
Online Advertising and Ad Auctions at Google

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Traditional Advertising

- *At the beginning: Traditional Ads*
 - Posters, Magazines, Newspapers, Billboards.
 - *What is being Sold:*
 - Pay-per-Impression: Price depends on how many people your ad is shown to (whether or not they look at it)
 - *Pricing:*
 - Complicated Negotiations (with high monthly premiums...)
 - Form a barrier to entry for small advertisers
-

Advertising On the Web

- **Online Ads:**
 - Banner Ads, Sponsored Search Ads, Pay-per-Sale ads.
 - **Targeting:**
 - Show to particular set of viewers.
 - **Measurement:**
 - Accurate Metrics: Clicks, Tracked Purchases.
 - **What is being Sold:**
 - Pay-per-Click, Pay-per-Action, Pay-per-Impression
 - **Pricing:**
 - Auctions
-

History of Online Advertising

1994: Banner ads,
pay-per-impression

Banner ads for Zima
and AT&T appear on
hotwired.com.

1998: Sponsored search,
pay-per-click 1st-price auction

GoTo.com develops keyword-
based advertising with pay-per-
click sales.

1996: Affiliate marketing,
pay-per-acquisition

Amazon/EPage/CDNow
pay hosts for sales generated
through ads on their sites.

2002: Sponsored search,
pay-per-click 2nd-price auction

Google introduces AdWords, a
second-price keyword auction with
a number of innovations.

Banner Ads

The screenshot shows the homepage of The New York Times from October 16, 2007. Several banner ads are highlighted with red circles:

- Lufthansa:** Located at the top left, featuring the Lufthansa logo and the slogan "There's no better way to fly."
- ETRADE:** Located below the Lufthansa ad, with the text "NYT Archive Since 1981" and a search box.
- OPINION:** A vertical banner on the right side of the page, featuring a photo of a man and the text "Editorial: Frayed Forces".
- ACTIVE TRADER SERVICES:** A green banner for Fidelity, located below the OPINION banner.
- the NEW tiffany.com:** A large circular banner at the bottom right, with the text "Exciting new ways to shop" and the Tiffany & Co. logo.

The main content area features several news articles:

- Treasury Chief Aims to Steady Credit Markets:** By Edmund L. Andrews. Henry M. Paulson Jr. is pushing Wall Street and the mortgage industry to devise solutions to the credit crunch.
- Home Insurers Canceling in East:** By Paul Vitello. Millions of homeowners in Northern states are losing their policies.
- Failing Schools Strain to Meet U.S. Standard:** By Diana Jean Schemo. Some states are being overwhelmed by growing numbers of schools that cannot satisfy the No Child Left Behind law's demands.
- Colorado Streaks to Its First World Series:** By Joe LaPointe. The Rockies completed a sweep of the Diamondbacks in the N.L.C.S. Monday night.
- Gingerly, Romney Seeks Ties to Christian Right:** By Michael Luo. Mitt Romney has tried to signal his kinship with evangelical Christians.

Other sections include "Mitt Romney Speaks About His Religion (mp3)", "More News" (listing Putin, China, and Giants), and "On the Blogs" (listing TierneyLab and Bits).

Pay-Per-Impression

- **Pay-per-1000 impressions (PPM)**: advertiser pays each time ad is displayed
 - Models existing standards from magazine, radio, television
 - Main business model for banner ads to date
 - Corresponds to inventory host sells
 - Exposes advertiser to risk of fluctuations in market
 - **Banner blindness**: effectiveness drops with user experience
 - Barrier to entry for small advertisers
 - Contracts negotiated on a case-by-case basis with large minimums (typically, a few thousand dollars per month)
-

Pay-Per-Click

- **Pay-per-click (PPC)**: advertiser pays only when user clicks on ad
 - Common in search advertising
 - Middle ground between PPM and PPA
 - Does not require host to trust advertiser
 - Provides incentives for host to improve ad displays
-

