Power Laws, Longtails, & Software

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Why should you believe anything I say?

iMALL!

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- $20 million in funding in 1998

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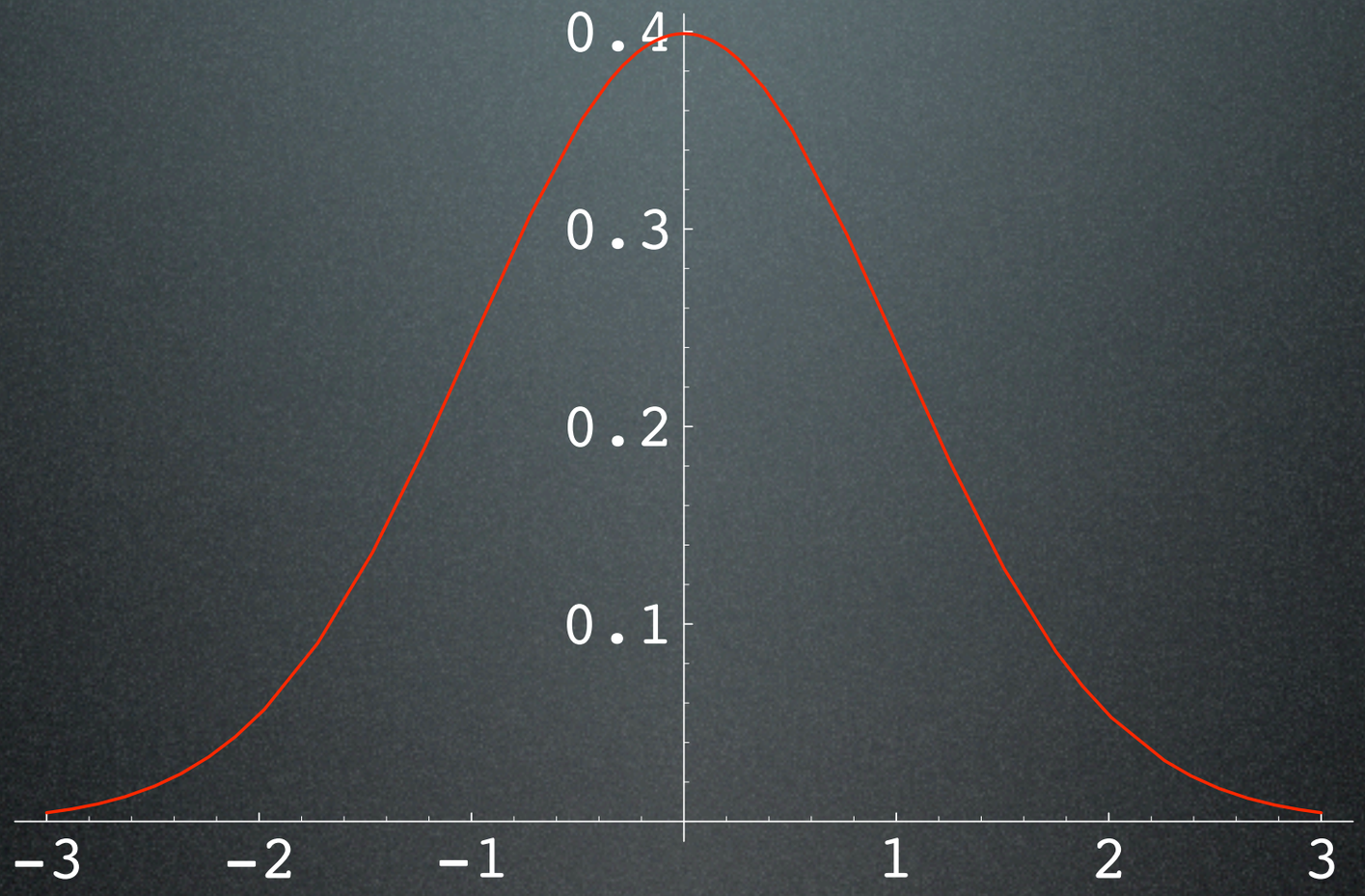
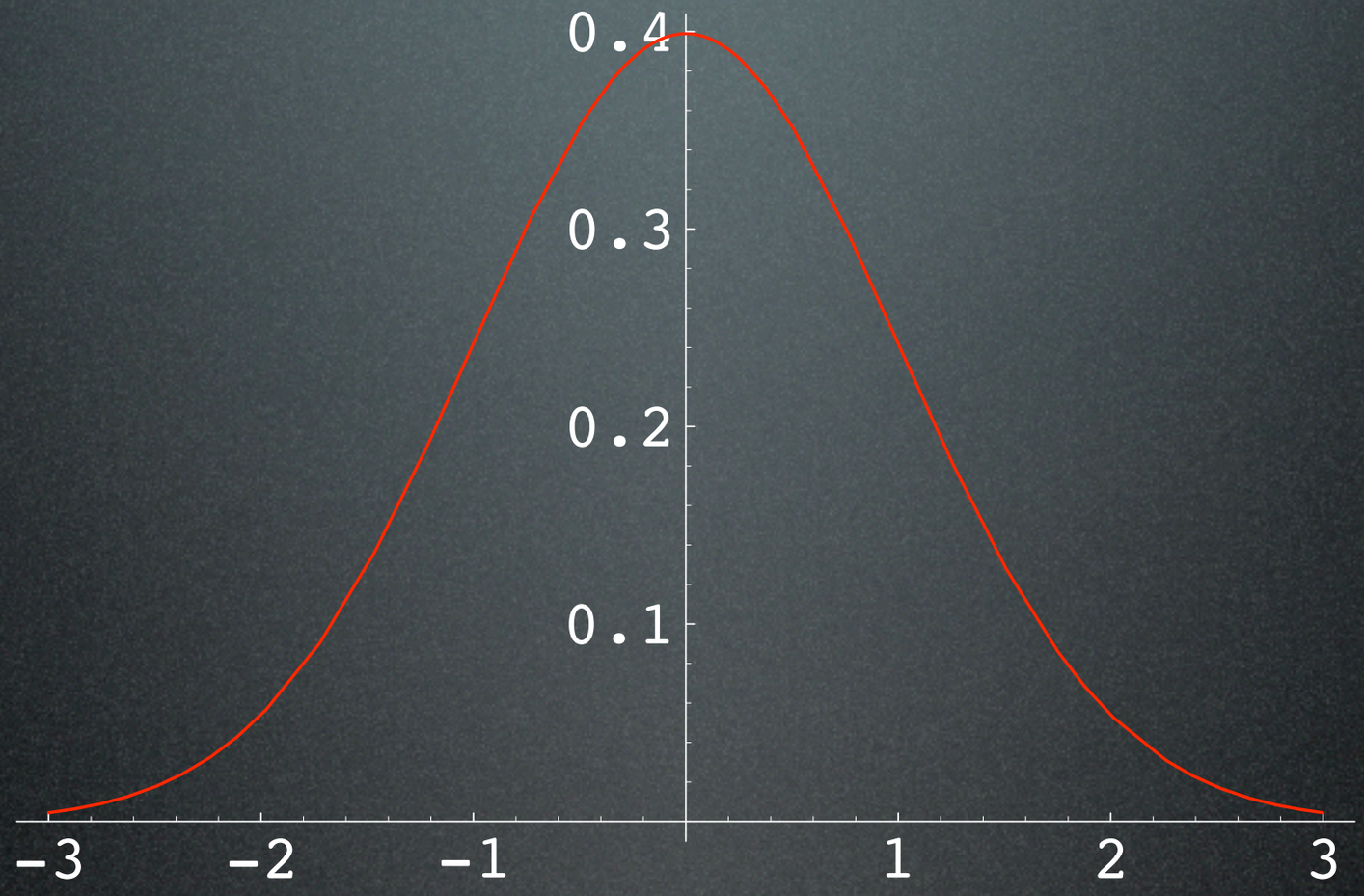
- $20 million in funding in 1998
- 3 to 125 employees in 18 months
- Built four complete versions of our eCommerce tools
- Sold for $500 million in 1999


0.4
0.3
0.2
0.1
−3
−2
−1
1
2
3



Normal Distribution

Pretend Networks

What if we simulate networks by adding links at random nodes according to a normal distribution?

