Web Search Basics

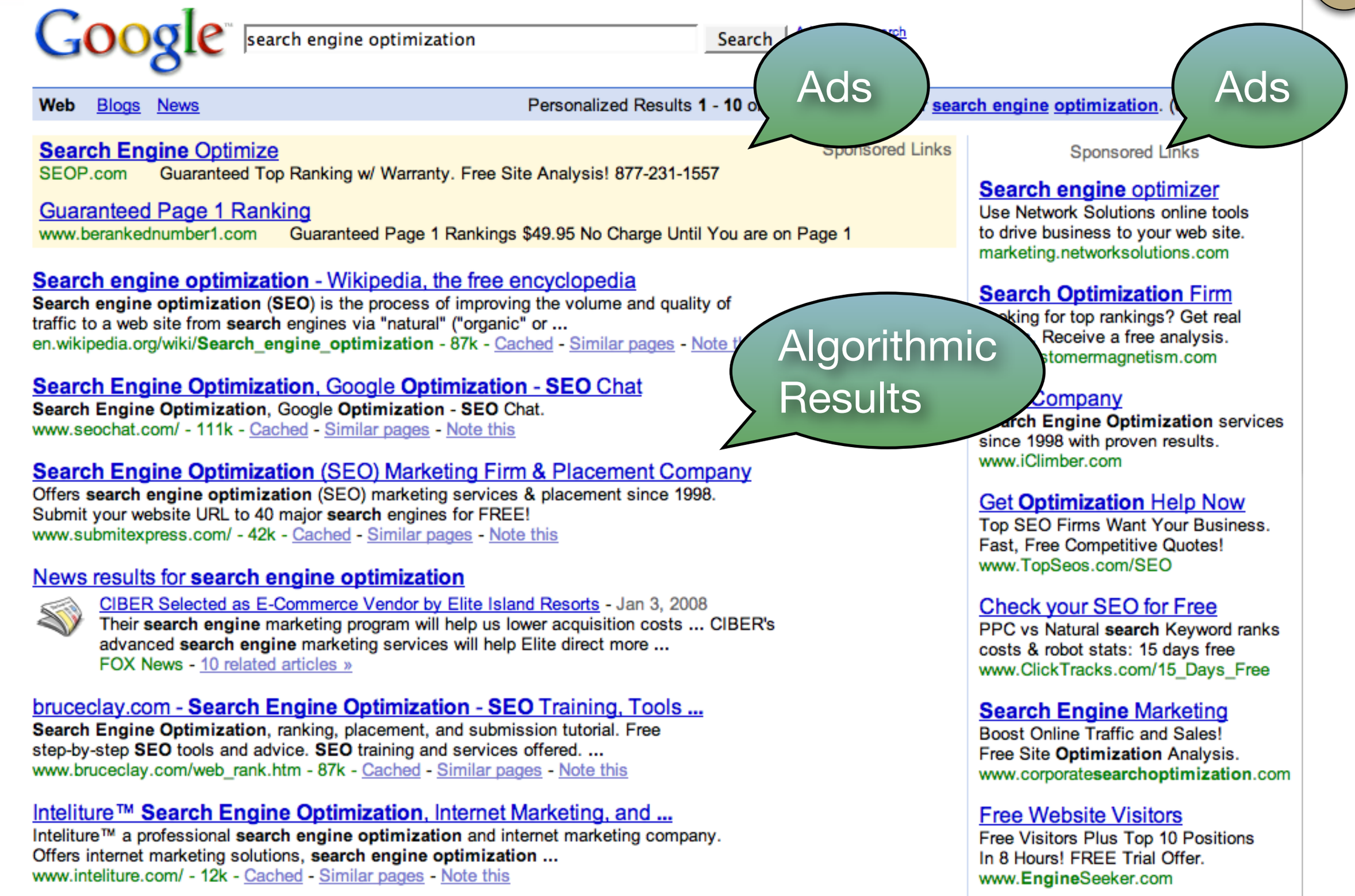
Introduction to Information Retrieval

Content adapted from Hinrich Schütze
http://www.informationretrieval.org

Overview

- Introduction
- Classic Information Retrieval
- Web IR
- Sponsored Search
- Web Search Basics
  - Size of the Web
- Web Users
- Spam

Sponsored Search



Sponsored Search

Ads vs. Search Results

- Google maintains that ads (based on vendors bidding for search queries) do not affect vendors ranking in search results

Sponsored Links

Search engine optimizer
Use Network Solutions online tools to drive business to your web site.
marketing.networksolutions.com

Search Optimization Firm
Looking for top rankings? Get real results. Receive a free analysis.
www.customermagnetism.com

SEO Company
Search Engine Optimization services since 1998 with proven results.
www.iClimber.com

Search engine optimization - Wikipedia, the free encyclopedia
Search engine optimization (**SEO**) is the process of improving the volume and quality of traffic to a web site from **search** engines via "natural" ("organic" or **...**
en.wikipedia.org/wiki/**Search_engine_optimization** - 87k - Cached - Similar pages - Note this