Auction Mechanism

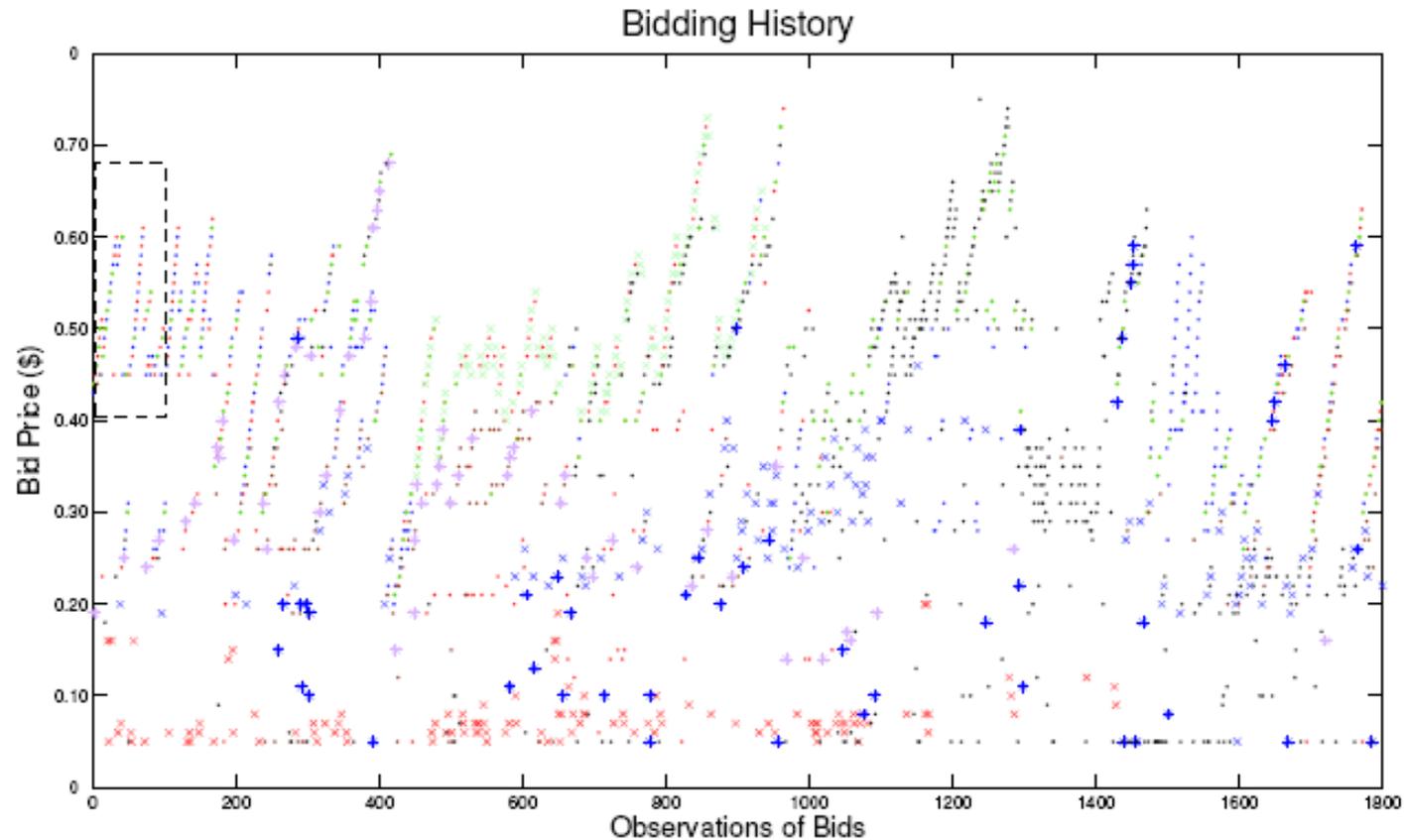
- Advertisements sold automatically through **auctions**: advertisers submit bids indicating value for clicks on particular keywords
 - Low barrier-to-entry
 - Increased transparency of mechanism
 - Keyword bidding allowed increased targeting opportunities
-

Auction Mechanism

- Initial GoTo model: **first-price auction**
 - Advertisers displayed in order of decreasing bids
 - Upon a click, advertiser is charged a price equal to his bid
 - Used first by Overture/Yahoo!
 - Google model: **stylized second-price auction**
 - Advertisers ranked according to bid and **click-through-rate (CTR)**, or probability user clicks on ad
 - Upon a click, advertiser is charged minimum amount required to maintain position in ranking
-

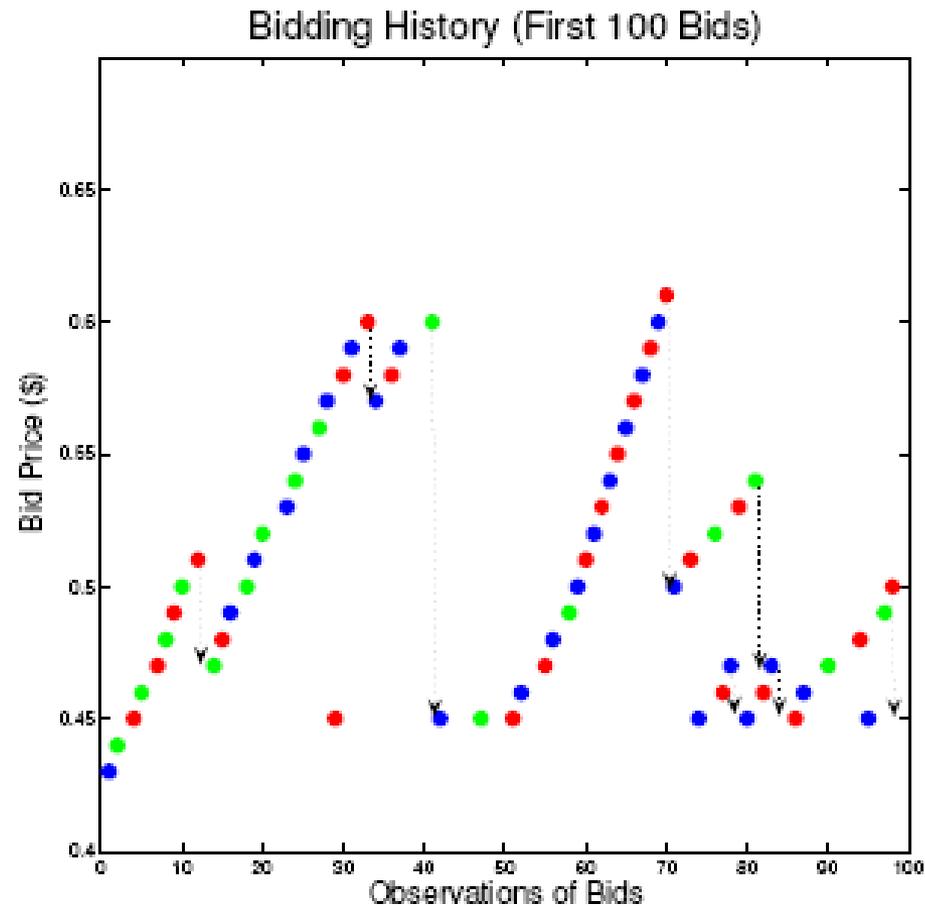
Bidding Patterns

- Bidding history in Yahoo! First-Price Auction:



Graph from [Zhang 2006]

Bidding Patterns



Graph from [Zhang 2006]

Bidding Process

Targeting
Populations

1

Advert
Creation

2

Keyword
Selection

3

Bids and
Budget

4



"You don't get it, Daddy, because they're not targeting you."

