Pursue robust indefinite scalability

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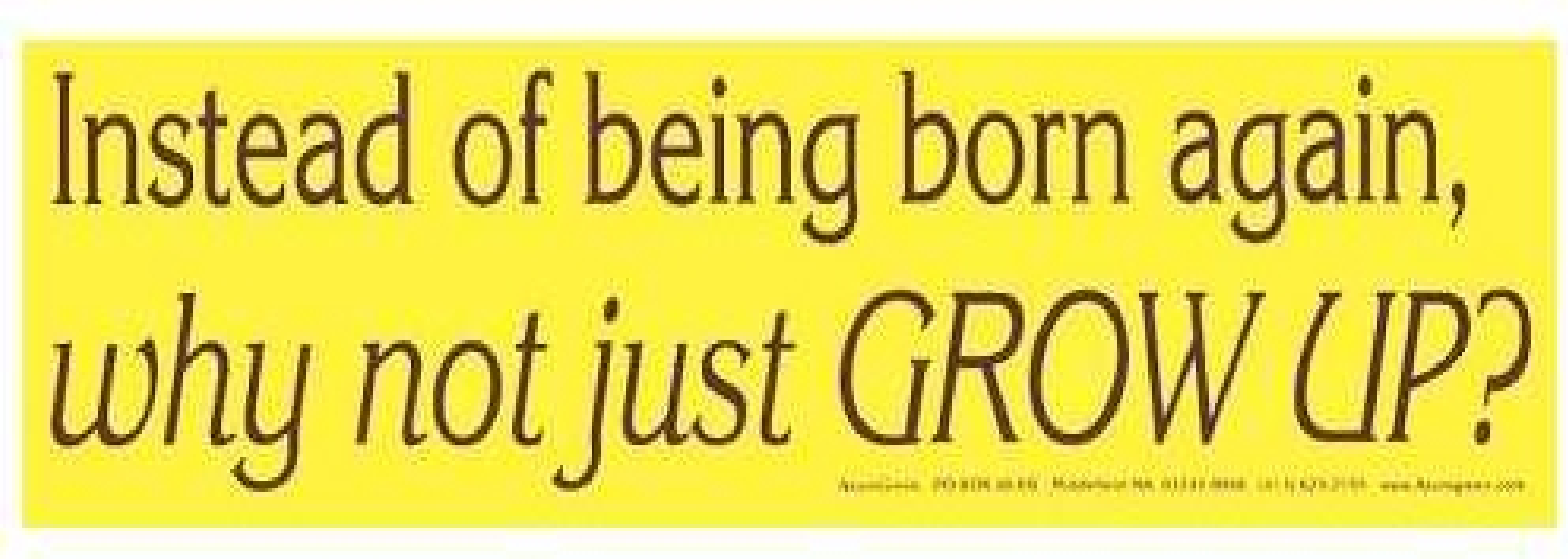
Computation must be born again



Instead of being born again,
why not just GROW UP?

[illegible]