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```
if (avg[links/node] < 1)
then  disconnected islands
else fully connected
```

Real Networks

Real network connection distributions follow this equation:

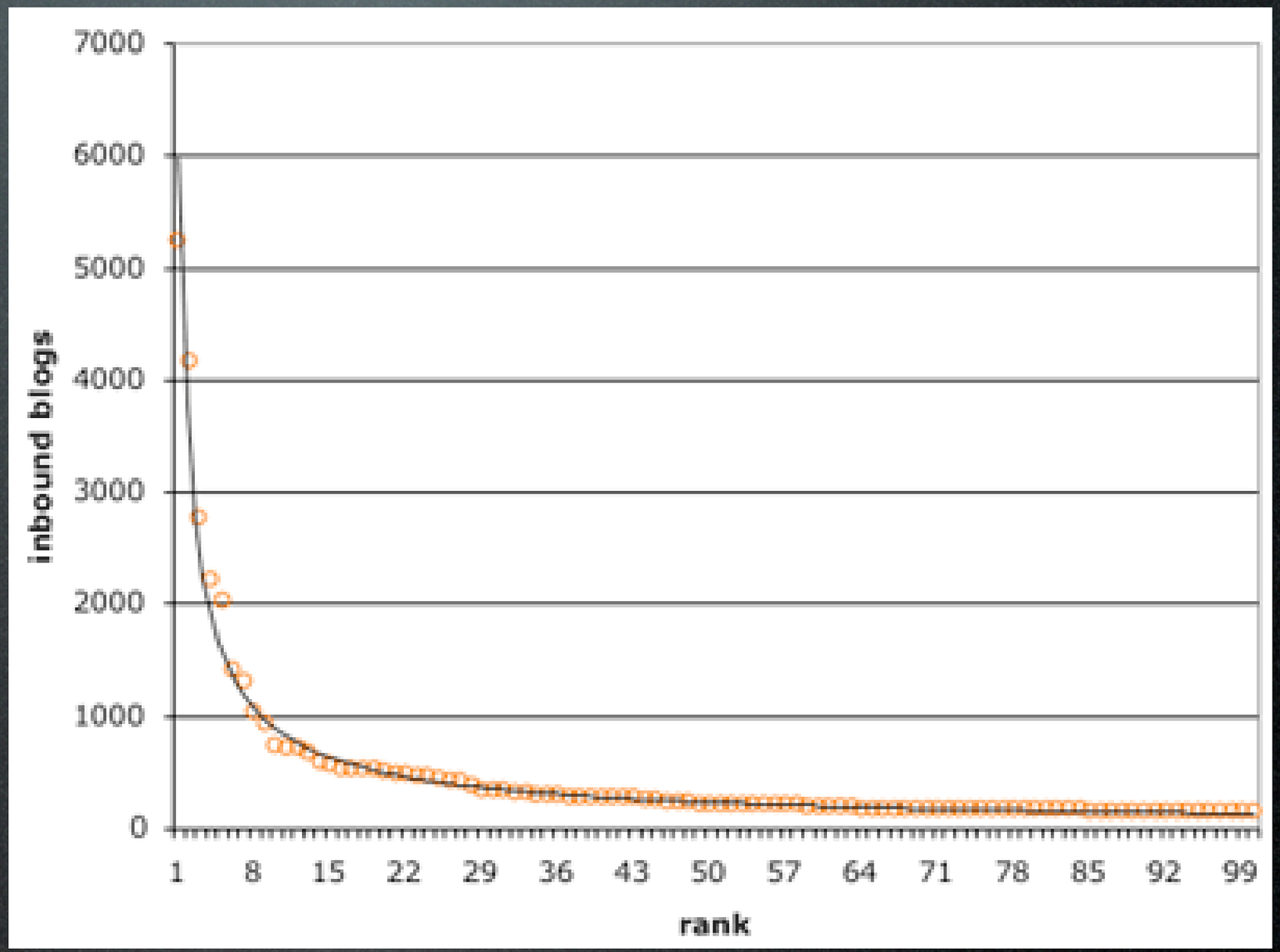
$$y = px^{-k}$$

Surprise!

So do the distributions of:

- Earthquakes vs Richter magnitude
- Actors who've starred in the same films
- Journal citations
- Links between Web sites
- Visits to Web sites by AOL users

Clay
Shirky



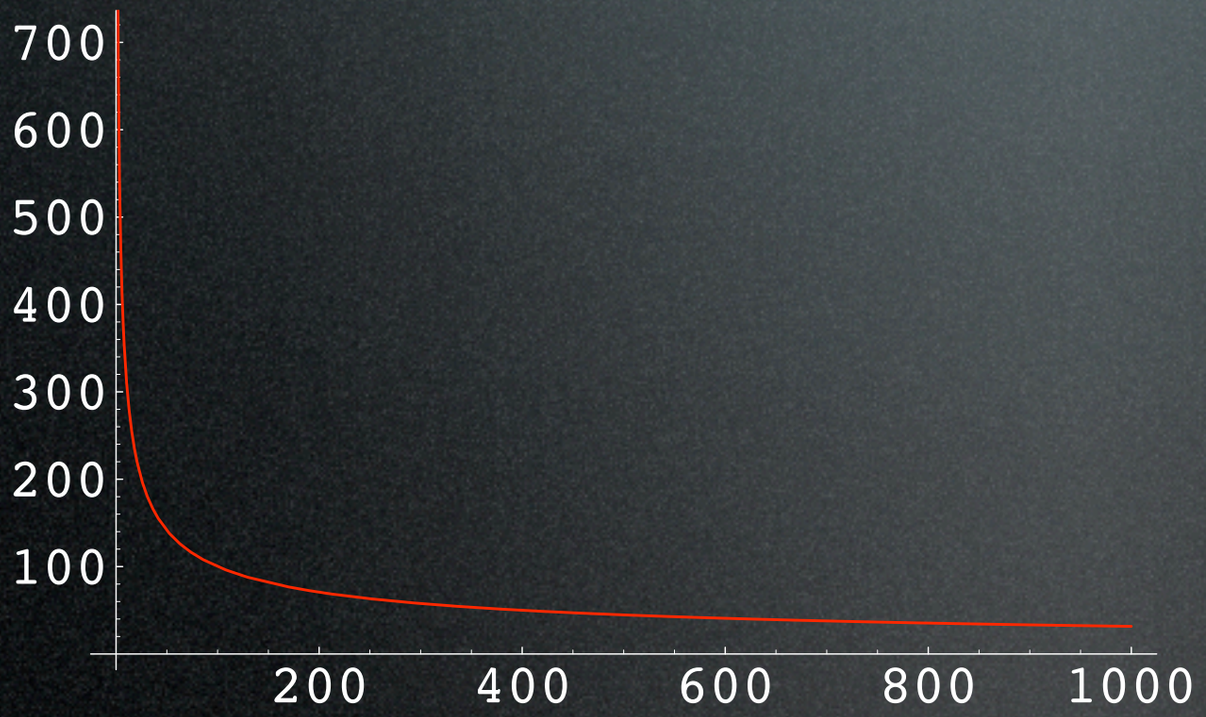
Blogs

Peter Denning

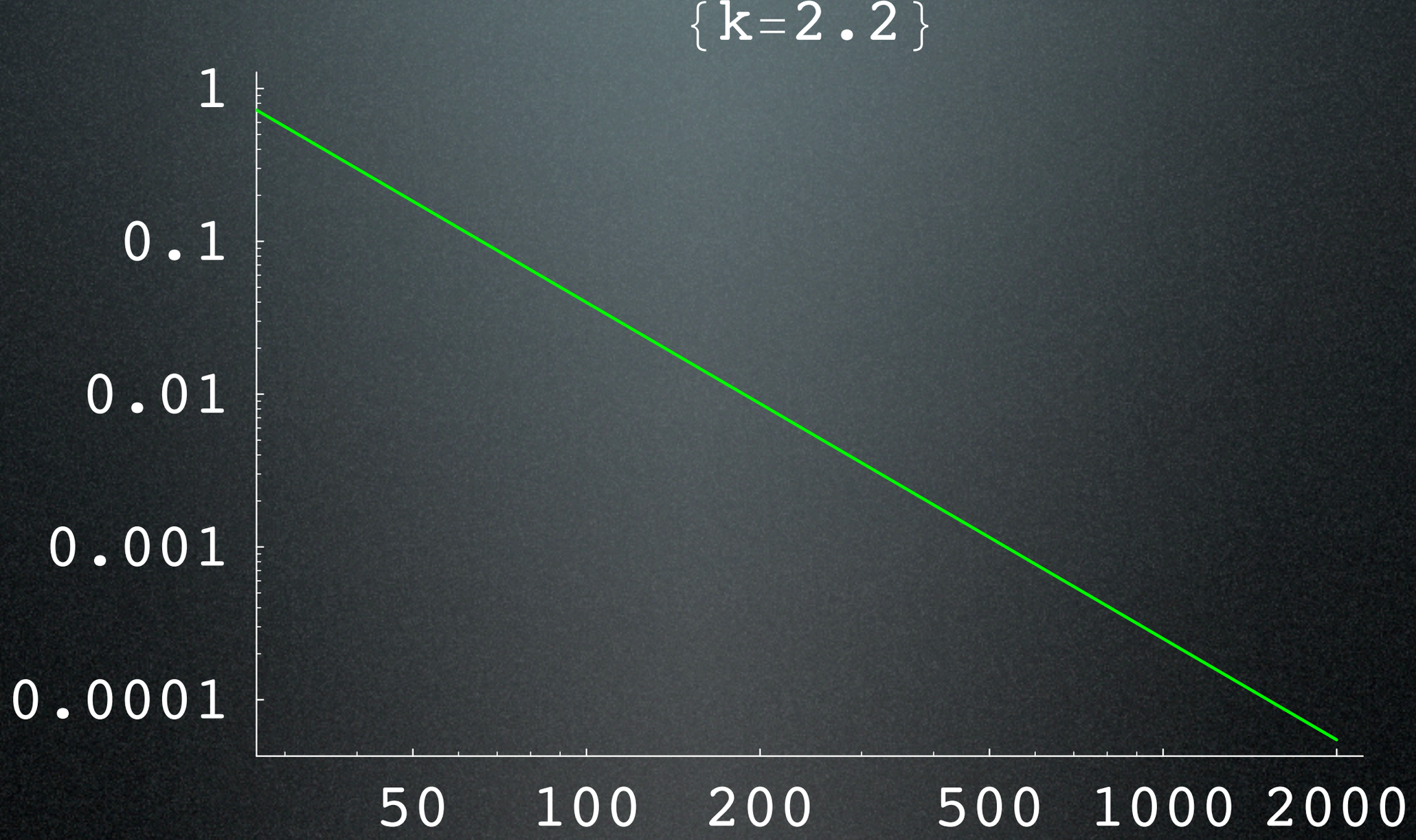
Power-law Distributions