All online campaigns

- get people to come to my tutorial
- EC 09
- ICALP 2008
- Sigmatrics
- Theory day

- Ad g
- Cam
- Gene
- Audi
- D
- Netw
- Net
- Biddi
- P
- Adva
- S
- Ad delivery: Ad rotation, frequency capping

Help

- What should I know about this new AdWords interface?
- How do I change my campaign's budget?
- How do I change my language targeting?
- How do I target a different geographical location?
- How do I schedule my ads to run at particular times of day?
- Keyboard shortcuts
- Help Center

Select a Location

- Search
- Browse
- Bundles
- Custom

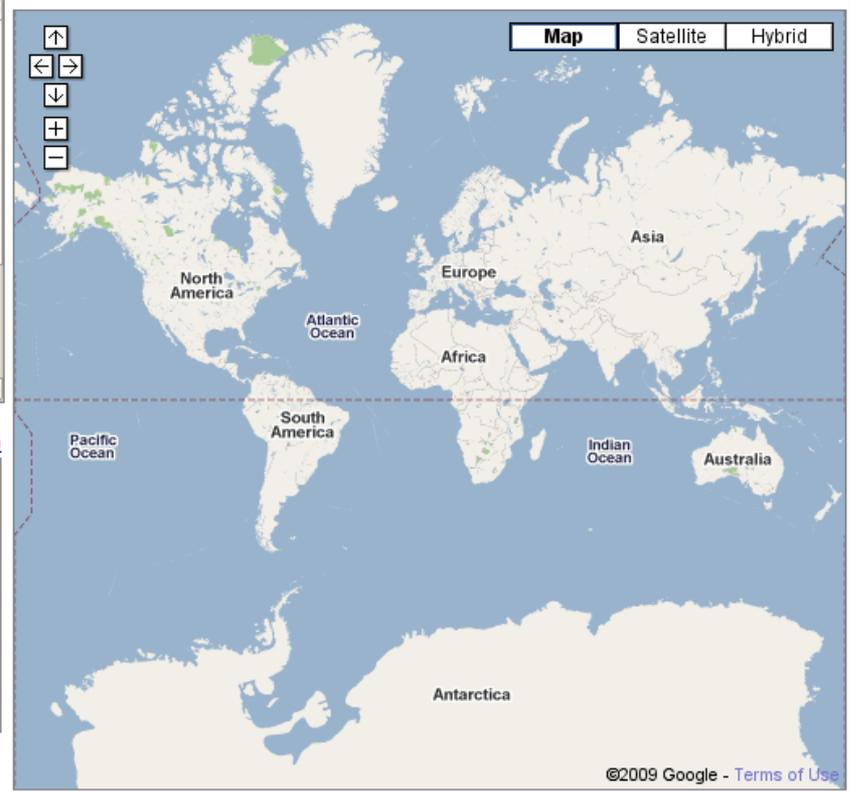
Use bundles to select several countries. ?

- United States and Canada (Bundle)
- North America (Bundle)
- Latin America (Bundle)
- Central America (Bundle)
- Caribbean (Bundle)
- South America (Bundle)
- Western Europe (Bundle)
- Europe (Bundle)
- Middle East (Bundle)
- Africa (Bundle)

Selected locations [remove all](#) | [view all on map](#)

No locations selected

Click on the map or use the tabs above to find and select locations.



Areas on map are approximate. [Learn more](#) about how AdWords targets ads.

Save Cancel

All online campaigns

- get people to come to my tutorial
- EC 09
- ICALP 2008
- Sigmetrics
- Theory day

All online campaigns >

Campaign: get people to come to my tutorial

Enabled Budget: \$1.00/day Targeting: All networks; All devices English All countries and territories

- Ad groups
- Settings
- Ads
- Keywords
- Networks

Campaign settings

General

Campaign name get people to come to my tutorial Edit

Audience

Locations All countries and territories Edit

Languages

This setting determines whether your ad can show for a specific language setting on Google. Note that AdWords doesn't translate your ads.

- | | | |
|---|--|--|
| <input type="checkbox"/> Arabic | <input checked="" type="checkbox"/> German | <input type="checkbox"/> Portuguese |
| <input type="checkbox"/> Bulgarian | <input checked="" type="checkbox"/> Greek | <input type="checkbox"/> Romanian |
| <input type="checkbox"/> Catalan | <input checked="" type="checkbox"/> Hebrew | <input type="checkbox"/> Russian |
| <input checked="" type="checkbox"/> Chinese (simplified) | <input checked="" type="checkbox"/> Hindi | <input type="checkbox"/> Serbian |
| <input checked="" type="checkbox"/> Chinese (traditional) | <input type="checkbox"/> Hungarian | <input checked="" type="checkbox"/> Slovak |
| <input type="checkbox"/> Croatian | <input type="checkbox"/> Icelandic | <input type="checkbox"/> Slovenian |
| <input type="checkbox"/> Czech | <input type="checkbox"/> Indonesian | <input type="checkbox"/> Spanish |
| <input type="checkbox"/> Danish | <input type="checkbox"/> Italian | <input type="checkbox"/> Swedish |
| <input type="checkbox"/> Dutch | <input type="checkbox"/> Japanese | <input type="checkbox"/> Thai |
| <input checked="" type="checkbox"/> English | <input type="checkbox"/> Korean | <input type="checkbox"/> Turkish |
| <input type="checkbox"/> Estonian | <input type="checkbox"/> Latvian | <input type="checkbox"/> Ukrainian |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Lithuanian | <input type="checkbox"/> Urdu |
| <input type="checkbox"/> Finnish | <input type="checkbox"/> Norwegian | <input type="checkbox"/> Vietnamese |
| <input type="checkbox"/> French | <input type="checkbox"/> Polish | |

Save Cancel

Demographic (advanced)

Networks, devices, and extensions

Help

- What should I know about this new AdWords interface?
- How do I change my campaign's budget?
- How do I change my language targeting?
- How do I target a different geographical location?
- How do I schedule my ads to run at particular times of day?