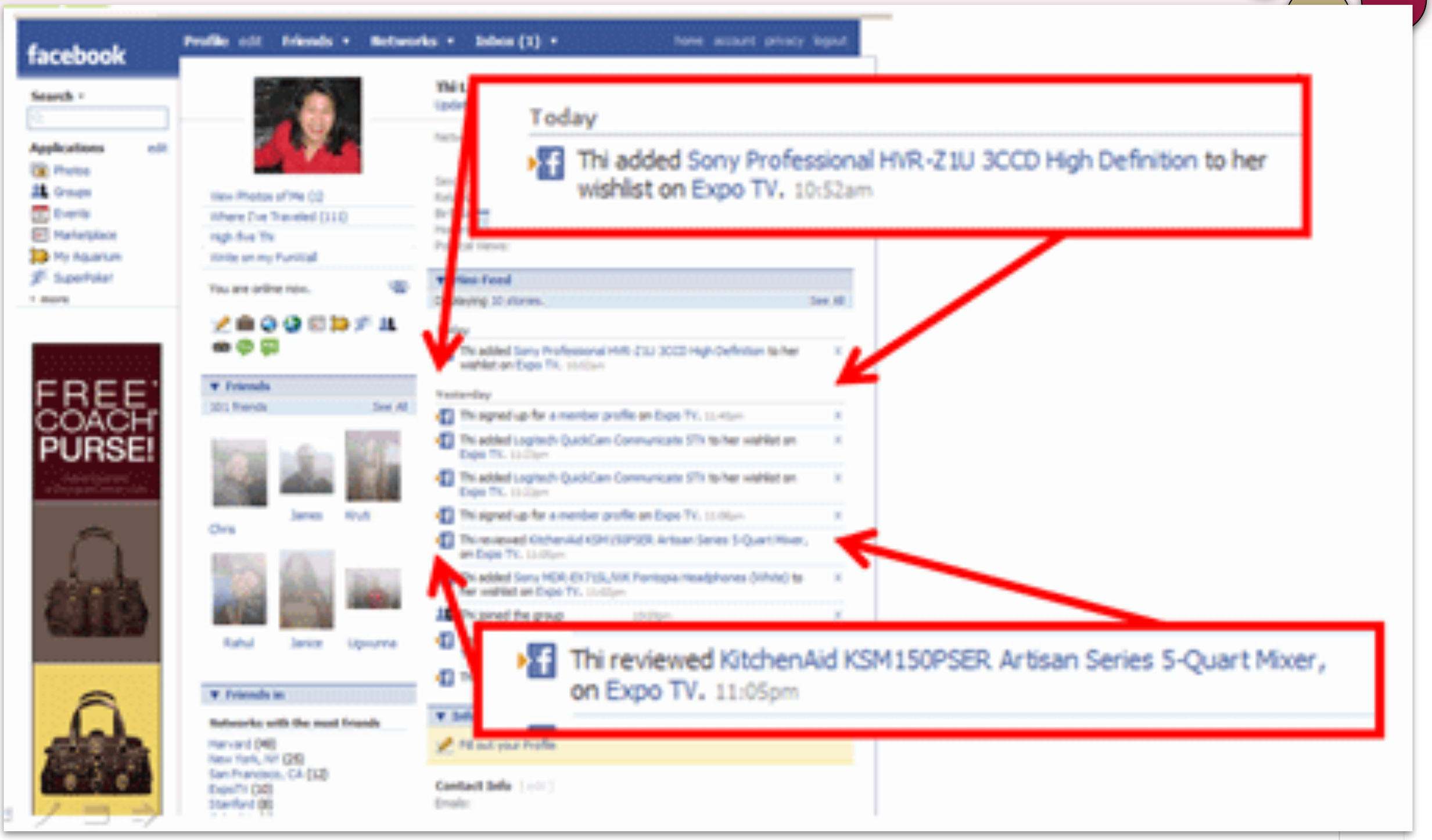
Search Engine Optimization, Google **Optimization** - **SEO** Chat
Search Engine Optimization, Google **Optimization** - **SEO** Chat.
www.seochat.com/ - 111k - Cached - Similar pages - Note this

Search Engine Optimization (SEO) Marketing Firm & Placement Company
Offers **search engine optimization** (SEO) marketing services & placement since 1998. Submit your website URL to 40 major **search** engines for FREE!
www.submitexpress.com/ - 42k - Cached - Similar pages - Note this

News results for **search engine optimization**

CIBER Selected as E-Commerce Vendor by Elite Island Resorts - Jan 3, 2008
Their **search engine** marketing program will help us lower acquisition costs **...** CIBER's advanced **search engine** marketing services will help Elite direct more **...**
FOX News - 10 related articles »

Sponsored Search



Sponsored Search

Ranking of ads

- Goto model:
  - Rank according to how much advertiser pays
- Current model:
- Balance auction price and relevance
- Irrelevant ads (few click-throughs)
  - Decrease opportunities for relevant ads
  - Harm the user experience
- Idea: Well-targeted advertising is good for everyone

Sponsored Search

Paying for advertisements - terms

- CPM
  - “Cost Per Mil”
  - Pay for 1000 eyeballs
  - Important for branding campaigns
- CPC
  - “Cost per Click”
  - Pay for clicking on ads
  - Important for sales campaigns

Sponsored Search

What are the stakes here?

- What role is Google playing?

Google Dreams of a World After Apps but It's a Nightmare for Rivals

It's a hazy world after apps.

/ MOBILE

Shutterstock

By Mark Bergen | @mhbergen | EMAIL | ETHICS

September 3, 2015, 11:37 AM PDT

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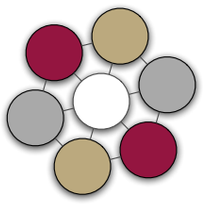


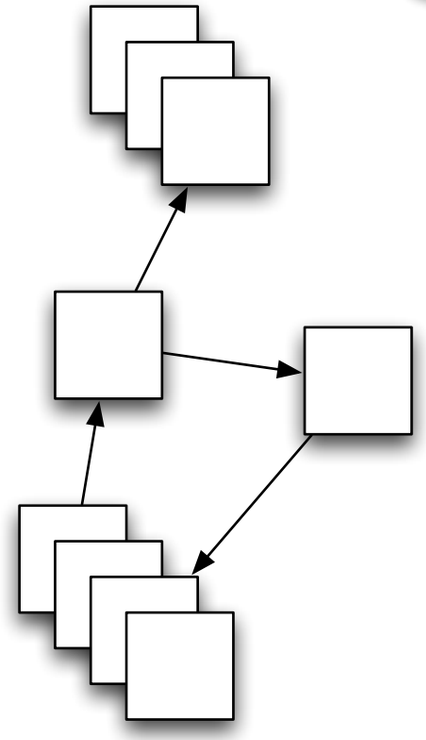
Web Search Basics

  - Size of the Web
  - Web Users
  - Spam

Web Search Basics

The Web Corpus

- No design/coordination
- Distributed content creation, linking
- “Democratization of publishing”
- Content includes truth, lies, contradictions, etc.
- Unstructured Data (text, html)
- Semi-Structured (XML, annotated photos)
- Structured (Databases)
- Scale is much larger than previous text corpora

