Nathan's laws of software

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Way back in 1997, Nathan Myhrvold (CTO of Microsoft at the time) wrote a paper entitled "**The Next Fifty Years of Software**" (Subtitled "Software: The Crisis Continues!") which was presented at the ACM97 conference (focused on the next 50 years of computing).

I actually attended an internal presentation of this talk, it was absolutely riveting. Nathan's a great public speaker, maybe even better than Michael Howard :).

But an email I received today reminded me of Nathan's **First Law** of Software: "Software is a Gas!"

Nathan's basic premise is that as machines get bigger, the software that runs on those computers will continue to grow. It doesn't matter what kind of software it is, or what development paradigm is applied to that software. Software will expand to fit the capacity of the container.

Back in the 1980's, computers were limited. So software couldn't do much. Your spell checker didn't run automatically, it needed to be invoked separately. Nowadays, the spell checker runs concurrently with the word processor. The "Bloatware" phenomenon is a direct consequence of Nathan's First Law.

Nathan's second law is also fascinating: "Software grows until it becomes limited by Moore's Law".

The second law is interesting because we're currently nearing the **end of the cycle of CPU growth brought on by Moore's law**. So in the future, the growth of software is going to become significantly constrained (until some new paradigm comes along).

His third law is "Software growth makes Moore's Law possible". Essentially he's saying that because software grows to hit the limits of Moore's law, software regularly comes out that pushes the boundaries. And that's what drives hardware sales. And the drive for ever increasing performance drives hardware manufacturers to make even faster and smaller machines, which in turn makes Moore's Law a reality.

And I absolutely LOVE **Nathan's 4th law**. "Software is only limited by human ambition and expectation." This is so completely true. Even back when the paper was written, the capabilities of computers today were mere pipe dreams. Heck, in 1997, you physically couldn't have a computer with a large music library - a big machine in 1997 had a 600M hard disk.

What's also interesting is the efforts in fighting Nathan's first law. It's a constant fight, waged by diligent performance people against the hoards of developers who want to add their new feature to the operating system. All the developers want to expand their features. And the perf people need to fight back to stop them (or at least make them justify what they're doing). The fight is ongoing, and unending.

Btw, check out the slides they're worth reading. Especially when he gets to the part where the stuff that makes you genetically unique fits on a 3 1/2" floppy drive.

He goes on from that point - at one point in his presentation, he pointed out that the entire human sensory experience can be transmitted easily on a 100mB ethernet connection.