Peter Denning

Power-law Distributions



Peter Denning


{k=2.2}
1
0.1
0.01
0.001
0.0001
50
100
200
500
1000
2000

Growing Scale-Free

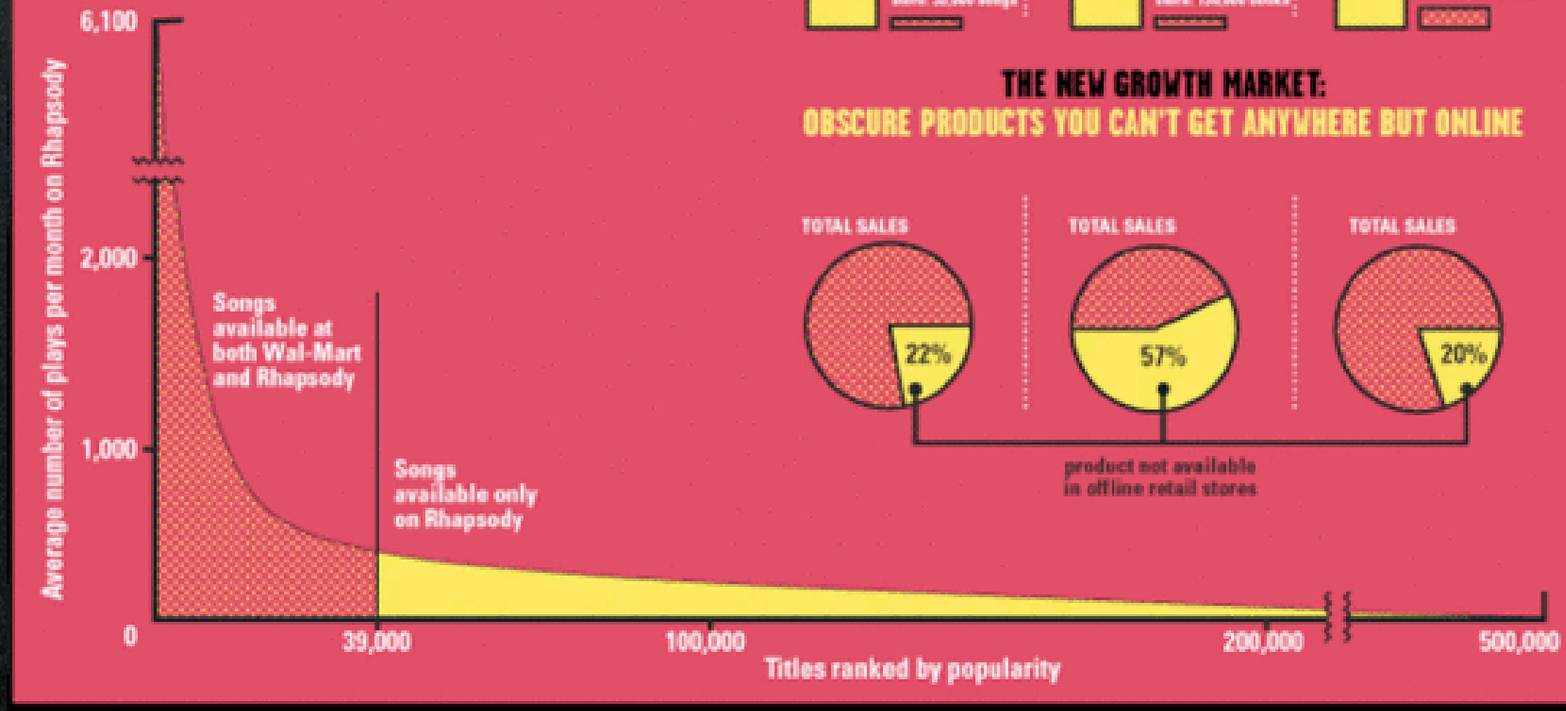
Two conditions:

- Growth: New nodes appear at random times
- Preferential connection: probability a new node will connect with an existing node is proportional to the connectivity of that node

The Longtail

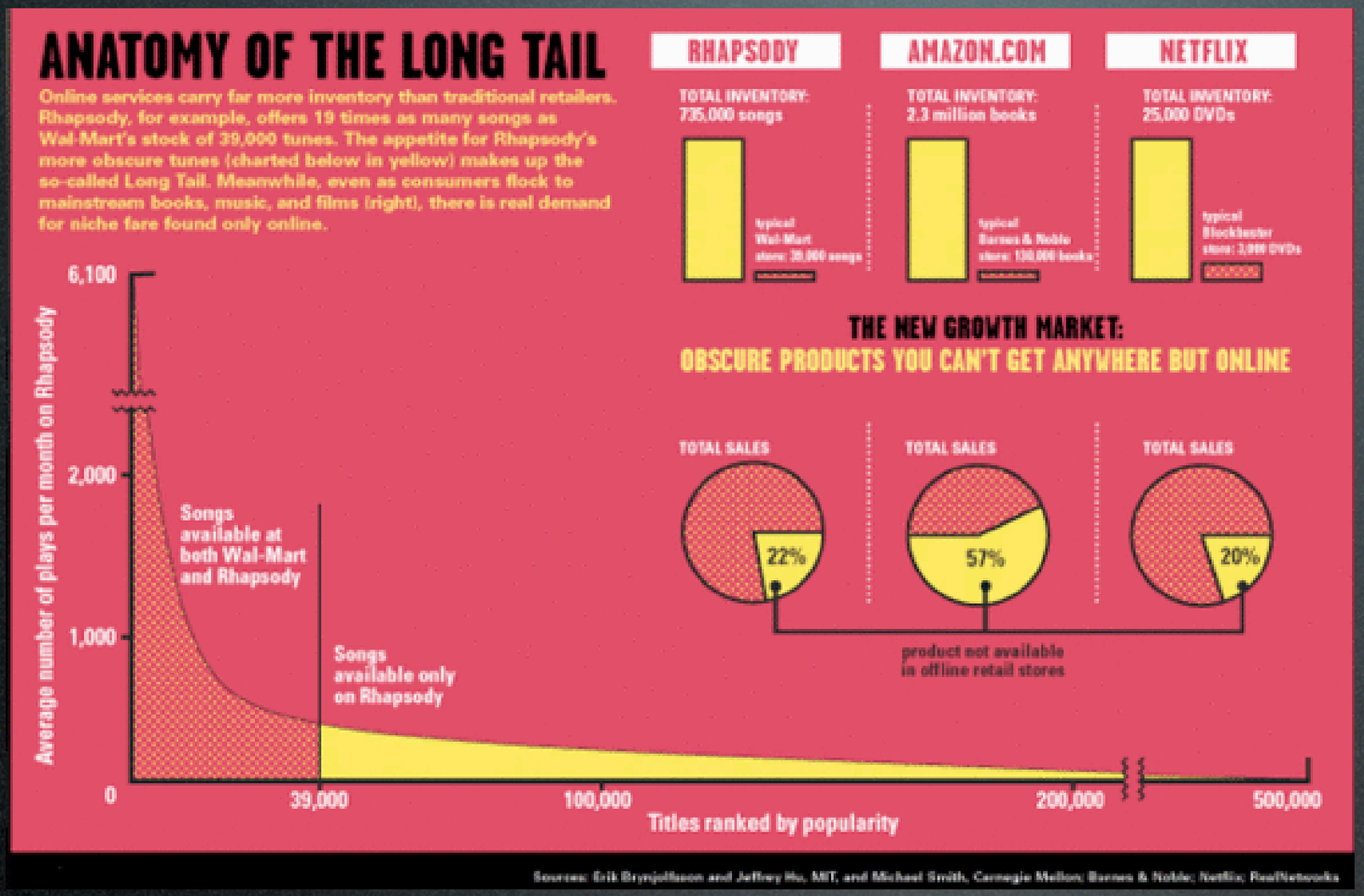
ANATOMY OF THE LONG TAIL

Online services carry far more inventory than traditional retailers. Rhapsody, for example, offers 19 times as many songs as Wal-Mart's stock of 39,000 