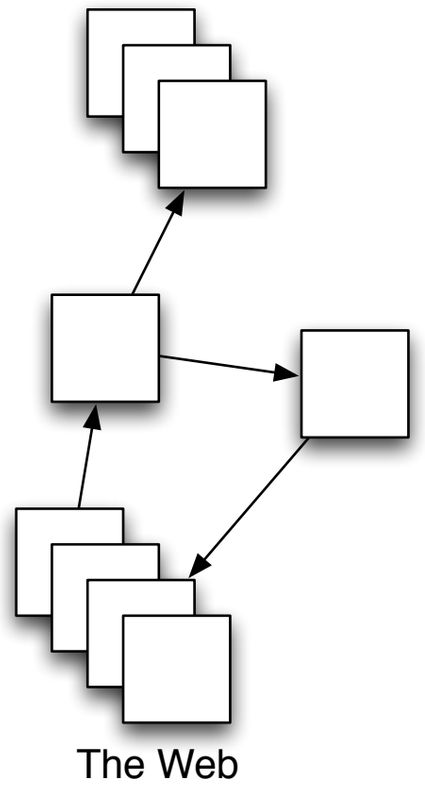


The Web

Web Search Basics

The Web Corpus

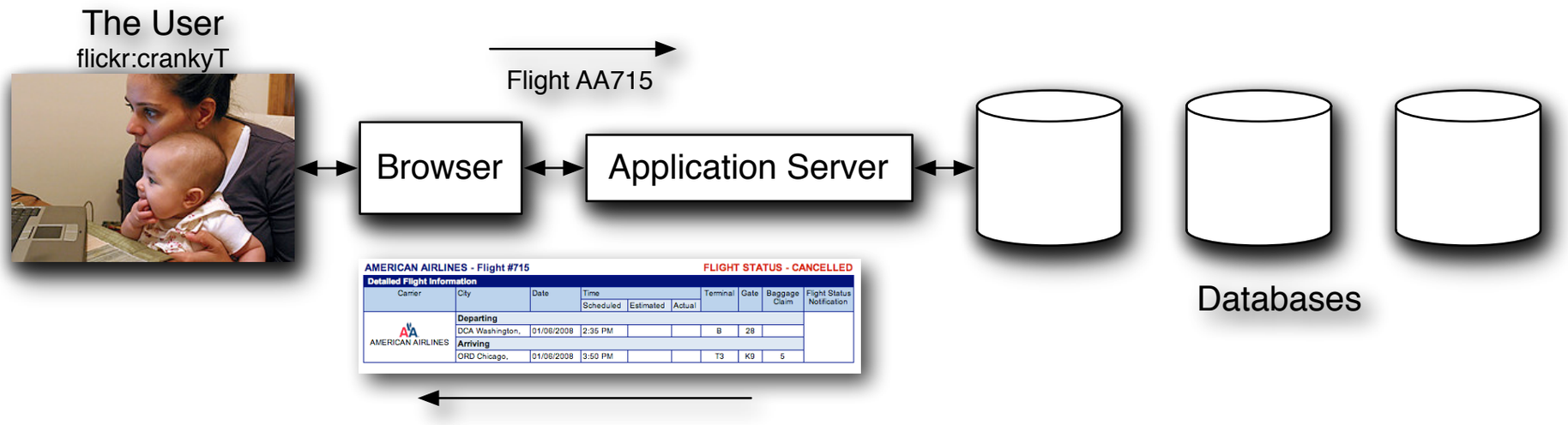
- Growth - slowing from “doubling every few months”, but still expanding



Web Search Basics

Dynamic Content

- Content can by dynamically generated
  - There is no static html version
    - Flight status information, evite responses
- Assembled on request (“?” in URL is a clue)



Web Search Basics

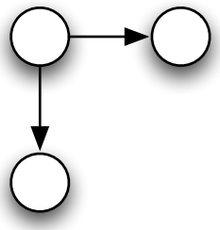
Dynamic Content

- Most (truly) dynamic content is ignored by search engines
  - Too much to index
  - Static information is more important for search
  - Spider Traps look dynamic
- Actually a lot of “static” content is assembled on the fly also
  - ASP, PHP, JSP, ads, etc....