Keyboard shortcuts Help Center

Search help center Go

All online campaigns

- get people to come to my tutorial
- EC 09
- ICALP 2008
- Sigmetrics
- Theory day

All online campaigns >

Campaign: get people to come to my tutorial

Enabled Budget: \$1.00/day Targeting: All networks; All devices Chinese (simplified); Chinese (traditional); (6 more) All countries and territories

- Ad groups
- Settings
- Ads
- Keywords
- Networks

Campaign settings

General

Campaign name get people to come to my tutorial Edit

Audience

Locations All countries and territories Edit

Languages Chinese (simplified), Chinese (traditional), English, German, Greek, Hebrew, Hindi, Slovak Edit

Demographic (advanced)

Demographic No demographic settings Edit

Networks, devices, and extensions

Networks and devices

All available sites and devices (Recommended for new advertisers)
 Let me choose...

Search Google search
 Search partners (requires Google search)

Content Content network
 Relevant pages across the entire network
 Relevant pages only on the placements I manage

Devices Desktop and laptop computers
 iPhones and other mobile devices with full Internet browsers

Bidding and budget

Bidding option Focus on clicks, manual maximum CPC bidding Edit

Budget \$1.00/day Edit

Position preference, delivery method (advanced)

Advanced settings

- Schedule: Start date, end date, ad scheduling
- Ad delivery: Ad rotation, frequency capping

Help

What should I know about this new AdWords interface?

How do I change my campaign's budget?

How do I change my language targeting?

How do I target a different geographical location?

How do I schedule my ads to run at particular times of day?

Keyboard shortcuts Help Center

Search help center Go

Campaign name **get people to come to my tutorial** [Edit](#)

Audience

Ad schedule ✕

Edit days and times below. When you're happy with the schedule, click "Save." To bid more or less during particular time periods, switch to the bid adjustment mode. (You can always switch back.)

[Reset to all days and hours](#)

Mode: **Basic** | [Bid adjustment](#) ? Clock: **12 hour** | [24 hour](#)

Day	Time period	Midnight	4:00 AM	8:00 AM	Noon	4:00 PM	8:00 PM
Monday	Running all day	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Tuesday	Running all day	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Wednesday	Running all day	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Thursday	<div style="border: 1px solid black; background-color: yellow; padding: 5px; display: inline-block;">Midnight ▼ to Midnight ▼ ✕ + Add another time period OK Copy ▼ Cancel</div>	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Friday		✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Saturday		✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓
Sunday	Running all day	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓	✓✓✓✓

(GMT-08:00) Pacific Time

[Save](#) [Cancel](#)

Demographics

Networks

Bidding

Positioning

Advanced

Scheduling

[Ad scheduling](#) ? **Show ads all days and hours** [Edit](#)

[Ad delivery: Ad rotation, frequency capping](#)

Bidding Process



Targeting
Populations

1

Advert
Creation

2

Keyword
Selection

3

Bids and
Budget

4

“Here it is – the plain unvarnished truth. Varnish it.”

All online campaigns

jon feldman

EC 09

ICALP 2008

jon feldman

Sigmetrics

Theory day

Set default bids Create an ad Add keywords

All online campaigns > jon feldman >

Ad group: EC 09

Ad

Enabled

Your first ad will appear here

Ad group default bids (Max. CPC) Edit

Search \$0.20 Content: automatic placements auto

Ad title

Ad text

Display url

Settings

New text ad Choose another ad type

Headline EC 2009 Tutorial

Description line 1 Info. Exchange in Sponsored Search

Description line 2 Feldman, Muthukrishnan

Display URL www.sigecom.org/ec09/...

Destination URL http:// www.sigecom.org/ec09/schedule_tutorials.html#7

Ad preview

EC 2009 Tutorial Info. Exchange in Sponsored Search Feldman, Muthukrishnan www.sigecom.org/ec09/...

Save and continue Do this step later

Bidding Process



Targeting
Populations

1

Advert
Creation

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Budget

4

“Now, that’s product placement!”

All online campaigns

- jon feldman
- EC 09
- ICALP 2008
- jon feldman
- Sigmatrics
- Theory day

Set default bids Create an ad Add keywords

All online campaigns > jon feldman >

Ad group: EC 09

Ad (1 of 1)

Enabled

EC 2009 Tutorial

Info. Exchange in Sponsored Search
Feldman, Muthukris
www.sigecom.org/e

Ad group default bids (Max. CPC) Edit

Add keywords Start with 10 to 20 keywords that relate directly to your ad. You can add more keywords later.

Settings Ads Keywords Networks

Your ads aren't running. Add keywords to run your ads on search and across the content network.

Add keywords

Enter one keyword per line.

You may enter as many as you link.