tunes. The appetite for Rhapsody's more obscure tunes (charted below in yellow) makes up the so-called Long Tail. Meanwhile, even as consumers flock to mainstream books, music, and films (right), there is real demand for niche fare found only online.



THE NEW GROWTH MARKET:
OBSCURE PRODUCTS YOU CAN'T GET ANYWHERE BUT ONLINE

Sources: Erik Brynjolfsson and Jeffrey Hu, MIT, and Michael Smith, Carnegie Mellon; Barnes & Noble; Netflix; RealNetworks



Virtually Free Distribution
+ Infinite Shelf Space
=
New Business Models based on
Customer Streams

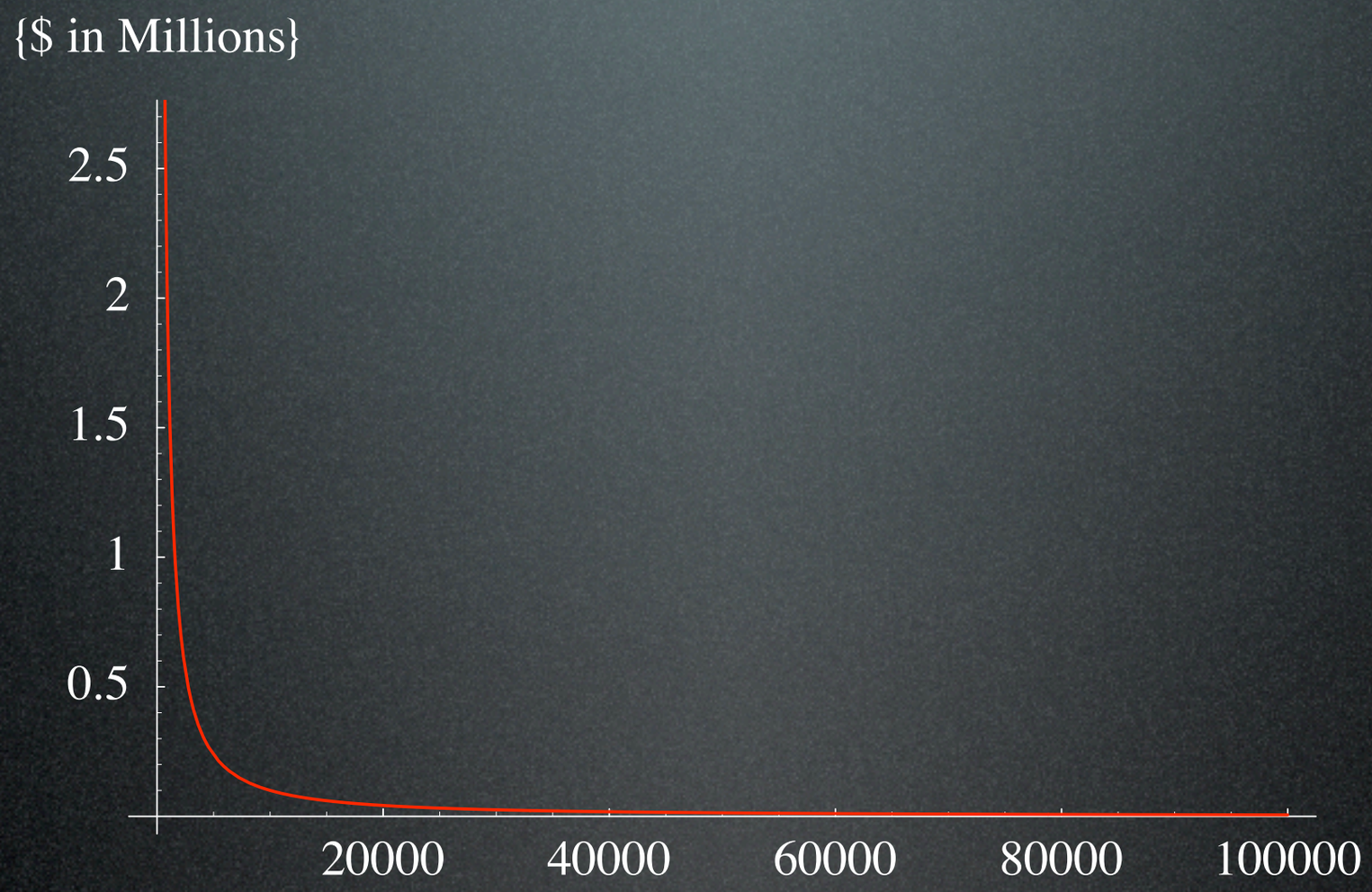
Not Just Media

