



Estimating performance parameters of the future network landscape

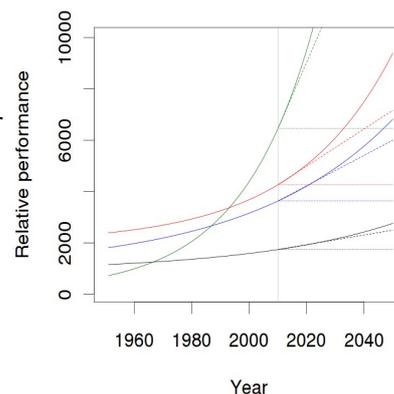
Motivation

Probably every computer scientist has heard of Moore's Law, which states that the complexity of microprocessors doubles every two years. What is less known is that similar laws systematically describing growth also exist for other technological performance parameters of information technology, e.g., for memory, for hard disk sizes, etc. However, it is an interesting aspect that most of these parameters have different growth speeds. A prominent example is RAM access speed, which has increased way slower than CPU speed.

However, not everything does grow; rather, there also exist limiting laws on some important factors. Examples are the speed of light, which sets an immutable lower bound on the propagation delay; Amdahl's law, which gives limits on parallelisation speedup gains; or the visual and temporal resolution of the human eye, which can be viewed as a sensible upper bound for uncompressed video streams (with a grain of salt, this can be estimated to be 130 Mpixel, 27 bit colour depth, <100 Hz).

Outline

First, this thesis should collect as many of such growth laws and limiting laws as possible, with a focus on factors that can be directly or indirectly related to IT and networking in a meaningful way. Interesting figures comprise network performance indicators such as network bandwidth, processing delays, total number of Bytes stored on Web servers globally, as well as other IT performance indicators such as CPU performance, RAM sizes, hard disk sizes, typical number of CPU cores per computer. Even economical, ecological and social figures such as the price for a typical network card, the number of Internet users globally, or the total revenue of the networking industry in relation to the general GDP can be interesting.



Second, own growth or limiting laws that are either based on the combination of other laws or the result of own research, should be derived.

Third the established growth laws and limits should be used to cast some predictions of the near- to mid-future of the future IT landscape, with a focus on networking and the Internet. For example, the influence of delays can be related to the influence of bandwidth on the network performance.

Prerequisites

Profound knowlegde of computer networks and computer architecture; a good general overview on the IT landscape in general and networks and the Internet in particular can be quite helpful.

Knowlegde in statistics.

Creativity and out-of-the box thinking.



More information at the chair for network architectures and services:

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