Web Search Basics

The Web as a graph

- Web pages are nodes
- Hyperlinks are directed edges

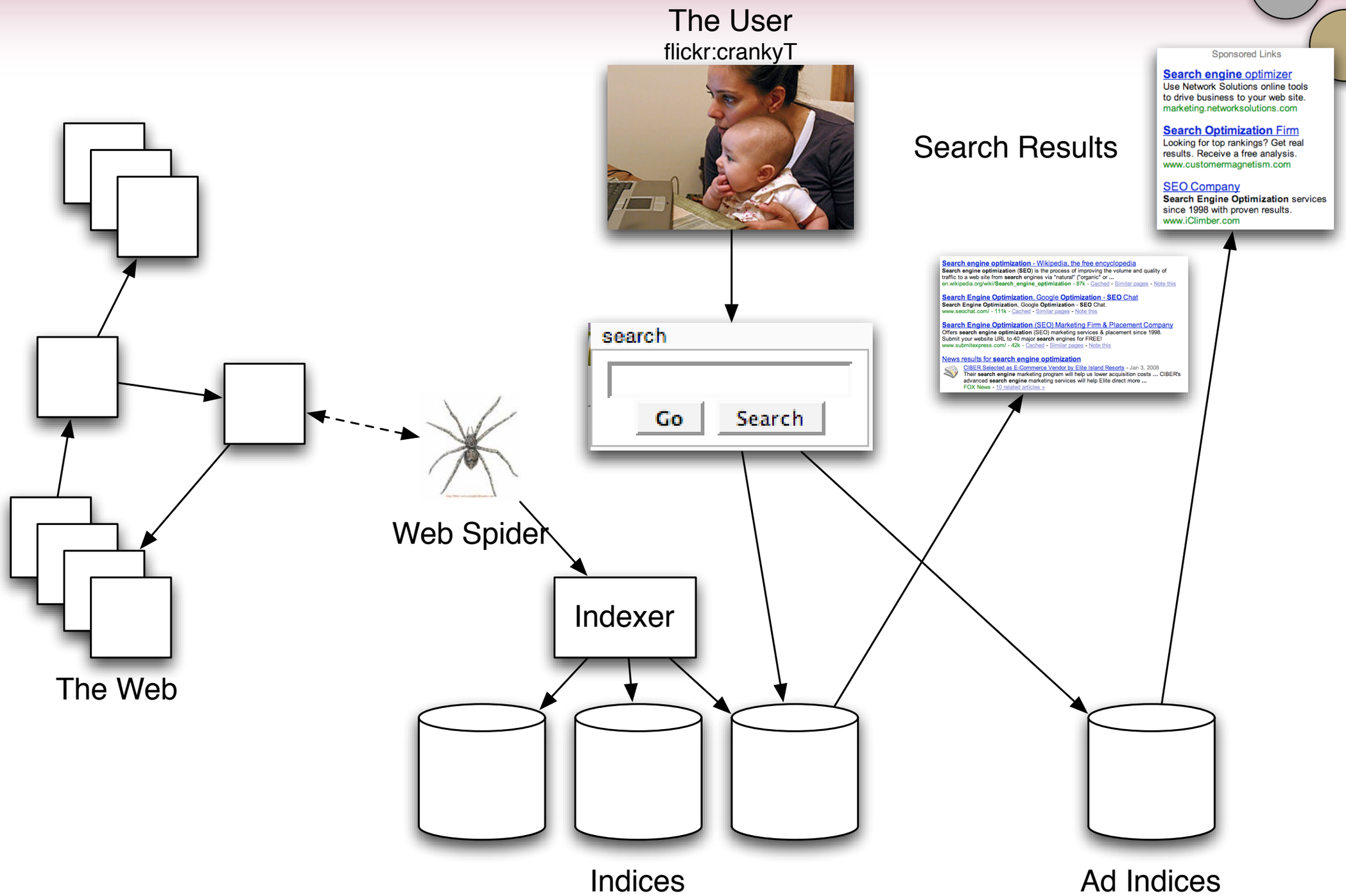


Web Search Basics

Characteristics of the web

- Significant Duplication
  - 30%-40% is some studies [Brod97, Shiv99]
  - www.copyscape.com
- High linkage
  - more than 8 links per page on average
- Spam
  - Billions of pages of it.

Web Search Basics



Web Search Basics: Size of the web

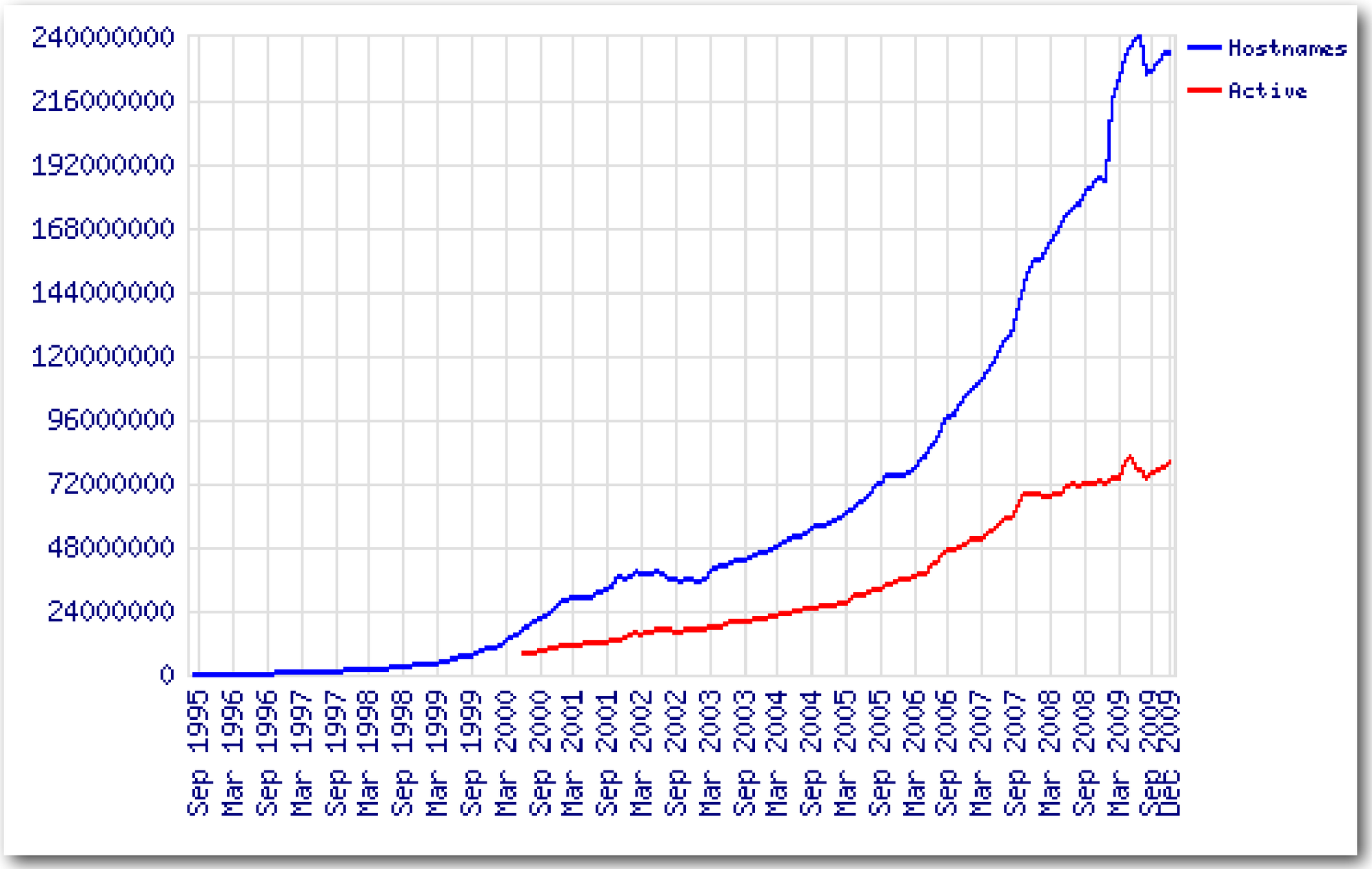
How big is the web?

- What is measured?
  - Number of hosts
  - Number of “static” html pages
- Number of hosts - netcraft survey
  - http://news.netcraft.com/archives/web_server_survey.html
  - Monthly report on hosts and servers
- Number of pages
  - Lots of estimates which warrant further discussion

Web Search Basics: Size of the web

How big is the web?

