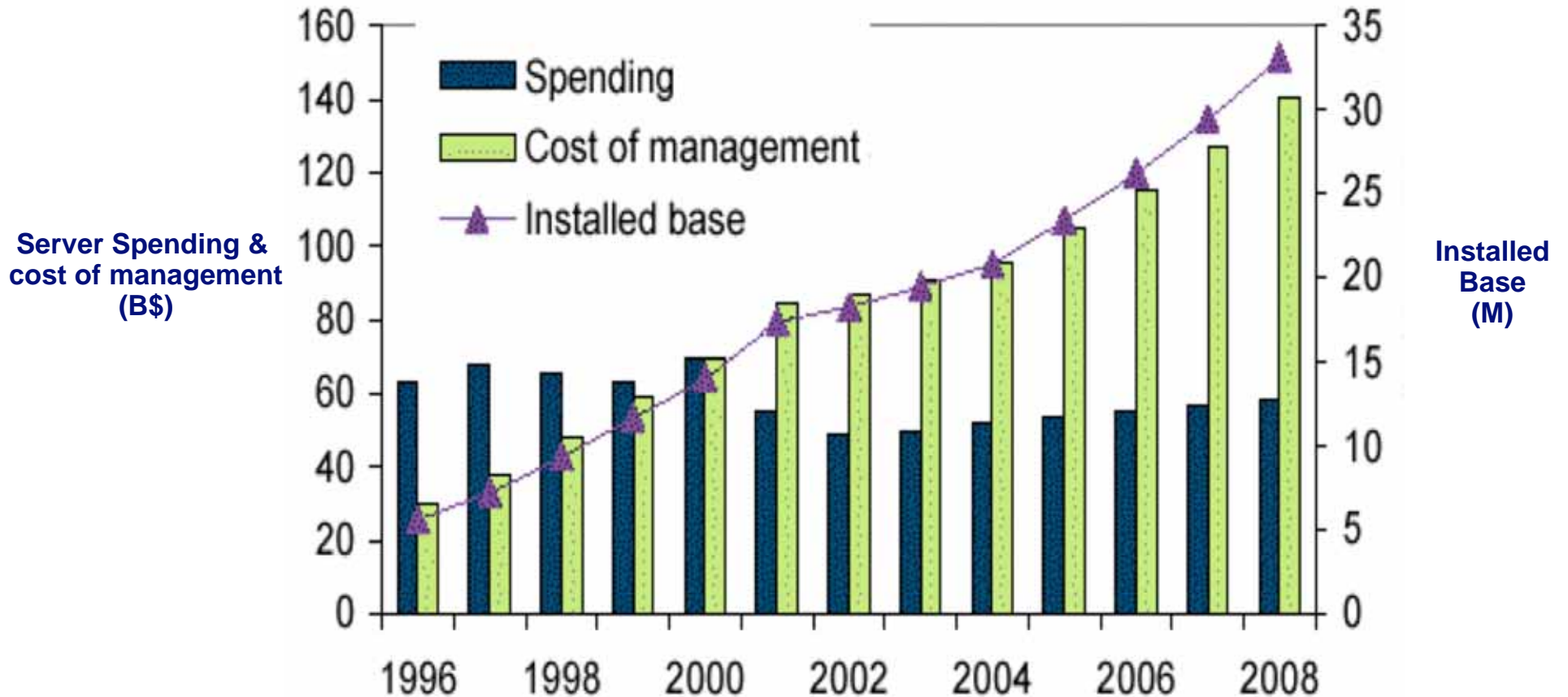
- One application per server is still the norm.
- Proliferation of new servers continues.
- Server utilizations remain very low.
- Server ASVs are dropping.
- System administration costs are lagging.



Administration costs are the number one pain point

**Following these trends, in 2031:
Average server cost \$200 with annual maintenance cost of \$600**

Spending and Installed Base Outlook



**Following these trends, in 2031:
1.7Billion servers worldwide with a management cost of \$US 3 trillion**

Optimistic outlook for dependable computing in next 25 years (at least servers)

- Cheap processing power
- Escalating # of servers
- Escalating management cost per server

leads to:

- Tremendous opportunity for economically attractive distributed dependable computing architectures, self managing systems
- Without unrealistic constraints on computing power applied to dependability and self-management