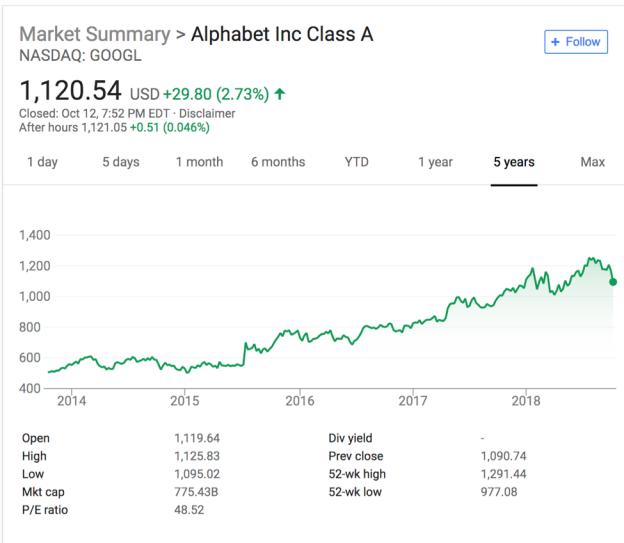


The Search Engine Business Model Advertising



Types of Online Advertising

- **Banner Advertising**
 - The earliest form of online ads
 - People have developed “banner blindness”
- **Pay-per-click Advertising**
 - Introduced by search engines Yahoo/Google/Bing/etc
- **Website Advertising**
 - Place ads on blogs/newsletters/websites that typically attract the customers you are aiming at
- **Affiliate Marketing**
 - Let third party sites advertise your goods/services and give them a commission
 - Amazon (<https://affiliate-program.amazon.com/>)
 - Ebay (<http://pages.ebay.com/affiliate/referral.html>)
- **Social Media Marketing**
 - The use of social media platforms (e.g. Facebook) and websites to promote a product or service



How Big is Search Engine Advertising

Google earned \$100 billion in 2017

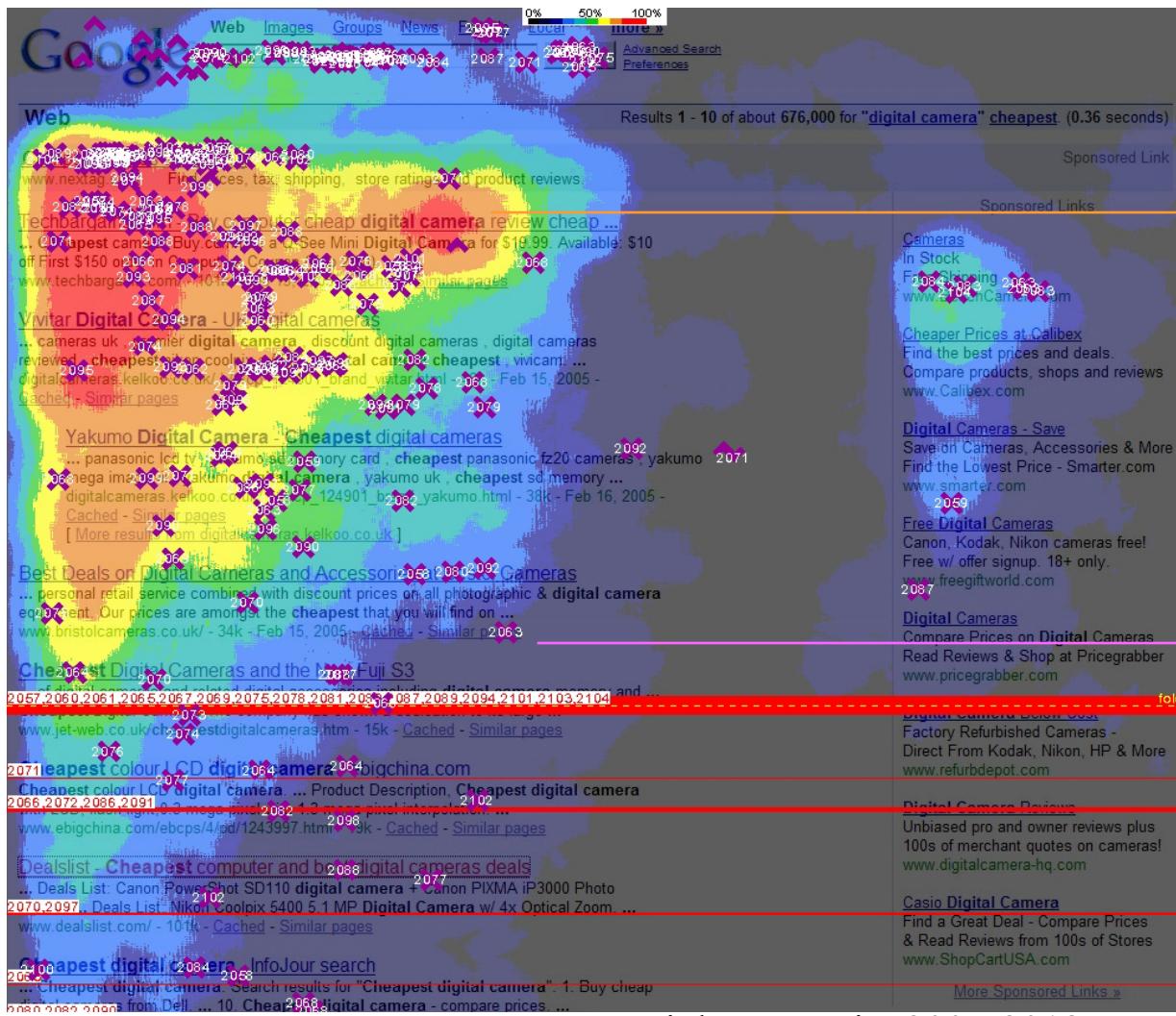
Yahoo earned \$4.6 billion in 2017
 Verizon has purchased Yahoo for \$4.5 billion