- Google: advertising
- eBay: hard goods
- CapitalOne: customers
- Offshoring: services

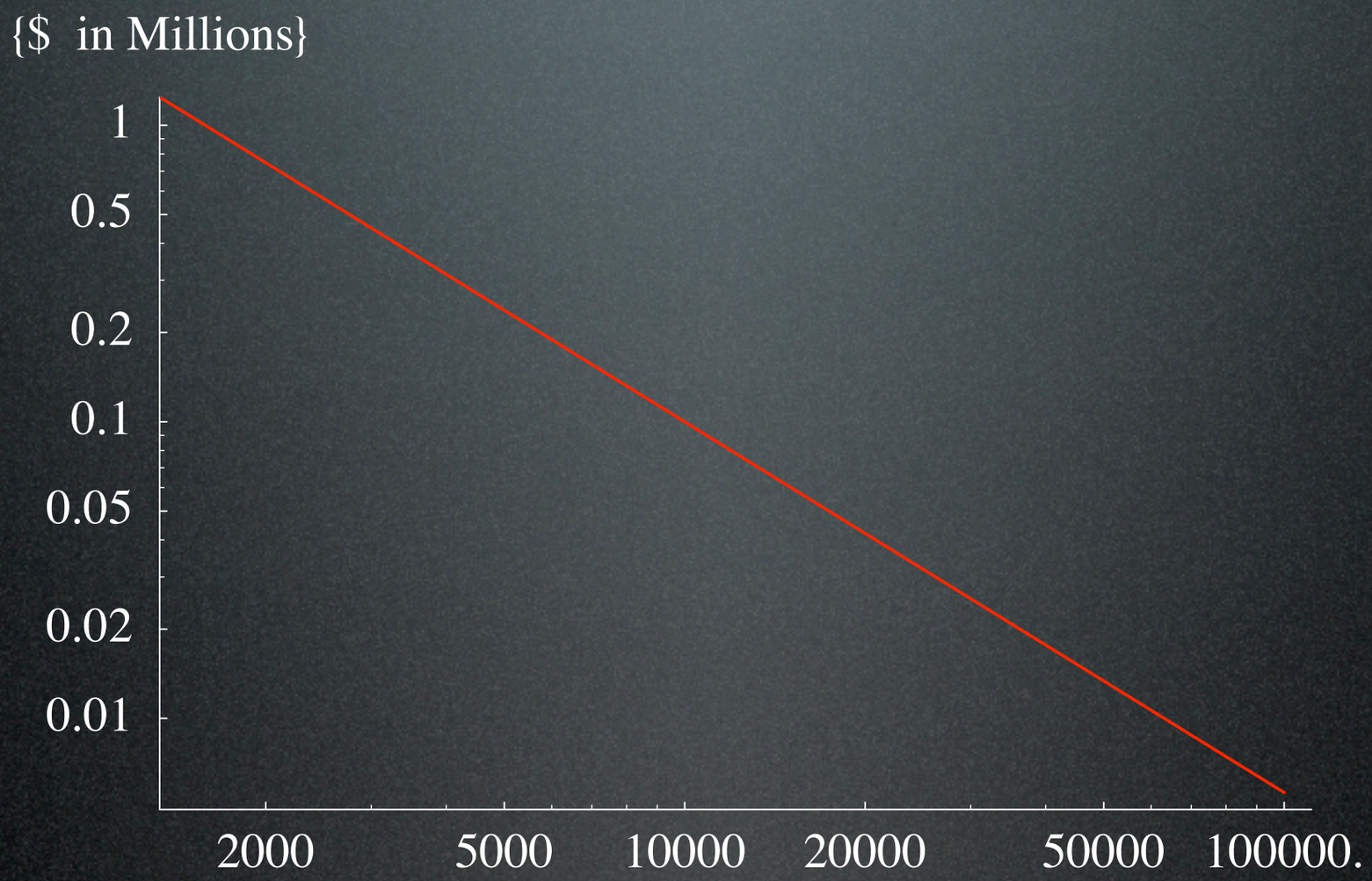
Source: Chris Anderson

Database Licensing

Database Licensing



Database Licensing



An Alternate View

Exploiting the Longtail

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1. Hire 1000 Consultants

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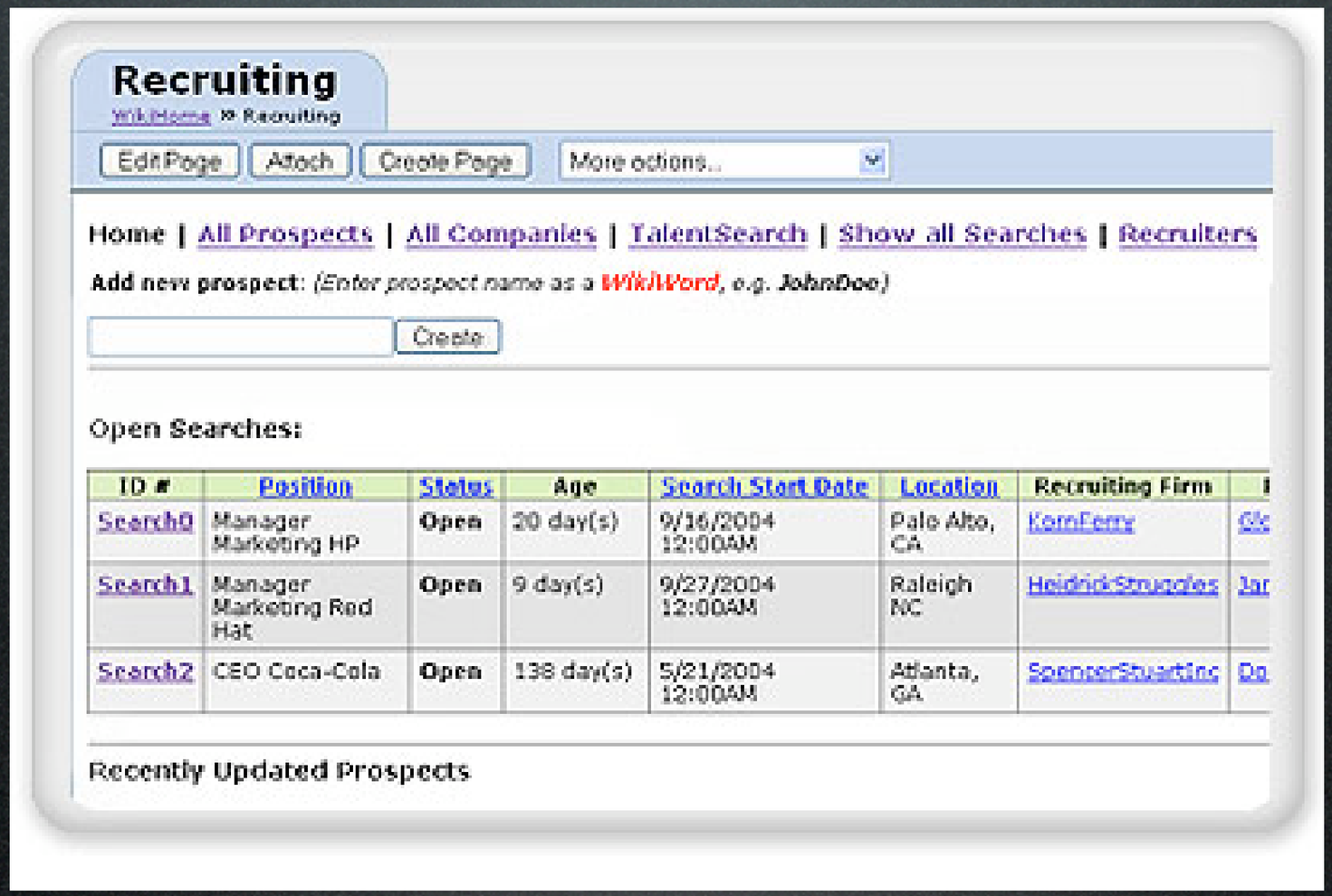
2. Build tools and sell them to 1000 consultants
3. Create a self-service system

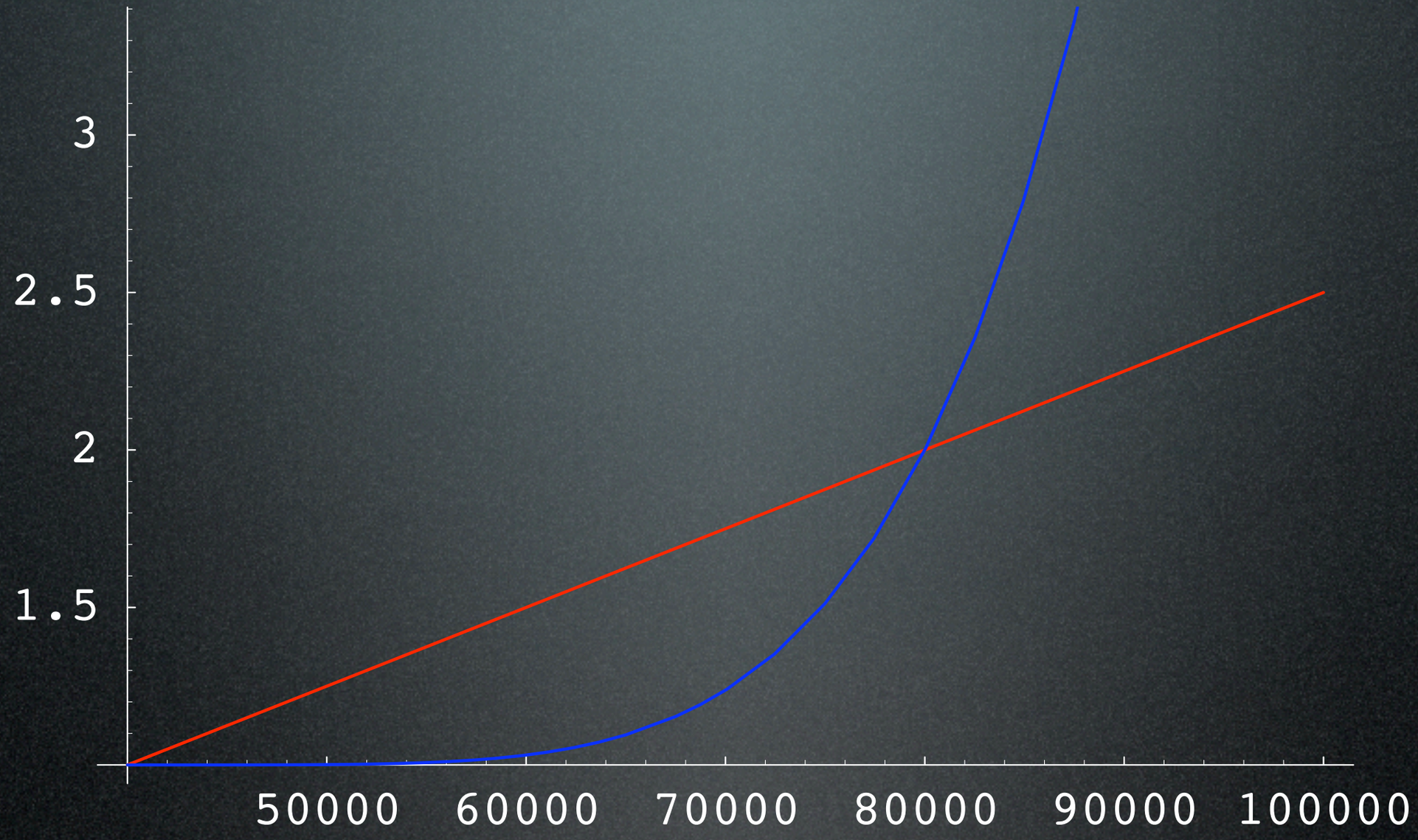
Exploiting the Longtail

	Email	Web Design