- ►*OK, our answer **might** be wrong*

Computation's Original Sin

Hardware Shall Be Reliable
Software Shall Be Efficient

- Efficiency and robustness are mortal enemies

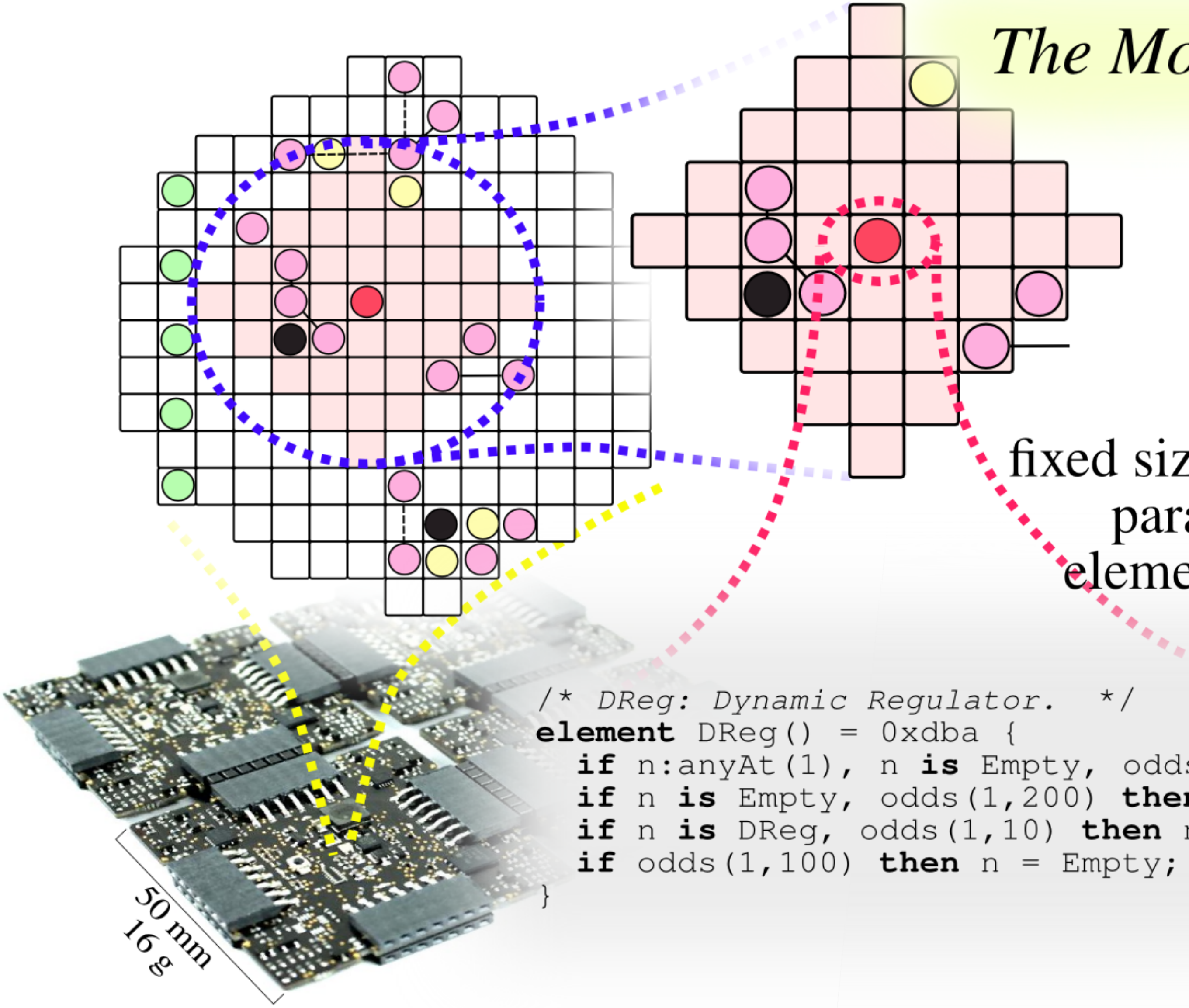
A path to redemption: *Indefinite scalability*

- Mantra: Let space be space, let time be time
- Sacrificing:
  - ✗ Fixed-width addresses, unique node names.
  - ✗ Logarithmic global communication cost
  - ✗ Clock and phase synchronization
- Embracing:
  - ✔Opportunistic reproduction for ||ism & robustness
  - ✔Movability for configuration, manifest destiny, ...
  - ✔Multilevel robustness: Up *to* the end-user

Strategy for universe domination

- Take $10^{\sim 14}$ hit to move to hosted physics; using small von Neumann machines as the 'ether'
- Hosted processor/memory/communication are assigned to regions of space at run-time
- You as god: *It's the* ***expressiveness****, stupid!*
- Optimize 'periodic table', buy back 10^{X} for *x*=?
- Deploy at scale.
- Ever. Increasing. Scale.