Bing, a division of Microsoft earned \$1.8 billion

Google and Microsoft Stock Quotes for 2018



HOW WE USE GOOGLE



A google result page showing where people looked and where people clicked

Eye pupil hotspots

See
<http://www.entertop.net/>

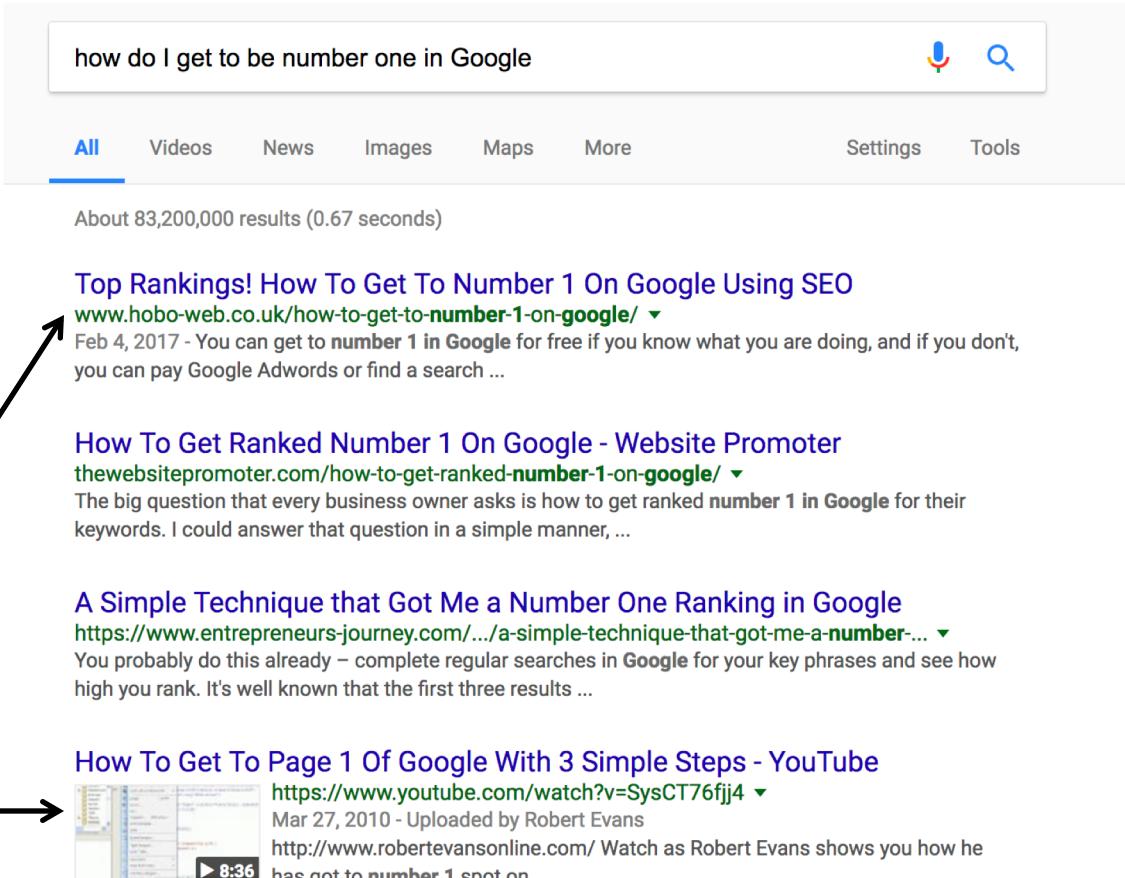
X marks the clicks

Estimating the Value of Rank in a Sponsored List

- <http://seoblackhat.com/2006/08/11/tool-clicks-by-rank-in-google-yahoo-msn/>
- A survey done back in 2006 worked by examining click data from AOL, HitWise and Overture yielding statistics about how often a user clicked on the first search result, second search result, etc.
- Total Searches: 9,038,794
- Total Clicks: 4,926,623
- Ranking Number 1 receives 42.1 percent of click throughs.
Ranking Number 2 receives 11.9 percent of click throughs.
Ranking Number 3 receives 8.5 percent of click throughs.
Ranking Number 4 receives 6.1 percent of click throughs.
Ranking Number 5 receives 4.9 percent of click throughs.
Ranking Number 6 receives 4.1 percent of click throughs.
Ranking Number 7 receives 3.4 percent of click throughs.
Ranking Number 8 receives 3.0 percent of click throughs.
Ranking Number 9 receives 2.8 percent of click throughs.
- Ranking Number 10 receives 3.0 percent of click throughs.

THE MILLION DOLLAR QUESTION

Q. How do I get to number one in Google?



how do I get to be number one in Google

All Videos News Images Maps More Settings Tools

About 83,200,000 results (0.67 seconds)

Top Rankings! How To Get To Number 1 On Google Using SEO
www.hobo-web.co.uk/how-to-get-to-number-1-on-google/ ▾
Feb 4, 2017 - You can get to number 1 in Google for free if you know what you are doing, and if you don't, you can pay Google Adwords or find a search ...

How To Get Ranked Number 1 On Google - Website Promoter
thewebsitepromoter.com/how-to-get-ranked-number-1-on-google/ ▾
The big question that every business owner asks is how to get ranked number 1 in Google for their keywords. I could answer that question in a simple manner, ...

A Simple Technique that Got Me a Number One Ranking in Google
<https://www.entrepreneurs-journey.com/.../a-simple-technique-that-got-me-a-number-...> ▾
You probably do this already – complete regular searches in Google for your key phrases and see how high you rank. It's well known that the first three results ...