<Enter new keyword>

Sample keywords, based on a scan of your site

- Category: nash equilibrium
 - Add all from this category
 - Add nash equilibrium
 - Add john nash equilibrium
 - Add nash equilibrium wiki
 - Add john nash equilibrium theory
 - Add game theory nash equilibrium
 - Add cournot nash equilibrium
 - Add nash equilibrium example
 - Add nash equilibrium mixed strategy
 - Add nash equilibrium theory
 - Add nash equilibrium definition
 - Add what is nash equilibrium
 - Add the nash equilibrium
- Category: e commerce

Estimate search traffic

Advanced option: match types

Important note: We cannot guarantee that these keywords will improve your campaign performance. We reserve the right to disapprove any keywords yo

Save and finish

Negative keywords

All online campaigns

jon feldman

EC 09

ICALP 2008

jon feldman

Sigmetrics

Theory day

Set default bids Create an ad Add keywords

All online campaigns > jon feldman >

Ad group: EC 09

Ad (1 of 1)

Enabled

EC 2009 Tutorial

Info. Exchange in Sponsored Search
Feldman, Muthukris
www.sigecom.org/e

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EC 2009
EC 09
EC tutorial
EC 09 tutorial
EC 2009 tutorial
ACM EC 09
ACM EC 2009
sponsored search tutorial
jon feldman
muthukrishnan

Sample keywords, based on a scan of your site

- nash equilibrium definition
what is nash equilibrium
the nash equilibrium
Category: e commerce
Add all from this category
e commerce
e commerce software
e commerce business
what is e commerce
e commerce solutions
e commerce companies
e commerce service
e commerce solution
e commerce definition
b2b e commerce
Category: john nash

Estimate search traffic

Advanced option: match types

Important note: We cannot guarantee that these keywords will improve your campaign performance. We reserve the right to disapprove any keywords

Save and finish

Negative keywords

All online campaigns

jon feldman

EC 09

- ICALP 2008
- jon feldman
- Sigmatrics
- Theory day

Set default bids Create an ad Add keywords

All online campaigns > jon feldman >

Ad group: EC 09

Ad (1 of 1)

Enabled

[EC 2009 Tutorial](#)
 Info. Exchange in Sponsored Search
 Feldman, Muthukrishnan
[www.sigecom.org/ec09/...](http://www.sigecom.org/ec09/)

Ad group default bids (Max. CPC) [Edit](#) [?](#)
 Search **\$0.20**
 Content: automatic placements **auto**

Settings Ads Keywords Networks

Your ads aren't running. Add keywords to run your ads on search and across the content network.

Add keywords

Enter one keyword per line.

You may enter as many as you link.

EC 2009
 "EC 09"
 EC tutorial
 EC 09 tutorial
 EC 2009 tutorial
 ACM EC 09
 ACM EC 2009
 sponsored search tutorial
 "jon feldman"
 muthukrishnan

Sample keywords, based on a scan of your site

- « Add b2b e commerce
- ▼ **Category: john nash**
 - « Add all from this category
 - « Add john nash
 - « Add john nash theory
 - « Add john nash game theory
 - « Add john nash governing dynamics
 - « Add john nash princeton
 - « Add john nash jr
- **Category: Miscellaneous keywords**
- **Category: nash**
- **Category: game theory**
- **Category: marketing**
- **Category: business**

Estimate search traffic

Advanced option: match types

Use keyword match types to better target your ads:

- keyword = broad match
- "keyword" = match exact phrase
- {keyword} = match exact term only
- keyword = don't match this term

Important note: We cannot guarantee that these keywords will improve your campaign performance. We reserve the right to disapprove any keywords you

Save and finish

Negative keywords

Bidding Process

Targeting



- All online campaigns <<
- get people to come to my tutorial
- EC 09
- ICALP 2008
- Sigmetrics
- Theory day

All online campaigns > Campaign: **get people to come to my tutorial**

● Enabled Budget: **\$1.00/day** Targeting: **All networks; All devices** **Chinese (simplified); Chinese (traditional); (6 more)** **All countries and territories**

- Ad groups
- Settings**
- Ads
- Keywords
- Networks

Campaign settings

General

Campaign name **get people to come to my tutorial** [Edit](#)

Audience

Locations ⓘ **All countries and territories** [Edit](#)

Languages ⓘ **Chinese (simplified), Chinese (traditional), English, German, Greek, Hebrew, Hindi, Slovak** [Edit](#)

Demographic (advanced)

Demographic ⓘ **No demographic settings** [Edit](#)
Content network only

Networks, devices, and extensions

Networks and devices ⓘ **All** [Edit](#)

Bidding and budget

Bidding option ⓘ **Focus on clicks, manual maximum CPC bidding** [Edit](#)

Budget ⓘ \$ per day

Daily budget represents your average spend over the month; actual spend on a given day may vary.

[View recommended budget](#) | [Learn how budget affects ad performance](#)

Your budget is OK. We do not recommend changes at this time.

To make the most of your budget, [try optimizing your campaign](#).

Custom preference, delivery method (advanced)

Advanced settings

- [Schedule: Start date, end date, ad scheduling](#)
- [Ad delivery: Ad rotation, frequency capping](#)

Daily Budget

- Help**
- [What should I know about this new AdWords interface?](#)
 - [How do I change my campaign's budget?](#)
 - [How do I change my language targeting?](#)

All online campaigns

- get people to come to my tutorial
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- Theory day

All online campaigns >

Campaign: get people to come to my tutorial

Enabled Budget: \$1.00/day Targeting: All networks; All devices Chinese (simplified); Chinese (traditional); (6 more) All countries and territories

- Ad groups
- Settings
- Ads
- Keywords
- Networks

Campaign settings

General

Campaign name get people to come to my tutorial Edit

Audience

Locations All countries and territories Edit

Languages Chinese (simplified), Chinese (traditional), English, German, Greek, Hebrew, Hindi, Slovak Edit

Demographic (advanced)

Demographic No demographic settings Edit

Networks, devices, and extensions

Networks and devices All Edit

Bidding and budget

Bidding option

- Focus on clicks - use maximum CPC bids
- Manual bidding for clicks
- You'll set your maximum CPC bids later.
- Automatic bidding to try to maximize clicks for your target budget
- Focus on conversions (Conversion Optimizer) - use maximum CPA (1-per-click) bids

Save Cancel

Budget \$1.00/day Edit

Position preference, delivery method (advanced)

Advanced settings

- Schedule: Start date, end date, ad scheduling
- Ad delivery: Ad rotation, frequency capping

Help

- What should I know about this new AdWords interface?
- How do I change my campaign's budget?
- How do I change my language targeting?
- How do I target a different geographical location?
- How do I schedule my ads to run at particular times of day?