Consultants	Lotus, Groupwise	US Web
Build Tools	Eudora, Microsoft	LAMP
Self-service	Hotmail, GMail	Wikis, Blogs

JotSpot



Exploiting the Longtail of Web Applications



Your best programmer is 40 times as effective as your worst

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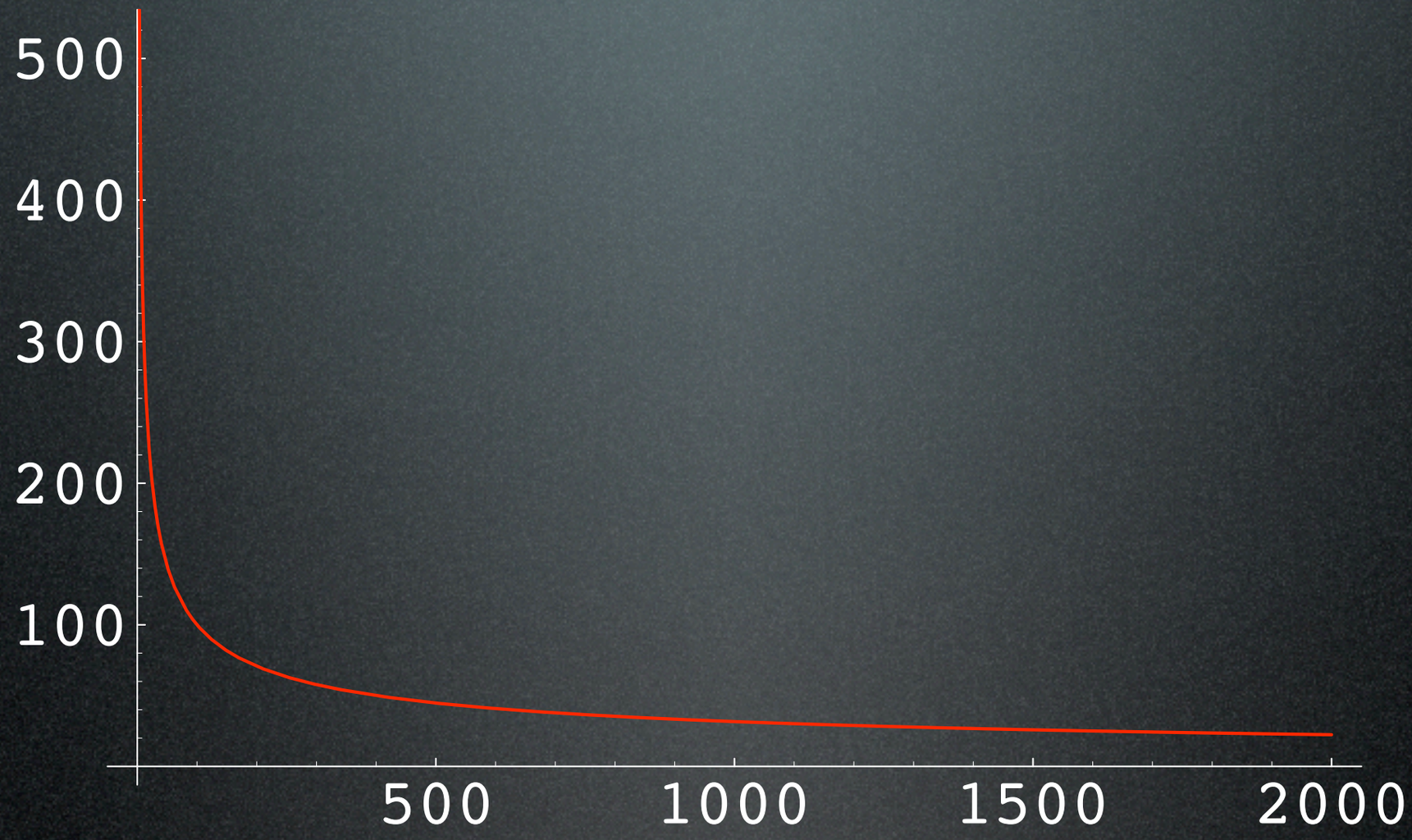
An Alternate View

{k=-0.5,p=1000}



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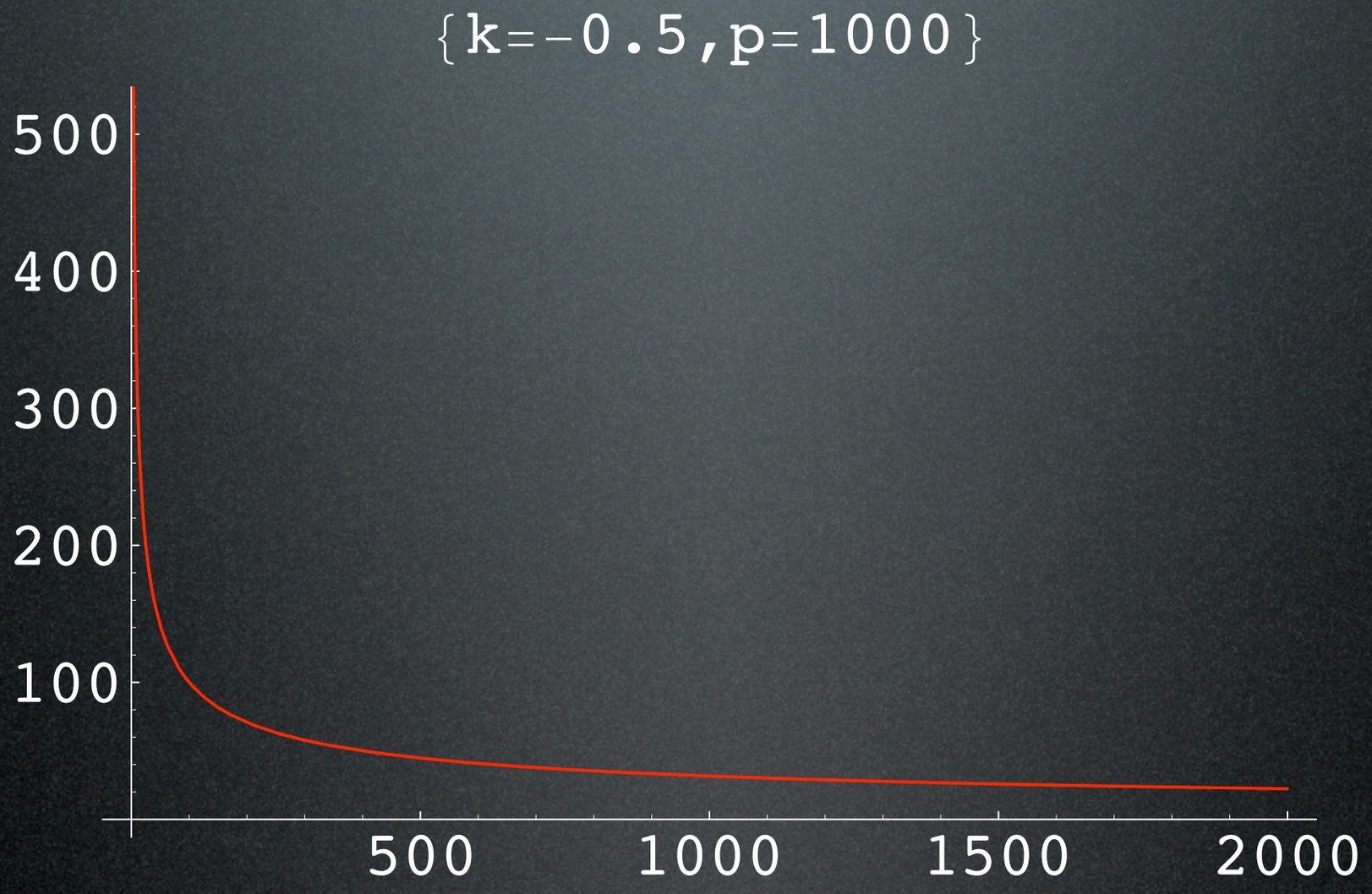
Programming Projects

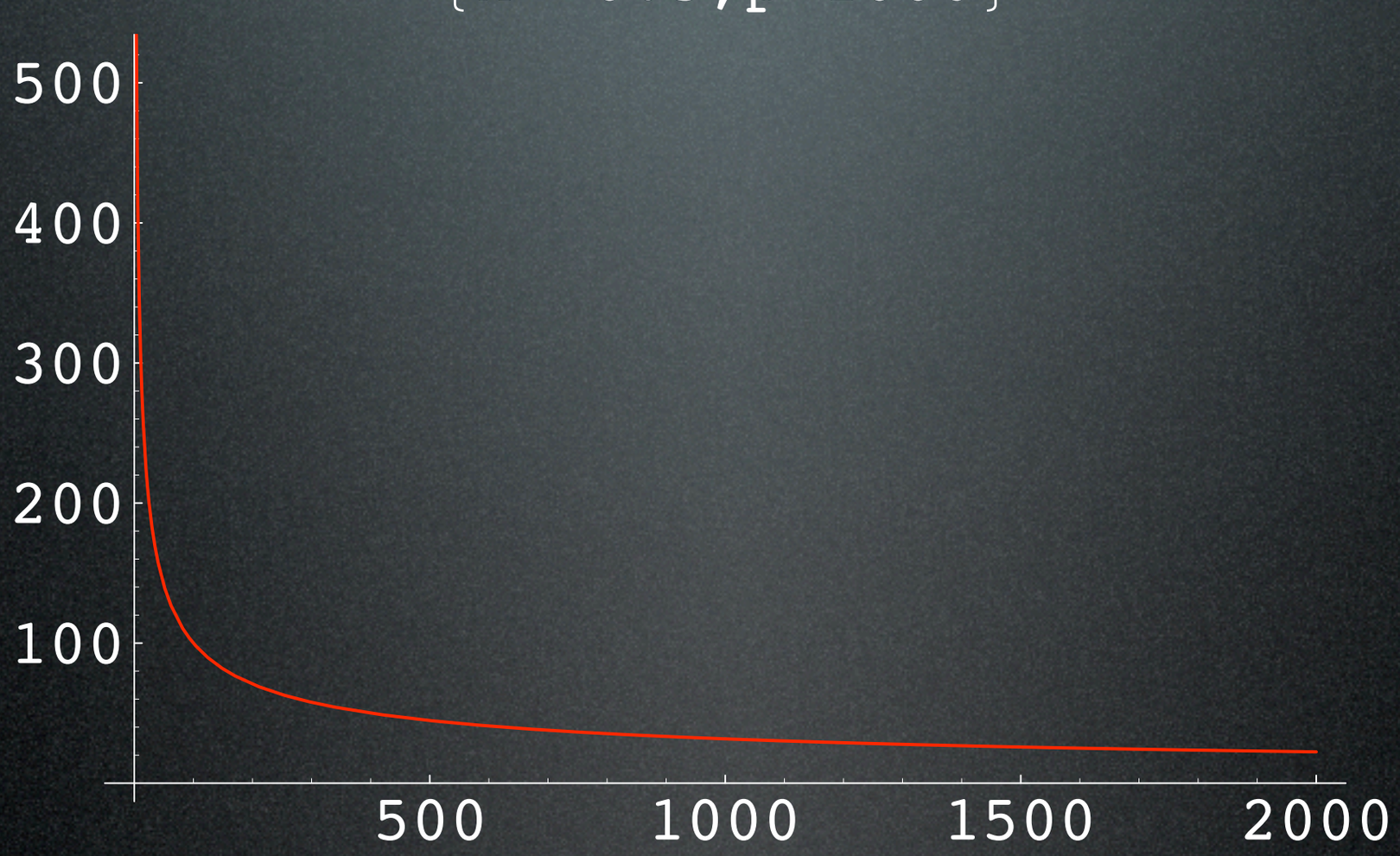
Programming Projects



Utah High Tech Employees

2500 High Tech Firms in Utah

Utah High Tech Employees