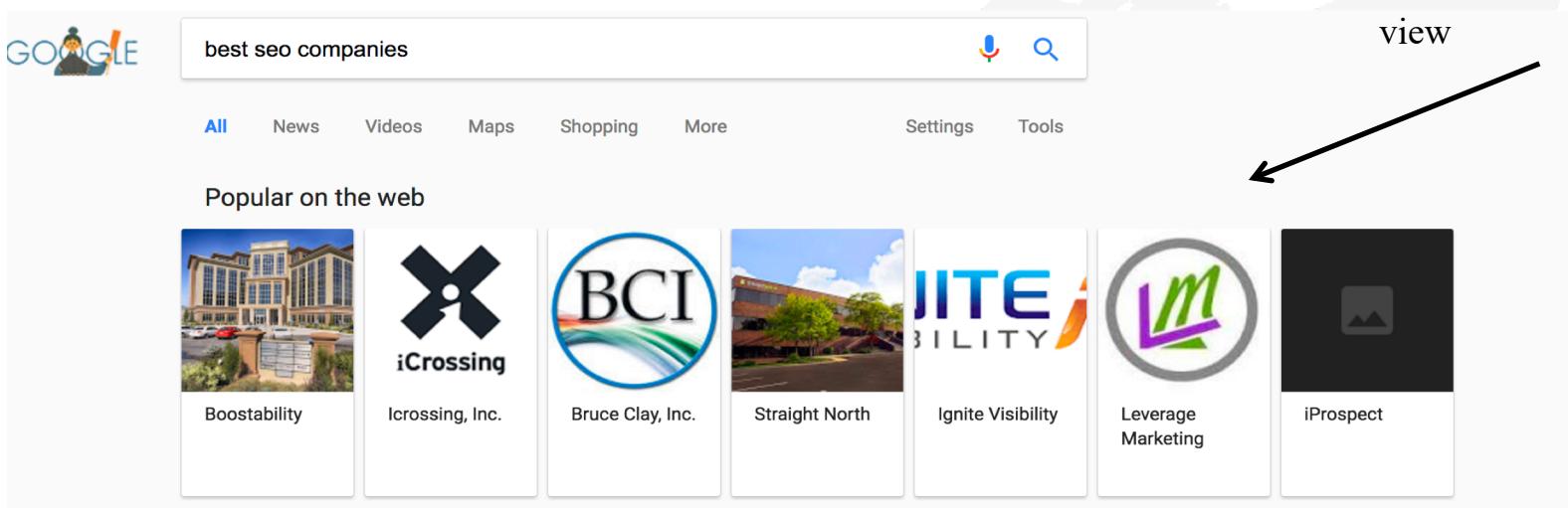
How To Get To Page 1 Of Google With 3 Simple Steps - YouTube
<https://www.youtube.com/watch?v=SysCT76fjj4> ▾
Mar 27, 2010 - Uploaded by Robert Evans
<http://www.robertevansonline.com/> Watch as Robert Evans shows you how he has got to number 1 spot on ...

Google's organic search results are produced by a proprietary algorithm that is often being changed, so there are never any guarantees that someone continues to be highly ranked

But there are lots of people ready to give you advice

Search Engine Optimization

- There is an industry of companies whose focus is to develop and refine a company's online presence;
 - They are called Search Engine Optimizers
- **Search Engine Optimization (SEO) involves:**
 - Making pages show up higher in search engine's organic results
 - Optimizing content to target certain keyword phrases
 - Developing web page content that responds to each seeker's interests
- **There are many companies who claim to do SEO**
 - For a list see <http://www.topseos.com/rankings-of-best-seo-companies>
 - Generally they are “small” companies, earning under \$10 million per year



New (2017) Google Horizontal card-style view

The screenshot shows a Google search results page for the query "best seo companies". The results are displayed in a horizontal card-style view, where each result is a card containing a thumbnail image, the company name, and a brief description. An arrow points from the text "New (2017) Google Horizontal card-style view" to the right side of the search results.

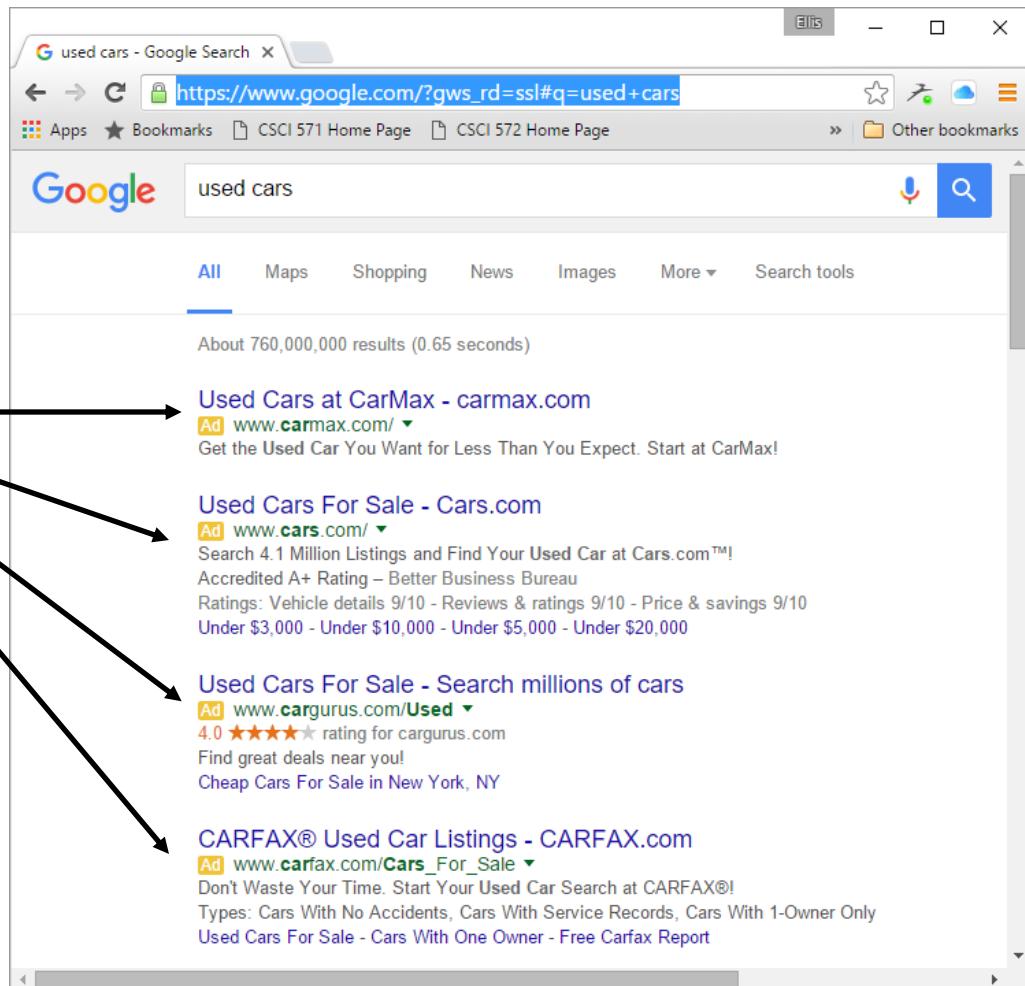
Thumbnail	Company Name	Description
	Boostability	
	iCrossing, Inc.	
	Bruce Clay, Inc.	
	Straight North	
	Ignite Visibility	
	Leverage Marketing	
	iProspect	

THE MILLION DOLLAR ANSWER

Q. How do I get to number one in Google?
A. Use paid search

Paid search is one answer; Google and many other search engines use the pay-per-click (PPC) model of advertising,

Pay enough for a click and you can pretty much guarantee to get a top spot on the list of ads for your chosen keywords



The screenshot shows a Google search results page for the query "used cars". The results are displayed in a standard Google search layout with a navigation bar at the top, followed by a snippet of results.