Keyboard shortcuts

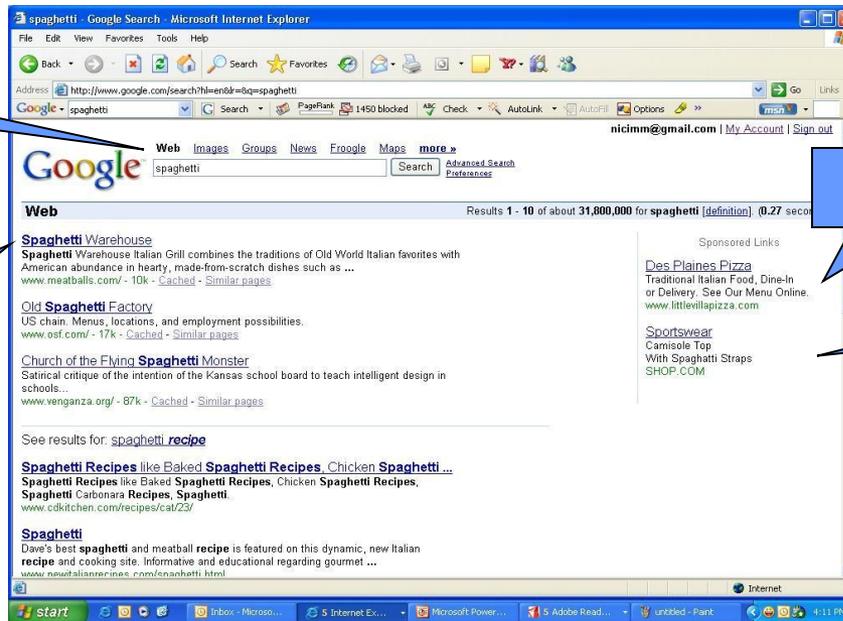
Auction Mechanism

- A repeated mechanism!
 - Upon each search,
 - Interested advertisers are selected from database using **keyword matching algorithm**
 - **Budget allocation algorithm** retains interested advertisers with sufficient budget
 - Advertisers compete for ad slots in **allocation mechanism**
 - Upon click, advertiser charged with **pricing scheme**
 - CTR updated according to **CTR learning algorithm** for future auctions
-

Click-Through Rates

- **Click-through rate (CTR)**: a parameter estimating the probability that a user clicks on an ad
 - A separate parameter for each ad/keyword pair
 - **Assumption**: CTR of an ad in a slot is equal to the CTR of the ad in slot 1 times a scaling parameter which depends only on the slot and not the ad
 - CTR learning algorithm uses a weighted averaging of past performance of ad to estimate CTR
-

(Old) Yahoo! 2nd-Price Auction



Keyword

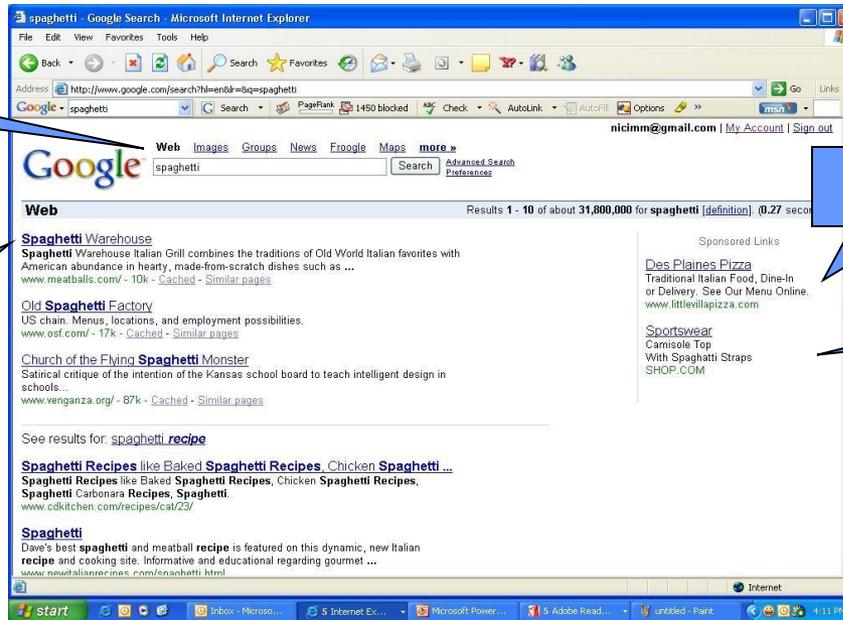
Algorithmic search results

Ad slot 1

Ad slot 2

Advertiser	Bid	Allocation	Price per click!
→ A	\$10	2	\$5
B	\$5	X	\$0
→ C	\$50	1	\$10

Google Single-Shot Auction



Keyword

Algorithmic search results

Ad slot 1

Ad slot 2

Advertiser	Bid	CTR	Bid x CTR	(expected bid per Allocation impression)	Price per click!
→ A	\$10	0.10	1.0	2	\$5
→ B	\$5	0.50	2.5	1	\$2
C	\$50	0.01	0.5	X	\$0