- Netcraft Web Server Survey



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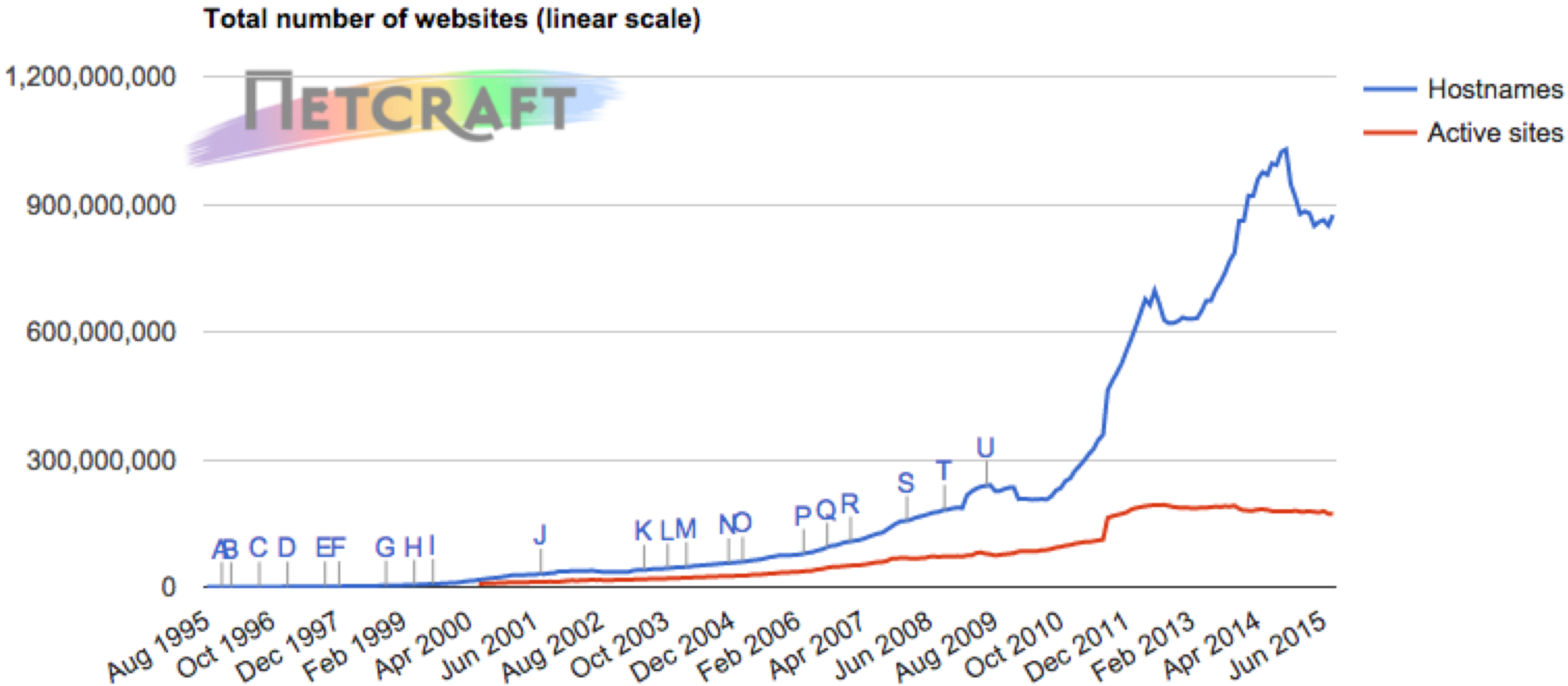

Web Search Basics: Size of the web

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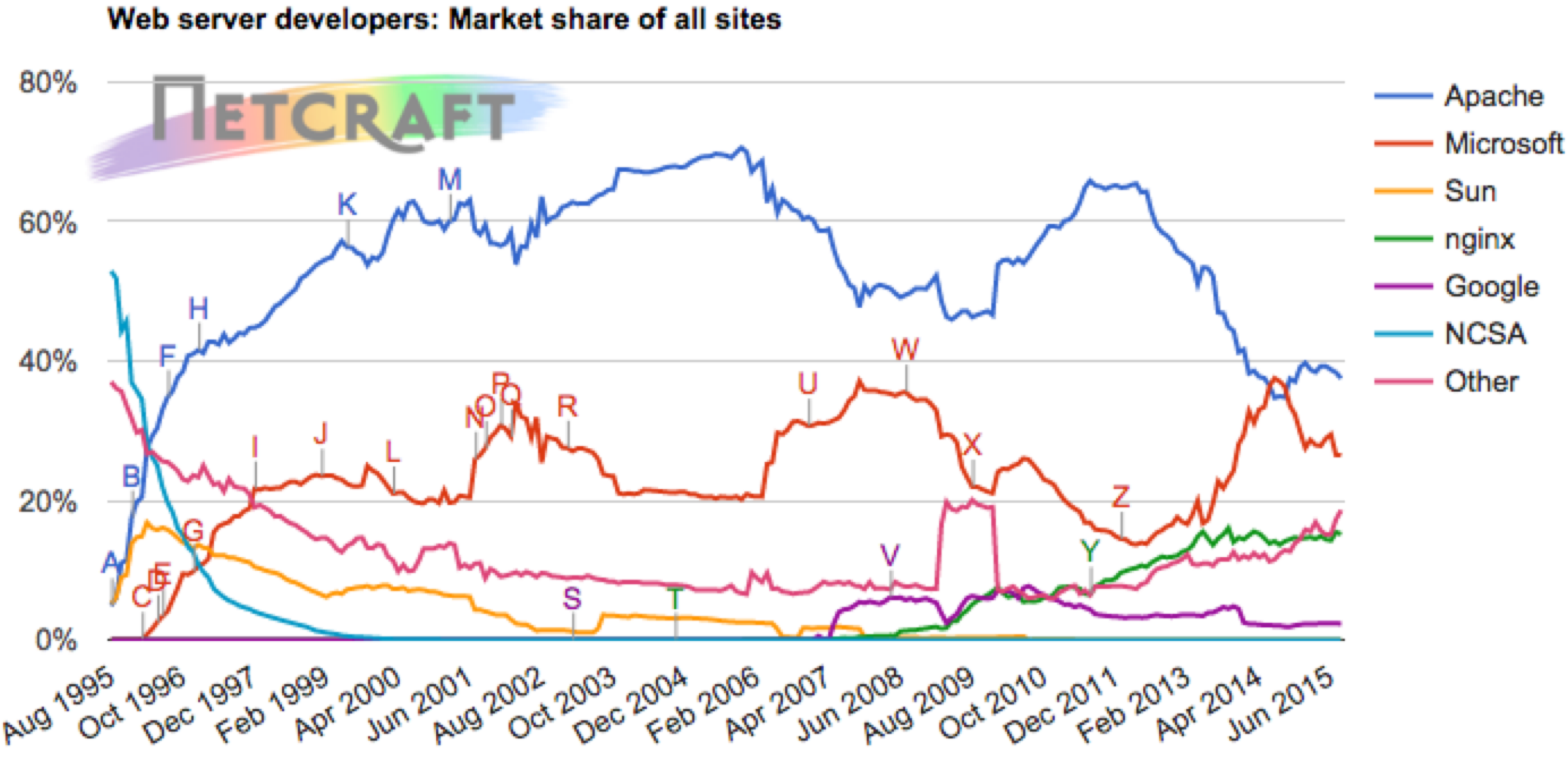