Search Query: used cars

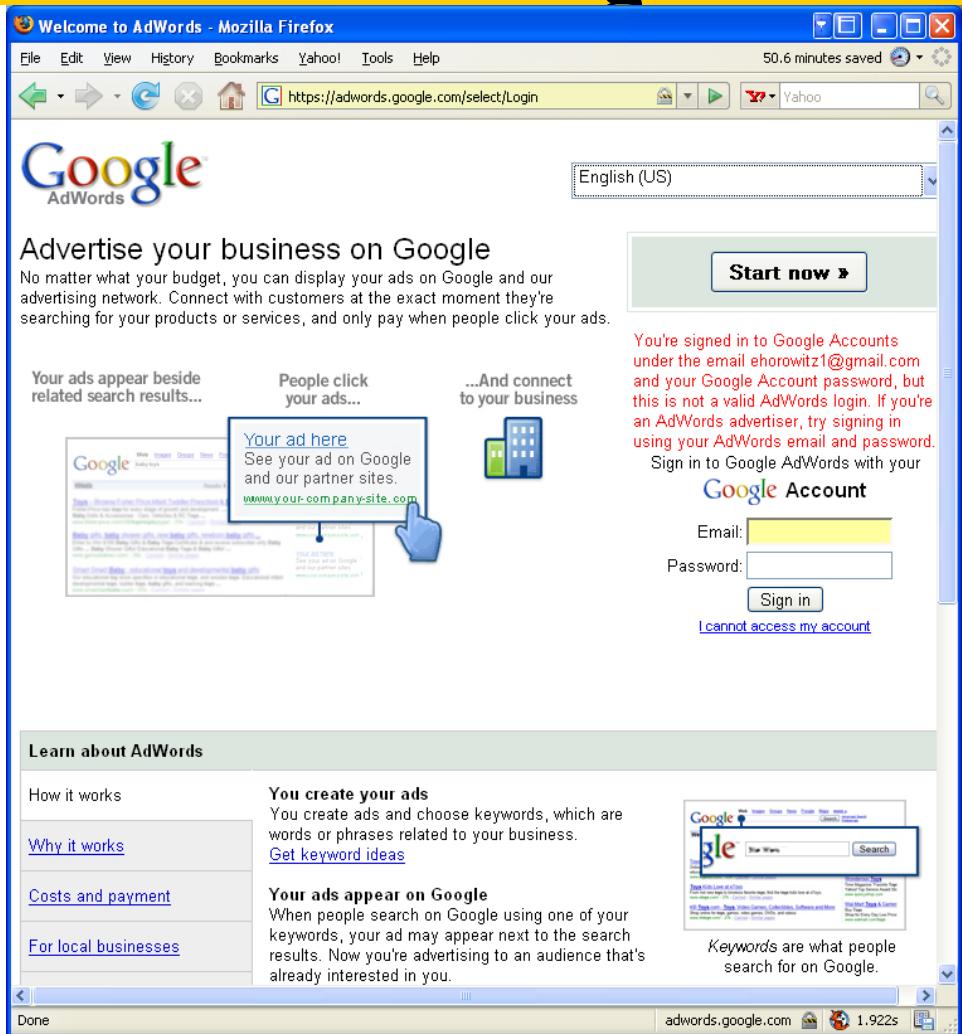
Results:

- Used Cars at CarMax - carmax.com**
Ad www.carmax.com/
Get the Used Car You Want for Less Than You Expect. Start at CarMax!
- Used Cars For Sale - Cars.com**
Ad www.cars.com/
Search 4.1 Million Listings and Find Your Used Car at Cars.com™!
Accredited A+ Rating – Better Business Bureau
Ratings: Vehicle details 9/10 - Reviews & ratings 9/10 - Price & savings 9/10
Under \$3,000 - Under \$10,000 - Under \$5,000 - Under \$20,000
- Used Cars For Sale - Search millions of cars**
Ad www.cargurus.com/Used
4.0 ★★★★☆ rating for cargurus.com
Find great deals near you!
Cheap Cars For Sale in New York, NY
- CARFAX® Used Car Listings - CARFAX.com**
Ad www.carfax.com/Cars_For_Sale
Don't Waste Your Time. Start Your Used Car Search at CARFAX®!
Types: Cars With No Accidents, Cars With Service Records, Cars With 1-Owner Only
Used Cars For Sale - Cars With One Owner - Free Carfax Report

Google's program for accepting pay-per-click ads is called **Adwords**. Its home page is
<https://adwords.google.com>

For every keyword phrase there is an auction where bidders agree to pay a certain amount to Google if their ad is clicked on;

Lets Take a Close Look at Google Adwords



The screenshot shows the Google AdWords login page. At the top, it says "Welcome to AdWords - Mozilla Firefox". Below that, there's a "Start now" button. A message states: "You're signed in to Google Accounts under the email ehorowitz1@gmail.com and your Google Account password, but this is not a valid AdWords login. If you're an AdWords advertiser, try signing in using your AdWords email and password." It also says "Sign in to Google AdWords with your Google Account". There are fields for "Email" and "Password", and a "Sign in" button. Below these, there's a link "I cannot access my account".

On the left, there's a "Learn about AdWords" sidebar with links: "How it works", "Why it works", "Costs and payment", and "For local businesses".

The main content area has three sections: "Your ads appear beside related search results...", "People click your ads...", and "...And connect to your business". It includes a diagram showing a hand pointing to a box labeled "Your ad here" which contains the text "See your ad on Google and our partner sites. [VISIT OUR COMPANY SITE](#)".

At the bottom right, there's a preview of a Google search results page with an AdWords ad highlighted.

