

LAND GRAB IN THE CLOUD



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We Lose

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<http://www.google.com/search?q=hellerstein+we+lose+hpts>

Why We Lose

- While we've been thinking about users...
- The OS/Bottom-Uppers have been targeting programmers
- Without programmers, it's damn hard to reach users
 - THIS is why we missed the first waves of the Internet
 - THIS is why ORDBMS lost to App Servers
 - Like trying to sell drugs without the Mafia

SHALL WE PLAY AGAIN?



CLOUD “OS”



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- ✿ a software dev/deploy framework
 - ✿ shared, dynamic, evolving
 - ✿ spanning multiple machines over time
 - ✿ data and session-centric
-
- ✿ but it's really about PROGRAMMING AND DATA

CURRENT (LOSING) STRATEGY

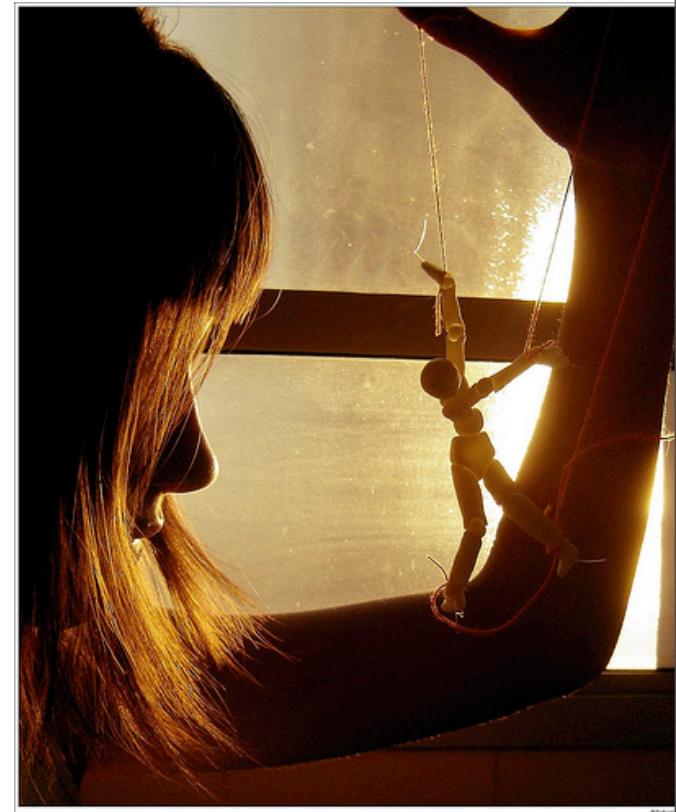


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- ✿ db folks/code boxed in to managing “important data”
 - ✿ with narrow functionality & guarantees
- ✿ “systems” people will manage “the rest”
 - ✿ programming model/environment
 - ✿ monitoring, load management, elasticity, fault mgmt
 - ✿ security

WHO'S THE BOSS

- ✿ it's all about the (distributed) state
 - ✿ session state
 - ✿ coordination state
 - ✿ system state
 - ✿ protocol state
 - ✿ permissions state
 - ✿ .. and the mission critical stuff
- ✿ and deriving/updating that state!



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WINNING STRATEGY

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✿ *reify state as data*

- ✿ system state is 1st-class data.
- ✿ model. evolve. react.

✿ *data-centric programming*

- ✿ declarative specs for state transition and constraints
- ✿ machine/workload independent ... continuously optimizable
- ✿ data parallel



STANDING ON THE SHOULDERS

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- ✿ Gray challenge 12: *automatic programming*
- ✿ Lampson JACM 50th response:
 - ✿ declarative only works for data
 - ✿ component reuse only at coarse grains
- ✿ Stonebraker mantra:
 - ✿ “you have a database problem”
 - ✿ (or maybe something gentler)
 - ✿ not just (or mostly) xactional data

THE LANGUAGE TRAIN LEAVES ONCE A DECADE

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wanna drive?



THE CLOUD GOES BOOM!

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- ★ BOOM is Orders Of Magnitude...

- ★ bigger: global-scale systems
- ★ smaller: pocket-size code
- ★ declarative cloud computing:
“nuggets” and composition
- ★ msg handling, 2PC, paxos, keystore, monitoring, schedulers, ...



LINCOLN

Image source: Chicago Historical Society

the log that's fun to play with

Backup

LITTLE LANGUAGE (DSL)?



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