Web Search Basics: Size of the web

Rate of change

- [Cho00] 720k pages from 270 popular sites sample daily for 5 months in 1999
  - 40% changed weekly, 23% daily
- [Fett02] Massive study: 151M pages checked over a few months
  - Significant changes 7% weekly
  - Any change 25% weekly

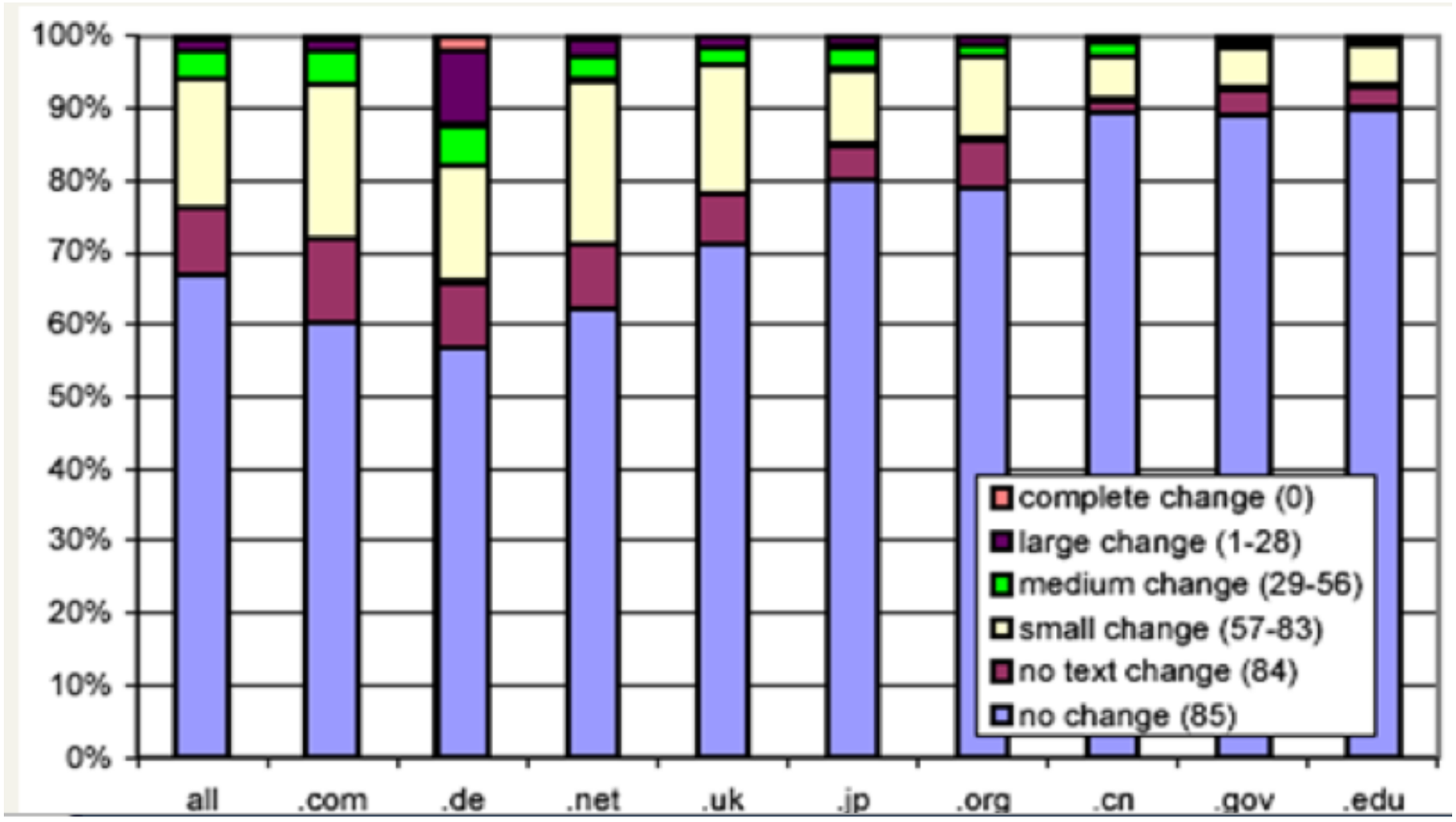
Web Search Basics: Size of the web

Rate of change

- [Ntul04] 154 large sites recrawled from scratch weekly
  - 8% had new pages ever week
  - 8% die
  - 5% new content
  - 25% new links per week

Web Search Basics: Size of the web
Rate of change

- Fetterly et al. study in 2002
  - 150 million pages over 11 weekly crawls
  - Bucketed into 85 groups according to amount of change



Web Search Basics: Size of the web

Web Evolution

- The nature of the web is change
- Not much work on studying web evolution
  - Exception is Fetterly et. al, 2003
- Some effort has been made to extrapolate from small samples using fractal models [Dill et. al. 2001]

Web Search Basics: Size of the web

The very nature of the web is changing as well

- Transforming from a source of information
- to what?
  - a communication platform?
  - a source of computation?
  - an application-space?
  - a mirror-world?
  - an augmentation of reality?
  - a cognitive orthotic?