Campaigns Begin By Choosing Keywords

Google Keyword Estimator

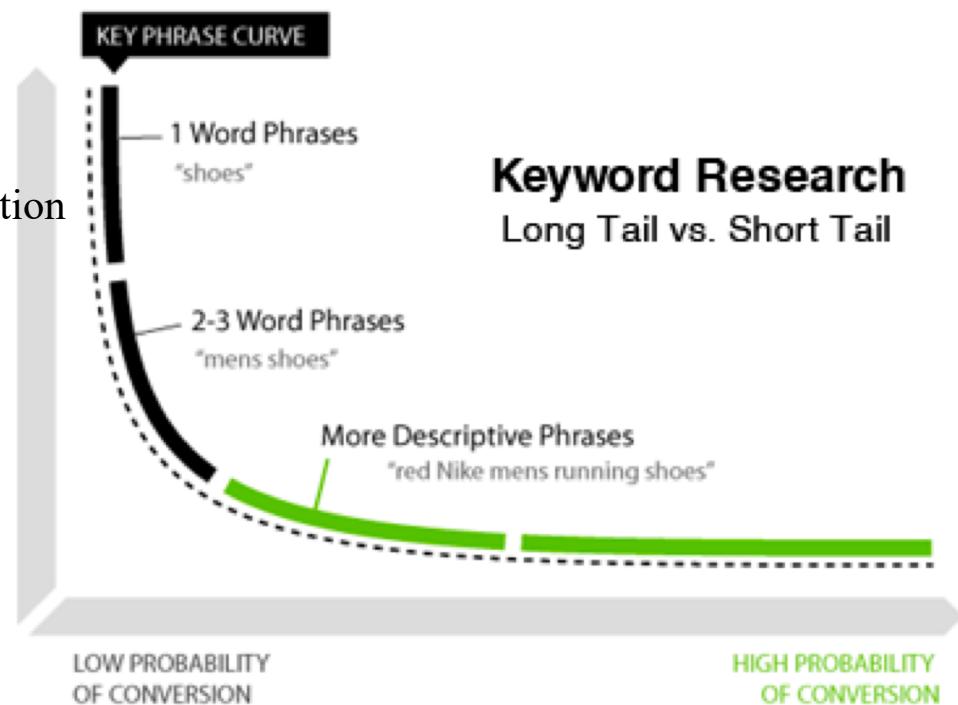
For specific keywords Google provides the approximate cost per click and the resulting position in the list, and other stats

Maximum CPC:	Daily budget:	Get New Estimates			
Keywords ▾	Search Volume	Estimated Avg. CPC	Estimated Ad Positions	Estimated Clicks / Day	Estimated Cost / Day
Search Total		\$5.23 - \$7.34	1 - 3	270 - 348	\$1,450 - \$2,660
crime scene detective class	<div style="width: 10px; height: 10px; background-color: #e0e0e0;"></div>		Not enough data to give estimates. [?]		
criminal justice	<div style="width: 20px; height: 10px; background-color: #669966;"></div>	\$4.85 - \$6.84	1 - 3	221 - 277	\$1,080 - \$1,900
criminal justice associates degree	<div style="width: 5px; height: 10px; background-color: #669966;"></div>	\$9.58 - \$12.76	1 - 3	0 - 1	\$0 - \$20
criminal justice career	<div style="width: 5px; height: 10px; background-color: #669966;"></div>	\$3.53 - \$4.41	1 - 3	2 - 3	\$8 - \$20
criminal justice career training	<div style="width: 10px; height: 10px; background-color: #e0e0e0;"></div>		Not enough data to give estimates. [?]		
criminal justice classes	<div style="width: 5px; height: 10px; background-color: #669966;"></div>	\$8.72 - \$10.90	1 - 3	0 - 1	\$0 - \$20
criminal justice college	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$4.76 - \$5.95	1 - 3	10 - 14	\$50 - \$90
criminal justice course	<div style="width: 5px; height: 10px; background-color: #669966;"></div>	\$10.63 - \$15.94	1 - 3	0 - 1	\$0 - \$20
criminal justice coursework	<div style="width: 10px; height: 10px; background-color: #e0e0e0;"></div>		Not enough data to give estimates. [?]		
criminal justice degree	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$13.76 - \$20.64	1 - 3	16 - 21	\$230 - \$440
criminal justice online class	<div style="width: 10px; height: 10px; background-color: #e0e0e0;"></div>		Not enough data to give estimates. [?]		
criminal justice program	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$7.34 - \$9.92	1 - 3	2 - 4	\$20 - \$40
criminal justice school	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$7.37 - \$9.31	1 - 3	4 - 6	\$30 - \$60
detective training	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$3.58 - \$4.48	1 - 3	2 - 3	\$8 - \$20
law enforcement career	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$4.40 - \$5.49	1 - 3	3 - 4	\$20 - \$30
law enforcement program	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$3.29 - \$4.12	1 - 3	0 - 1	\$0 - \$5
law enforcement training	<div style="width: 10px; height: 10px; background-color: #669966;"></div>	\$3.44 - \$4.30	1 - 3	10 - 12	\$40 - \$60

Estimates for these keywords are based on clickthrough rates for current advertisers. Some of the keywords above are subject to review by Google and may not trigger your ads until they are approved. Please note that your traffic estimates assume your keywords are approved.

Long Tailed Keywords can be Valuable

- Long-tail keywords are search queries made up of three-four word phrases that are very specific to a product, good, or service that's being sold.
 - Long-tail keywords are the phrases search engine users are generally more likely to type in when they're closer to purchasing an item.
- The conversion rate for long-tail keywords is approximately **2.5 times higher than it is for head (shorter) keywords.**
- long-tail keywords that present *less* competition also offer *lower cost-per-click prices* since few marketers are targeting them



Your Keyword Phrases Should be Mapped on Your Website

- **Use Key Phrases in the content on your page**
- **Develop meta data with Key Phrases**
 - TITLE tags
 - Meta Description and Keyword tags
 - ALT tags
- **Name directories, files and images with the same key words or phrases**



Advertisers Designate Keyword Matching Rules

- The *advertiser* will specify the type of matching to be done against his keyword phrases
 - Four types of keyword matching options can help you refine your ad targeting
 1. Broad Match
 2. Exact Match
 3. Phrase Match
 4. Negative Keyword