Keyword Matching

- **Exact match:** keyword phrase equals search phrase
- **Phrase match:** keyword phrase appears in search (“red roses” matches to “red roses for valentines”)
- **Broad match:** each word of keyword phrase appears in search (“red roses” matches to “red and white roses”)
- **Issues:**
 - Tradeoff between relevance and competition
 - How to handle spelling mistakes

Budget Allocation

- Basic algorithm
 - Spread monthly budget evenly over each day
 - If budget leftover at end of day, allocate to next day
 - When advertiser runs out of budget, eliminate from auctions
 - **Issues:**
 - Need to smooth allocation through-out day
 - Allocation of budget across keywords
-

Typical Parameters

- PPC of most popular searches in Google, 4/06

Keyword Price in 3 rd slot	# of Keywords
\$20-\$50	2
\$10.00 - \$19.99	22
\$5.00 - \$9.99	206
\$3.00 - \$4.99	635
\$1.00 - \$2.99	3,566
\$0.50 - \$0.99	4,946
\$0.25 - \$0.49	5,501
\$0.11 - \$0.24	5,269

Typical Parameters

- Bids on some valuable keywords

Keyword	Top Bid	2 nd Bid
mesothelioma	\$100	\$100
structured settlement	\$100	\$52
vioxx attorney	\$38	\$38
student loan consolidation	\$29	\$9

- CTRs are typically around 1%

Other Important issues in ad auctions

- Avoiding click fraud
 - Bidding with budget constraints
 - Externalities between advertisers
 - User search models
-

Measurement: Information

- Adwords FrontEnd: Bid Simulations
 - Clicks and Cost for other bids.
 - Google Analytics
 - Traffic Patterns, Site visitors.
 - Search insights:
 - Search Patterns
 - Interest-Based Advertising
 - Indicate your interests so that you get more relevant ads
-

AdWords FrontEnd

All online campaigns

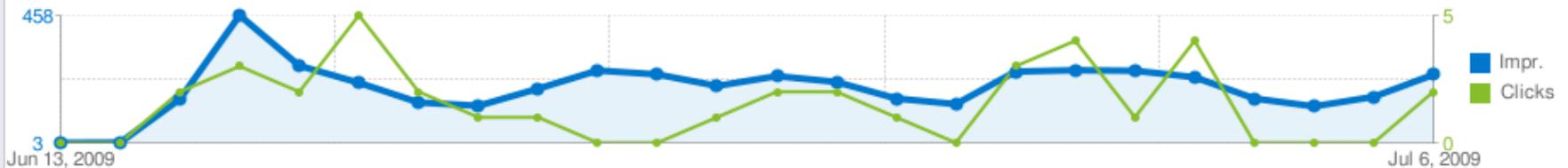
Jun 13, 2009 - Jul 6, 2009 Go

Custom date range

Filter and views

Campaigns Ad groups Settings Ads Keywords Networks

Change Graph Options



+ New campaign Change status... More actions...

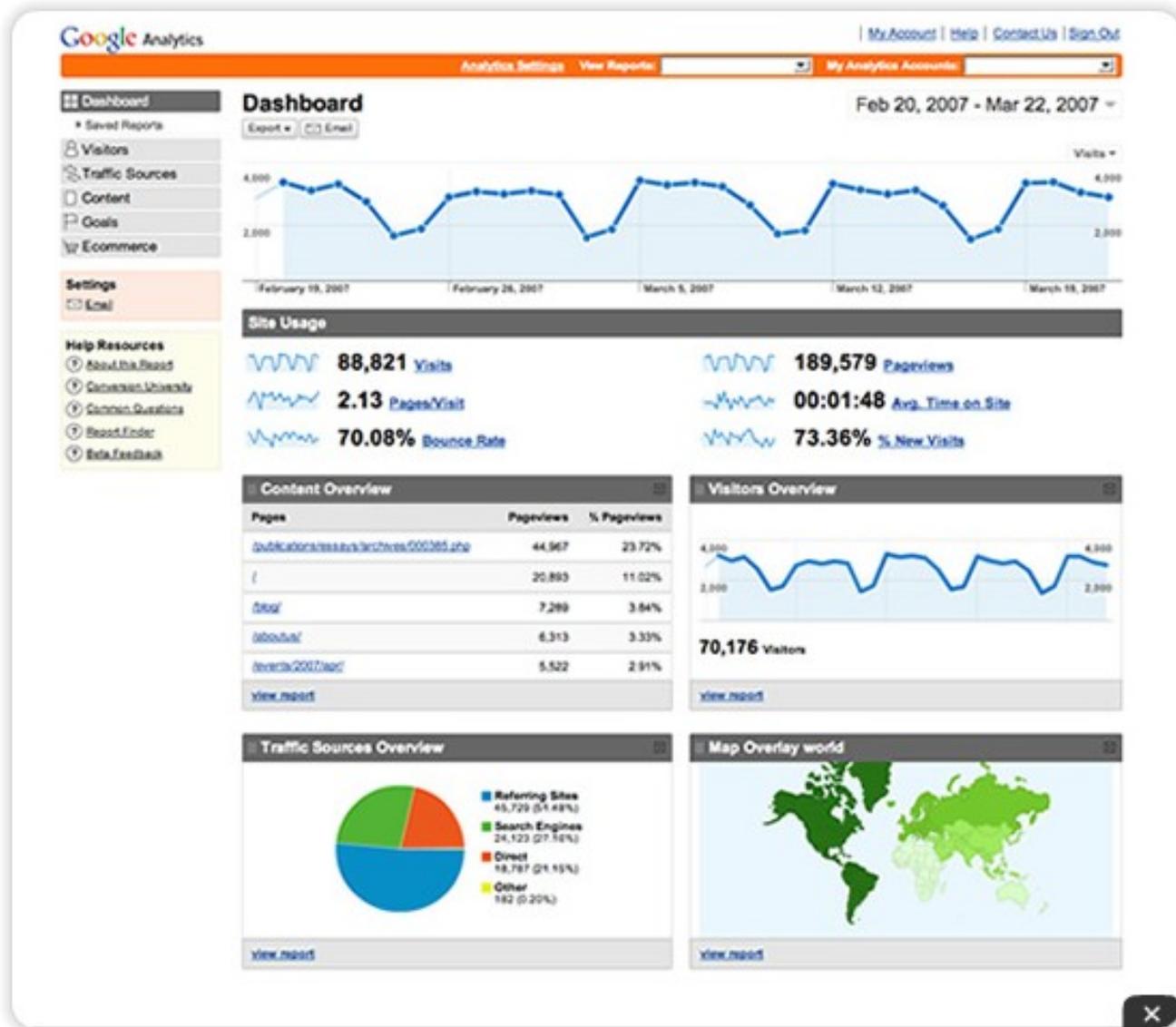
Show: All | All enabled | All but deleted