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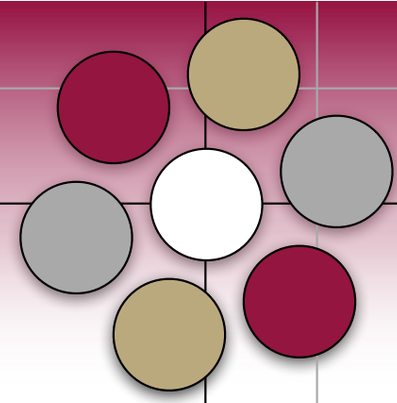
Web Users

User Search Needs in Brod02/RL04

- Informational
  - Want to learn about something (~40%/65%)
- Navigational
  - Want to go to that page (~25%/15%)
- Transactional
  - Want to do something (~35%/20%)
    - Access a service, download, shop
- Others?
  - Exploration, social, etc...



Web Users

- Make ill defined queries
  - Short
    - Reported in 2012: ~3.5 (Dan Russell personal conv.)
    - Allegedly in 2009: 3-4 terms (lots of nuance)
    - Average in 2001: 2.54 terms (80% < 3 words)
    - Average in 1998: 2.35 terms (88% < 3 words) [Silv98]
  - Imprecise terms
  - Suboptimal syntax (no operators)
  - Low effort (spelling mistakes)

Web Users

- Wide Variance in
  - Needs
  - Expectations
  - Knowledge
  - Bandwidth

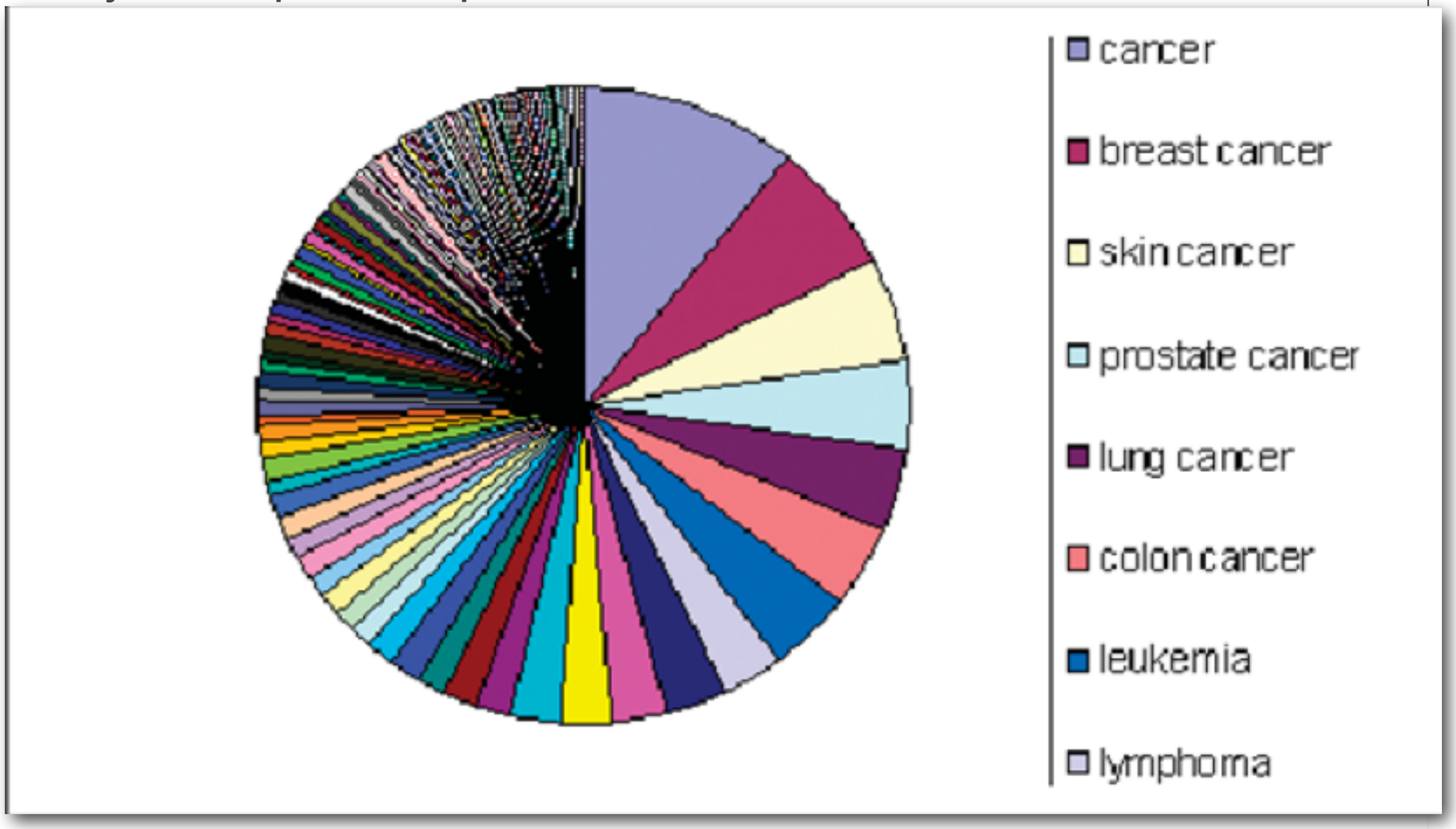
Web Users

- Behavior
  - 85% look over one result screen only
  - 78% of queries are not modified
- Follow links (“the scent of information”)

Web Users

Power law

- Few popular broad queries
- Many rare specific queries



Web Users

Top queries

- Most are related to sex
- 2008 Who What How (Google)

Who is...

1. who is obama
2. who is mccain
3. who is palin
4. who is lil wayne
5. who is miley cyrus
6. who is dolla
7. who is jonas brothers
8. who is chris brown
9. who is biden
10. who is martin luther

What is...