<http://www.google.com/ads/glossary.html>



Keyword: Broad Match

- **A broad match is the default option**
 - When you include keyword phrases like "tennis shoes" in your keyword list, your ads will appear when users search for "tennis" and "shoes", in any order (and possibly along with other terms)
- **Broad Match ads may also show for expanded matches, including synonyms and plurals**
 - Google will analyze your keyword list, ad text, and daily Google search queries, and show your ads for relevant terms and variations (such as "tennis sneakers")
 - Even if you didn't include these terms in your keyword list
- **Broad matches are often less targeted than exact or phrase matches**
 - If you decide to run your ads on broad-matched keywords, create keyword phrases containing at least two descriptive words

<http://www.google.com/ads/glossary.html>

Keyword: Exact Match

- The search query must exactly match your keyword
 - Originally Exact Match meant that "tennis shoes" would only match a user request for "tennis shoes" and not for "red tennis shoes," even though the second query contains your keywords
 - However, Google now includes rewording and reordering for exact match keywords
 - Exact match will now ignore function words (in, to), conjunctions (for, but), articles (a, the) and other words that don't impact the intent of the query
 - <https://adwords.googleblog.com/2017/03/close-variants-now-connects-more-people.html>

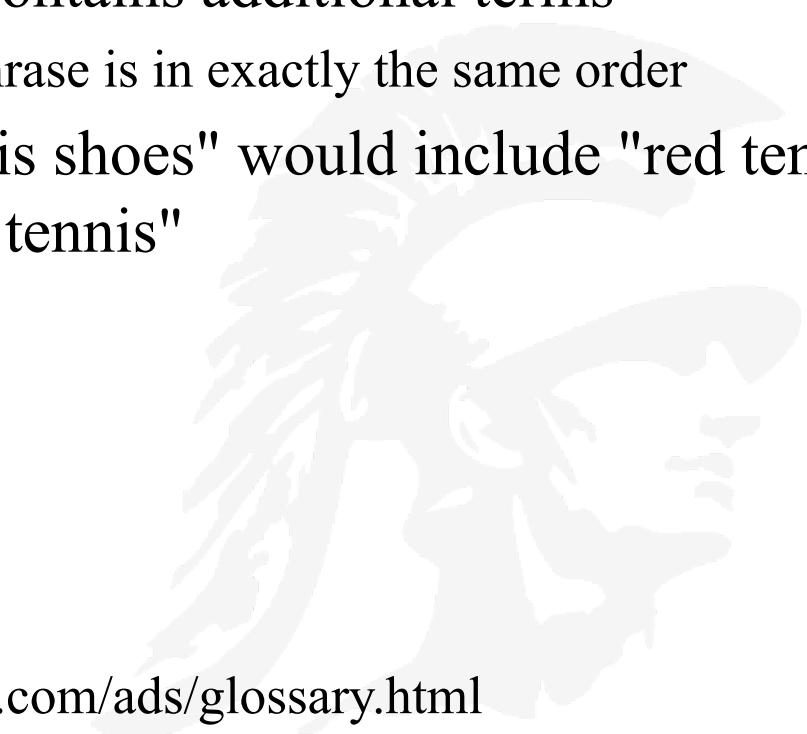
Keyword	Query	Why it matched
jobs in united states nike shoes women	jobs in the united states nike shoes for women	Function words added
parks in san diego paint for a deck	parks san diego paint for deck	Function words removed
news from today bahamas cruise from miami	news for today miami to bahamas cruise	Function words changed

Keyword	Query	Why it matched
running shoes men's dress shirt	shoes running dress shirt men's	Words reordered

<http://www.google.com/ads/glossary.html>

Keyword: Phrase Match

- Your ad appears when users search on the exact phrase
 - AND when their search contains additional terms
 - As long as the keyword phrase is in exactly the same order
 - A phrase match for "tennis shoes" would include "red tennis shoes" but not "shoes for tennis"



<http://www.google.com/ads/glossary.html>

Keyword: Negative Keyword

- **Negative keywords allow you to eliminate searches that you know are not related to your message**
 - If you add the negative keyword "**–table**" to your keyword "**tennis shoes,**" your ad will not appear when a user searches on "**table tennis shoes**"
 - Negative keywords should be used with caution, -- they can eliminate a large portion of a desired audience if applied incorrectly

<http://www.google.com/ads/glossary.html>

A Sample Google Adwords Campaign Screen



The screenshot shows a Mozilla Firefox browser window displaying the Google AdWords Campaign Summary. The URL is https://adwords.google.com/select/CampaignSummary. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Yahoo!, Tools, Help), a toolbar with standard icons, and a search bar.

The main content area is titled "All Campaigns" and displays data for the period "Jan 29, 2003 to Feb 7, 2007". A date range selector shows "all time" selected. The table lists two campaigns:

Campaign Name	Current Status	Current Budget [?]	Clicks ▾	Impr.	CTR	Avg. CPC	Cost
Campaign #2	Deleted	[\$10.00 / day]	747	87,551	0.85%	\$0.44	\$326.34
Campaign #1	Deleted	[\$5.00 / day]	328	9,893	3.31%	\$0.53	\$174.94
Total - all 2 campaigns	-	\$0.00 / day active campaigns	1,075	97,444	1.10%	\$0.47	\$501.28

At the bottom, there is a search bar with "Find: money" and navigation buttons for "Next", "Previous", "Highlight all", and "Match case".