Example: Software engineering as artificial chemistry

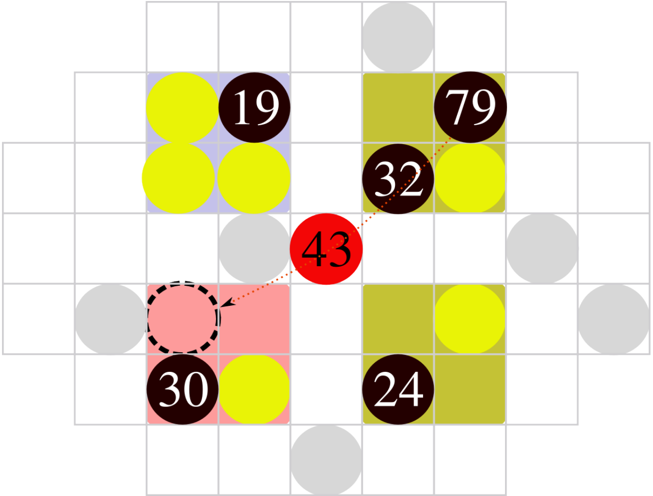


The Movable Feast Machine

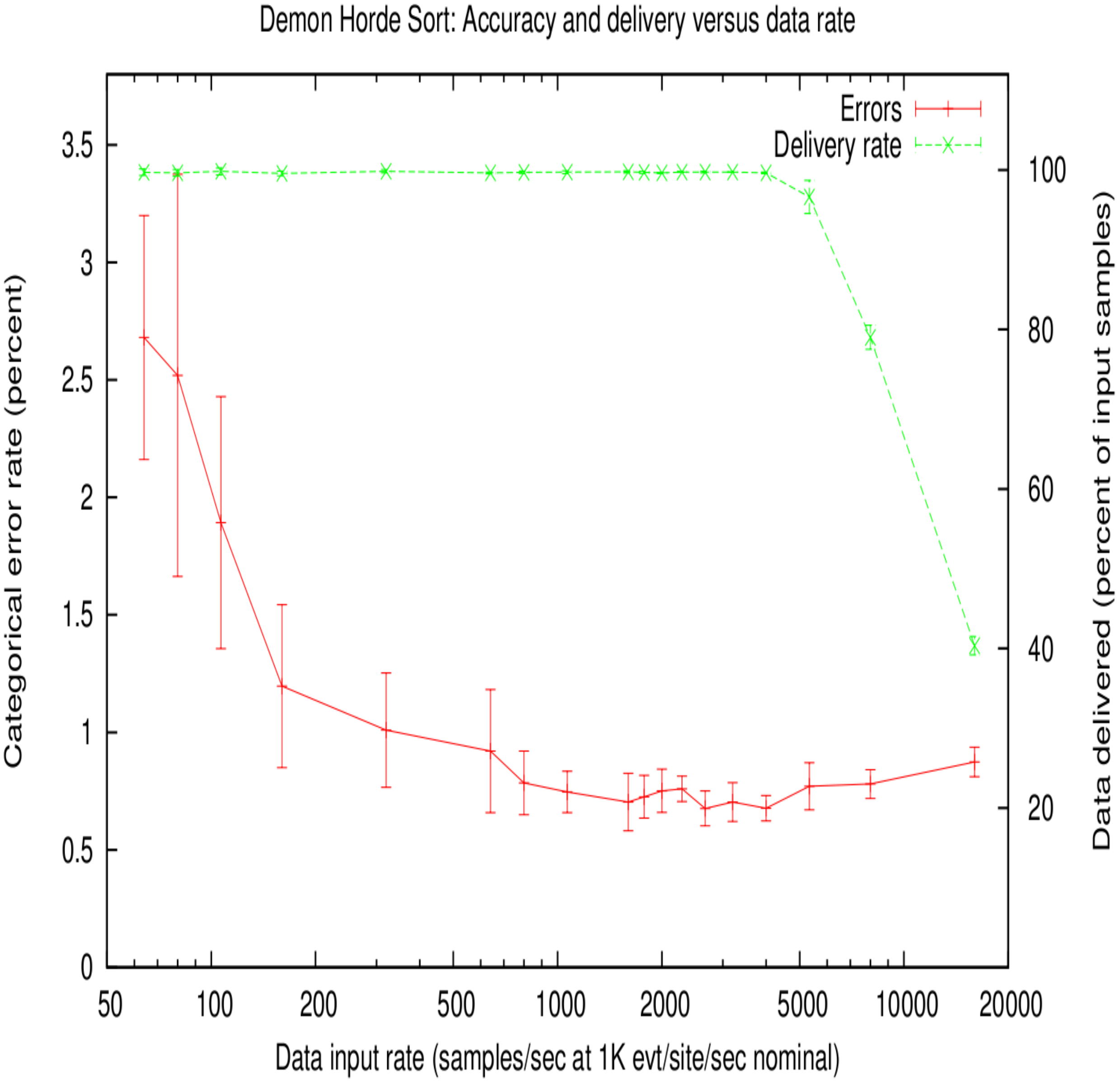
spatial computing
relative addressing
local connectivity
indefinitely scalable
fixed size atoms/sites for mobility
parallel asynchronous update
element-oriented programming

```
/* DReg: Dynamic Regulator.  */
element DReg() = 0xdba {
  if n:anyAt(1), n is Empty, odds(1,1000) then n = DReg;
  if n is Empty, odds(1,200) then n = Res;
  if n is DReg, odds(1,10) then n = Empty; // limit DRegs
  if odds(1,100) then n = Empty;
}
```

Demon Horde Sorting:
Robust Computation Example



- Task: Flow sort endless data stream
- 'Maxwell's Demon' sorting elements stabilized by BC+DReg
- Surprise: Sorting quality vs data rate..


Demon Horde Sort: Accuracy and delivery versus data rate
Errors
Delivery rate
Categorical error rate (percent)
Data delivered (percent of input samples)
Data input rate (samples/sec at 1K evt/site/sec nominal)