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Big Programming

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Java is a language for accreting programs as a series of patches

-Paul Graham

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Is your language better than machine language?

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Follow this argument to its logical conclusion...

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Why?

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Follow this argument to its logical conclusion...

One language must be more powerful than the rest.

Lisp

Lisp

(or Ruby, Python, Perl, PHP)

You don’t have to believe me...

You don’t have to believe me...

In fact, I hope you don’t.

Some advice...

Don’t be afraid to work for small companies

Don’t confuse your job with your career

Exploit
longtail
opportunities

Build a
self-service,
hosted
product

Two pizza teams

Manage
programming debt

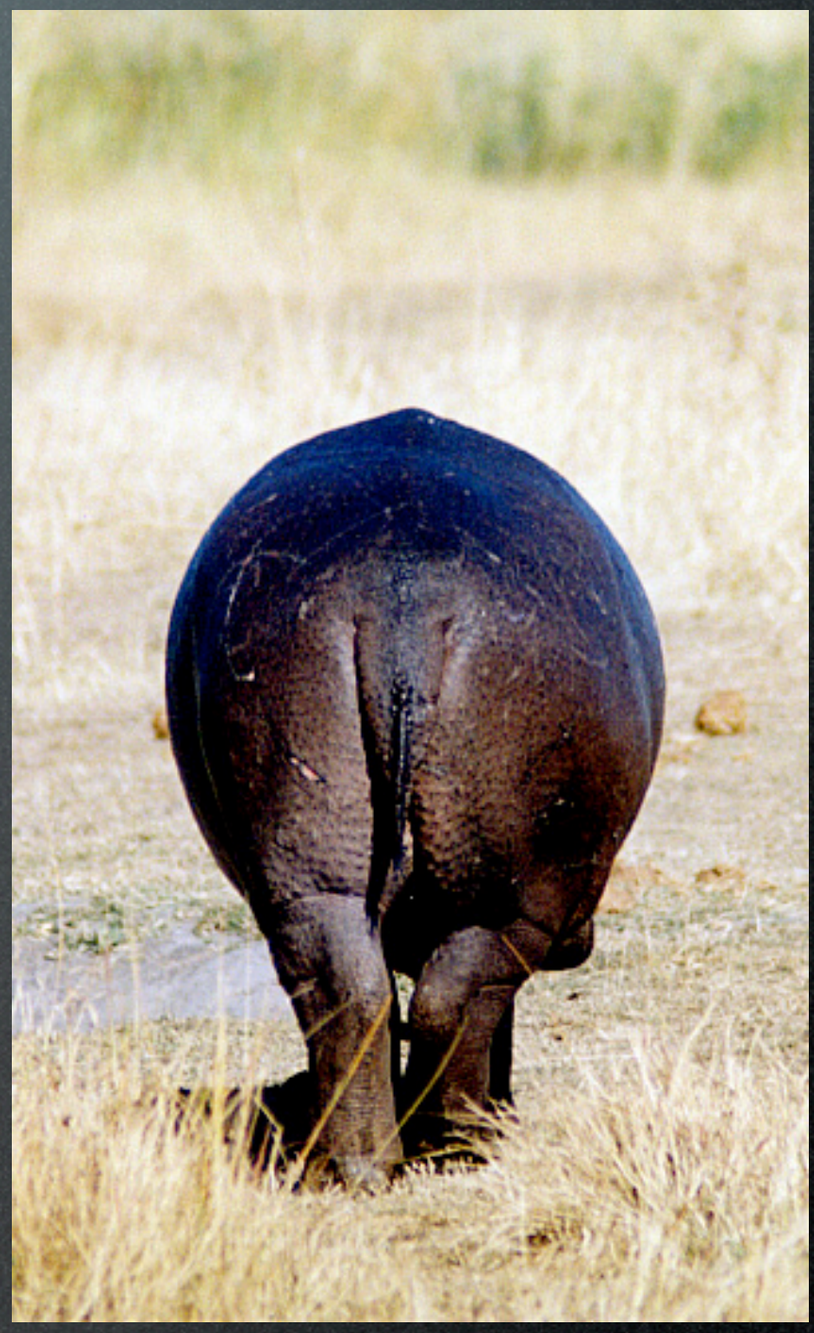
Release early and often

Don’t give up your advantages easily

Choose the most powerful language you can

The End

Questions?



Contact me:

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