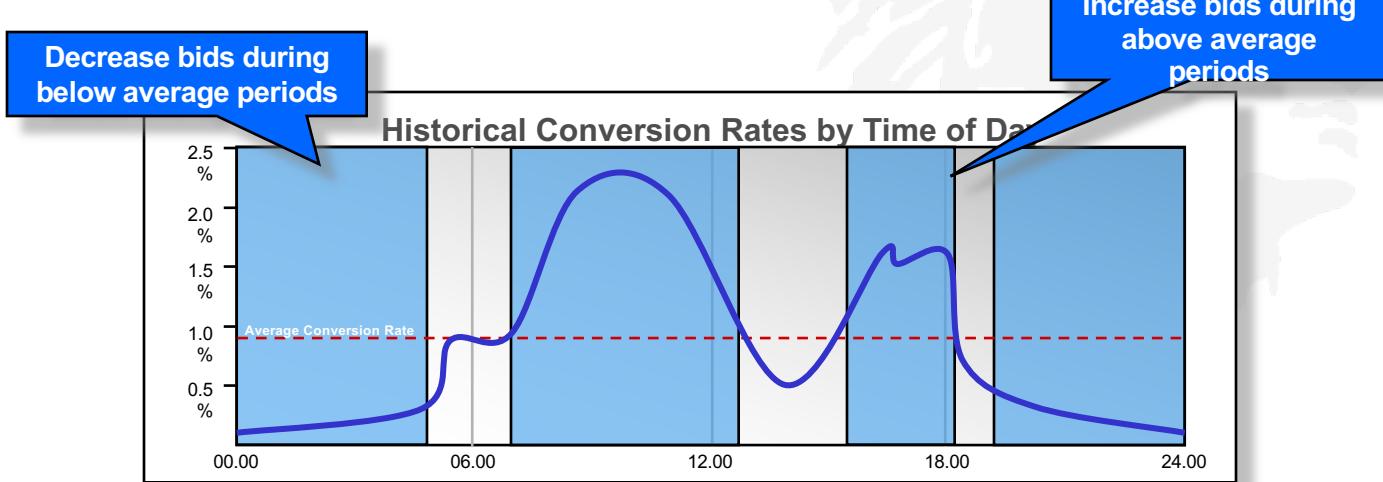
- **AdWords advertisers create advertising campaigns**
 - There are two campaigns defined above
- **Each campaign has a set of keyword and associated ads, and includes**
 - a budget, recorded clicks, recorded impressions, click thru rate, average cost/click, and total cost of the campaign

Capabilities of Search Engine Ad Servers

- **The typical common functionality of ad servers includes:**
 - Uploading the creative (*creative* is the term used to describe the ad that will appear)
 - Maintaining business rules for placing ads
 - Targeting ads to different users, or content
 - Optimizing appearance of a set of creatives based upon results (choosing the most effective ad)
 - Reporting impressions, clicks, post-click activities, and interaction metrics.
- **Advanced functionality may include:**
 - *Frequency capping* creatives so users only see messages a limited amount of time.
 - *Sequencing* creatives so users see messages in a specific order (sometimes known as surround sessions).
 - Excluding competitive creatives so users do not see competitors' ads directly next to one another.
 - Displaying creatives so an advertiser can own 100% of the inventory on a page (sometimes known as roadblocks).
 - Targeting creatives to users based on their previous behavior (behavioral marketing or behavioral targeting).

Search Engine Ad Servers are Versatile

- Advertisers with accounts on Google's Adwords can define a set of criteria for placement of their ad; typical criteria might include rules such as
 - Only display my ad
 - from 9:00AM-5:00PM EST
 - once/day
 - if the viewer is located in the United States
 - dayparting* is a technique that involves increasing your bids during times when conversion rates are typically above average, and decreasing them when rates are typically below average



- **Each bidder specifies (i) search terms that trigger its bid and (ii) the amount to bid for each search term.**
 - Bidders may also establish an overall ad budget and limits for each kind of bid.
 - Google may set a reserve or minimum price for each term.
- **Google estimates the “click-through rate” that each bidder would have if it were listed in the first spot.**
 - Ads with very low click-through rates are not displayed.
 - Google ranks bids by multiplying the click-through-rate and the bid amount.
 - Ads are displayed in rank order.
- **Google is paid only when an ad gets clicked.**
 - In that case, the price it receives is *the smallest price the bidder could have bid to get its ranking*.

How does AdWords bidding work?

- The actual position of your ad is determined by your ad rank (Maximum Bid multiplied by the Quality Score).
- The highest ad rank gets the 1st ad position.
- Your actual CPC (cost per click) will be determined by the ad rank of the next highest ad below you
- Exception: when you are the only bidder or the lowest bid in the AdWords auction; then you pay your maximum bid per click!
- AdWords bidding heavily penalizes advertisers who bid with low quality scores. Conversely, those with high Quality Scores get higher ad ranks and lower CPC
- The average cost per click on AdWords varies by keyword and industry, but is roughly \$2.32 on the search network and \$0.58 on the display network
- For more facts about Adwords costs see
- <http://www.wordstream.com/blog/ws/2016/02/29/google-adwords-industry-benchmarks>

Second Price Auction Using Only Bid Amount

Bid2: (\$9)

- **Bidder 2 is ranked 1st**

- Pays $\$6+1¢=\6.01

Bid1: (\$5)

- **Bidder 3 is ranked 2nd**

- Pays $\$5+1¢=\5.01

Let $P(C)$ be the Probability
of the Ad Being Clicked

Bid2: \$9 $P(C)=0.1$

Bid3: \$6 $P(C)=0.1$

Bid1: \$5 $P(C)=0.4$

$P(c)$ can depend upon:

- Historical click performance of the ad
- Landing page quality
- Relevance to the user
- User click through rates