<input type="checkbox"/>	<input checked="" type="checkbox"/>	Campaign	Budget	Status ?	Clicks	Impr.	CTR ?	Avg. CPC ?	Cost	Avg. Pos.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	get people to come to my tutorial	\$1.00/day	Eligible	36	4,796	0.75%	\$0.11	\$3.99	1.5
		Total - search ?			36	4,796	0.75%	\$0.11	\$3.99	1.5
		Total - content ?			0	0	0.00%	\$0.00	\$0.00	0
		Total - all campaigns	\$1.00/day		36	4,796	0.75%	\$0.11	\$3.99	1.5

Show rows: 50 1 - 1 of 1

<input type="checkbox"/>	●	Keyword	Campaign	Ad group	Status ?	Max. CPC	Clicks	Impr.	CTR ?	Avg. CPC ?	Cost	Avg. Pos.	
<input type="checkbox"/>	●	EC 2009	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	12	2,158	0.56%	\$0.10	\$1.21	1.5	
<input type="checkbox"/>	●	muthukrishnan	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	12	1,002	1.20%	\$0.10	\$1.18	1.2	
<input type="checkbox"/>	●	EC tutorial	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	6	651	0.92%	\$0.17	\$1.04	1.9	
<input type="checkbox"/>	●	EC-09	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	4	556	0.72%	\$0.11	\$0.43	2.1	
<input type="checkbox"/>	●	EC09	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	1	127	0.79%	\$0.05	\$0.05	1.1	
<input type="checkbox"/>	●	"jon feldman"	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	0	105	0.00%	\$0.00	\$0.00	1.1	
<input type="checkbox"/>	●	"EC 09"	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	1	96	1.04%	\$0.08	\$0.08	1.6	
<input type="checkbox"/>	●	ACM EC 2009	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	0	63	0.00%	\$0.00	\$0.00	1	
<input type="checkbox"/>	●	ACM EC 09	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	0	14	0.00%	\$0.00	\$0.00	1.1	
<input type="checkbox"/>	●	sponsored search tutorial	get people to come to my tutorial	EC 09	🗨 Low search volume ?	\$0.20	0	10	0.00%	\$0.00	\$0.00	1.6	
<input type="checkbox"/>	●	EC 2009 tutorial	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	0	4	0.00%	\$0.00	\$0.00	1	
<input type="checkbox"/>	●	EC 09 tutorial	get people to come to my tutorial	EC 09	🗨 Eligible	\$0.20	0	0	0.00%	\$0.00	\$0.00	0	
		Total - search ?						36	4,797	0.75%	\$0.11	\$3.99	1.5
		Total - content ?						0	0	0.00%	\$0.00	\$0.00	0
		Total - all keywords						36	4,797	0.75%	\$0.11	\$3.99	1.5

Web Analytics



Re-acting to Metrics

- Distinguish Causality and Correlation.
- Experimentation:
 - Ad Rotation: 3 different creatives
 - Website Optimizer
 - E.g. 6000 search quality experiments, 500 of which were launched.
- Repeated experimentation:
 - Continuous Improvement (Multi-armed bandit)

Other Online Advertising Aspects

- Google Ad Systems:
 - Sponsored Search: AdWord Auctions.
 - Contextual Ads (AdSense) & Display Ads (DoubleClick)
 - Ad Exchange
 - Social Ads, YouTube, TV ads.
- Bid Management & Campaign Optimization for Advertisers
 - Short-term vs. Long-term effect of ads.
- Planning: Ad Auctions & Ad Reservations.
 - Stochastic/Dynamic Inventory Planning
 - Pricing: Auctions vs Contracts
- Ad Serving
 - Online Stochastic Assignment Problems

Ad Serving

- Efficiency, Fairness, Smoothness.
- Sponsored Search: Repeated Auctions, Budget Constraints, Throttling, Dynamics(?)
- Display Ads: Online Stochastic Allocation
 - Impressions arrive online, and should be assigned to Advertisers (with established contracts)
 - Online Primal-Dual Algorithms.
 - Offline Optimization for Online Stochastic Optimization: Power of Two Choices.
 - Learning+Optimization: Exploration vs Exploitation??
- Ad Exchange Ad Serving: Bandwidth Constraints.
- Social Ads: Ad Serving over Social Networks

Future of Online Advertising

- Measurements
 - Pricing
 - Experimentation

 - Other form of Advertising:
 - TV Ads
 - Ad Exchanges
 - Social Ads
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