Seite 3 Kommentare
Energy needed to accomplish work
kWh measure for electric energy (on elecricity bills)
Power: rate of energy - how much energy does something consume in a specific amount of time - J/s
Often confusion: "consumption of power" ...it is technically only possible to consume energy
Still "power"-Watts more often used because it doesn't depend on time. - knowing the energy-kWh doesn't help if you don't have the time.

you might think this is refering to big hpc data centers of amazon, google and so on but that's just a small fraction -
the majority, about 50% comes from small and medium sized data centers that take up around 40% of all data centers.
51,4 million German homes based on the average of 1,770 kWh per capita last year

Seite4
There are always to races, how to make communication faster and how to make communication more efficient.
At the beginning it was more about getting higher Data throughput, Videos etc. the energy needed wasn't really an important factor
- nowadays it's more about making highspeed connection cheaper.
We're at the point where the reason for our bad skype connection isn't the unadvanced technology but our
missing money for a superfast internet connection and of course the missing money of the area we're in
perhaps if it doesn't have Fiber-optic communication yet and still uses copper cables
The assessment is based on the case study of a 40 megabit per second videoconferencing transmission between Switzerland and Japan,
yielding a consumption of 0.2 kilowatt hours per transmitted gigabyte for 2009
8000MBit(Videosize)/40MBit => 200s => 0.2kWh/200s => 1Wh/s

Especially the farther the distance the more components are involved at the measurement gets less accurate

seite 7
Ethernet targets macadresses in LANs
All protocols cancel when wrong checksum - Phones can lose significant amounts of energy caused by incomplete data removal

seite 10
tmpC - rate per minute
Measuring: 60days every year, every 20min
Dividing the performance by the price of the entire system including 3 years 24/7 maintenance and cost
Today: Top Data Center: Oracle - 8.5million tmpC, $0.55 ; SAP 112,890 tpmC, $0.19
we can see how the performance increases dramatically while the price stays almost the same.
This is nothing to scary, but there's annother graph I can show you.

seite 11
SAS up to 70% more energy efficient
currently up to 256GB RAM for servers by HP
Energy is going up steadily...this is the main challenge here and it's fought against very aggressively

As you can see the subsystem disks consume the most energy which is partly because of their sheer quantity

seote 13
TOE calculates the checksums instead of CPU

seite 15
20Ghz work of CPU in 10Gbs Networklink without TCP offload

seite 16
MPI is an Interface for Inifiband RDMA
iWarp is the less efficient of them all so no further specifying

seite 18
Legacy Application - that businesses invested a lot of money and time in that are of high performance and efficiency

watch for bottlenecks..if you have 10Gbit/s ethernet,
you will never be able to download something that fast over the internet from one server,
but it could be helpful if you're loading from multiple servers because the speed won't be decreased then.