1. what is love
2. what is life
3. what is java
4. what is sap
5. what is rss
6. what is scientology
7. what is autism
8. what is lupus
9. what is 3g
10. what is art

How to...

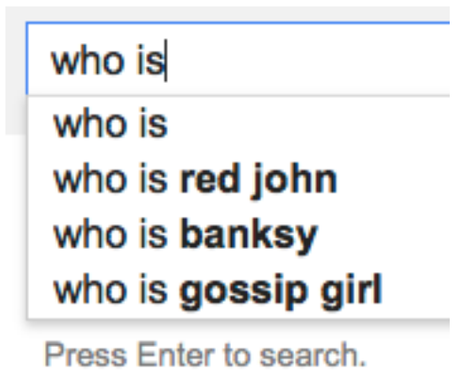
1. how to draw
2. how to kiss
3. how to write
4. how to cook
5. how to tie
6. how to hack
7. how to run
8. how to cite
9. how to paint
10. how to spell

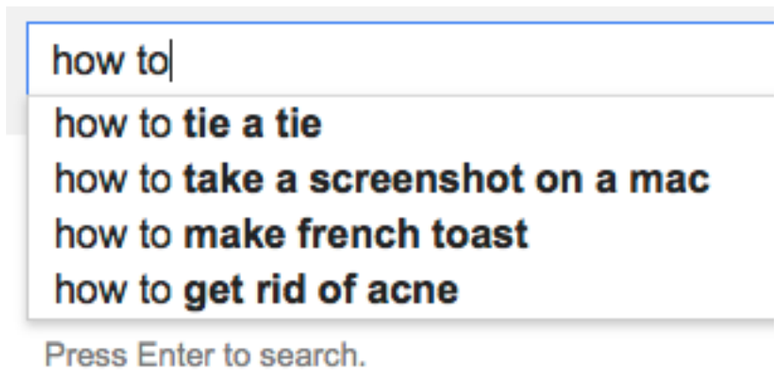
- http://www.google.com/intl/en/press/zeitgeist2008/mind.html

Web Users

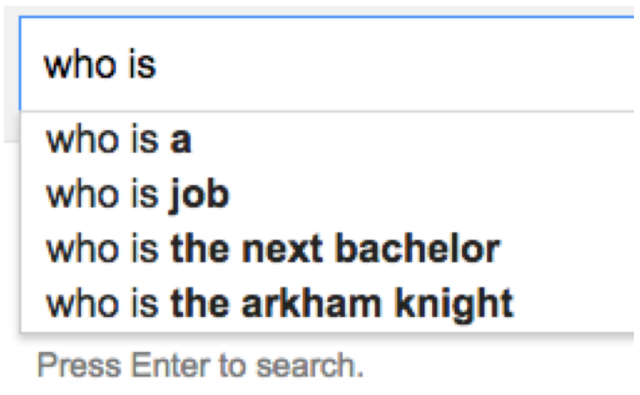
Top queries

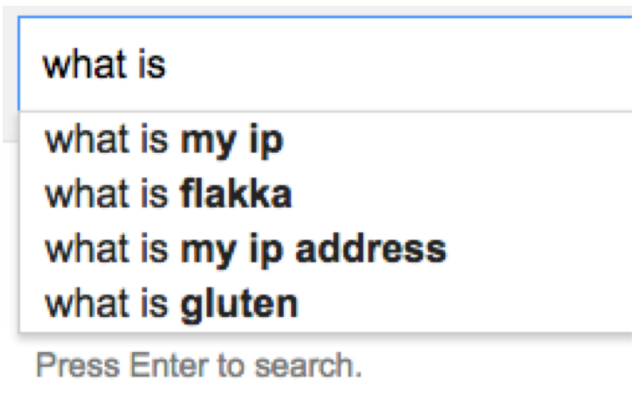
- Differences today
- 01/2014 Who What How (Google)

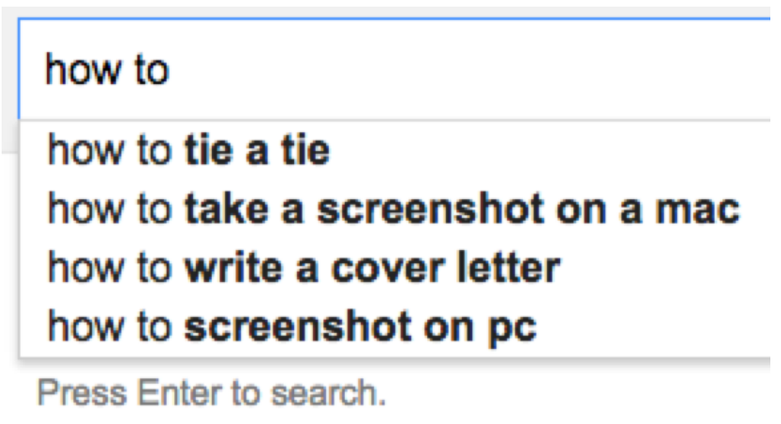




- 09/2015



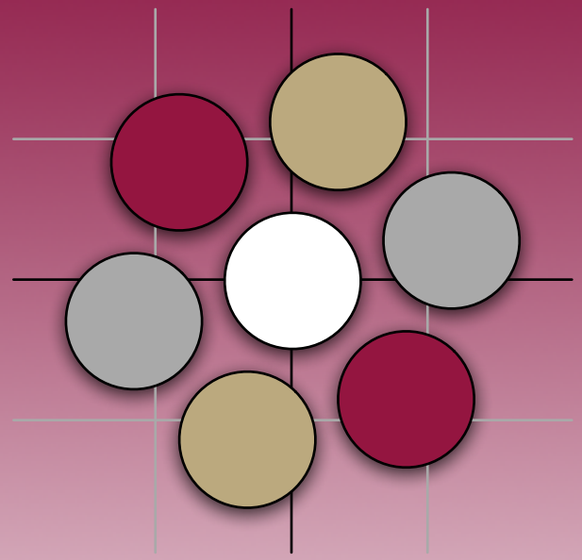




Web Users

Top queries

- Live demo - WARNING this is not very safe....
  - “Is it safe to”
  - “Is it legal to”
  - “why does”
  - “why doesn’t
  - “why is there”
  - “why isn’t”
  - “americans are”



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