Expected Revenue = Bid X Click Probability

So the ad with highest bid does not necessarily produce the most revenue



\$0.9
\$0.6
\$2.0

*Expected
Revenue*

Google Ranks Ads by the Product of Bid*Click Probability

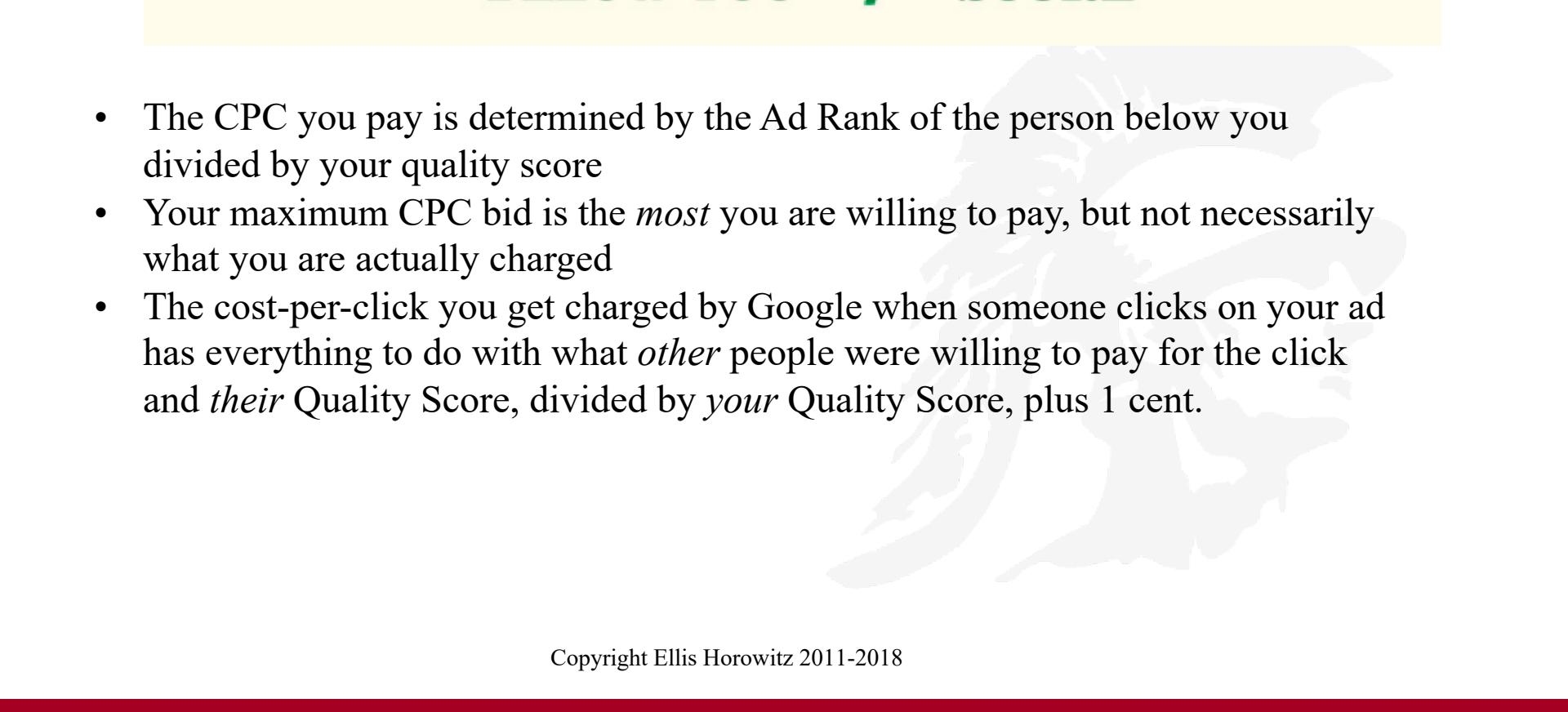
Bid1: \$5 $P(C)=0.4$ \$2.0

Bid2: \$9 $P(C)=0.1$ \$0.9

Bid3: \$6 $P(C)=0.1$ \$0.6

Ad Rank= Bid X Click Probability

More Examples



YOUR PRICE = **THE AD RANK OF THE PERSON BELOW YOU** / **YOUR QUALITY SCORE + \$0.01**

- The CPC you pay is determined by the Ad Rank of the person below you divided by your quality score
- Your maximum CPC bid is the *most* you are willing to pay, but not necessarily what you are actually charged
- The cost-per-click you get charged by Google when someone clicks on your ad has everything to do with what *other* people were willing to pay for the click and *their* Quality Score, divided by *your* Quality Score, plus 1 cent.

Even More Examples

	Max Bid	Quality Score	Ad Rank	Actual CPC
Advertiser I	\$2.00 	10 	20	$16/10 + 0.01 = \$1.61$ 
Advertiser II	\$4.00 	4 	16	$12/4 + 0.01 = \$3.01$ 
Advertiser III	\$6.00 	2 	12	$8/2 + 0.01 = \$4.01$ 
Advertiser IV	\$8.00 	1 	8	Highest CPC 

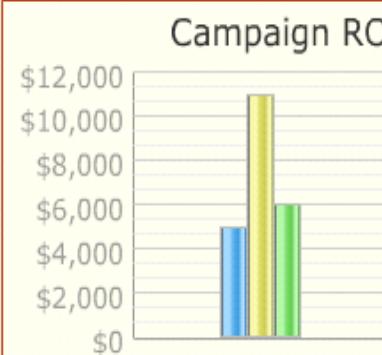
Notice how Advertiser I can pay less for a higher position due to his high quality score.

In this example, four advertisers are competing for the same keyword. Notice if someone were to click on advertiser 1's ad, he would pay just \$1.61 which is equal to the *Ad Rank he must beat* (which is Advertiser 2's Ad Rank of 16) divided by *his own Quality Score* (which is 10), plus 1 penny.

The key takeaway here is that AdRank helps determines both *your ad position* and the *cost-per-click of your nearest competitor*.

<https://searchengineland.com/all-hail-quality-score-king-of-the-adwords-kpis-166542>

Return On Investment: What is Each Conversion Worth?



Total Campaign Cost: **\$5,000.00**

of Responders: **5000**

of Buyers: **110**

Revenue Generated: **\$11,000.00**

Profit: **\$6,000.00**

Cost per Responder: **\$1.00**

Cost per Buyer: **\$45.45**

note: double-click cells below to enter data

Clicks Purchased:

Conversion Rate:
(What % of responders will buy?)

Cost-per-click:

Average Buyer Purchase:
(How much will buyers spend?)

Source: <http://www.bplans.com/common/calculators/ppcroi.cfm>

Improved Conversion Rate



Total Campaign Cost: **\$5,000.00**

of Responders: **5000**

of Buyers: **215**

Revenue Generated: **\$21,500.00**

Profit: **\$16,500.00**

Cost per Responder: **\$1.00**

Cost per Buyer: **\$23.26**

note: double-click cells below to enter data

Clicks Purchased:

Conversion Rate:
(What % of responders will buy?)

Cost-per-click:

Average Buyer Purchase:
(How much will buyers spend?)



- **AdSense** from Google is a service for placing Google ads on third party web pages
- Google purchased the content matching technology from Oingo, a small Santa Monica-based search engine in 2003 for \$102 million
- The program is designed for website publishers who want to display targeted text, video or image advertisements on their website pages and earn money when site visitors view or click the ads
- Typically Google keeps 32% of the ad revenue and returns 68% to the website developer
- In addition to cost-per-click ads, Google also offers
 - *Cost per Thousand* displays, CPM
 - *Cost per Engagement*, where advertisers only pay when users actively engage with ads, e.g. hovering over them or expanding them or reviewing the landing page for more than a few seconds
- **Typically blogs use AdSense to monetize their site**

How AdSense Works

1. The webmaster inserts the AdSense JavaScript code into a webpage.
2. Each time this page is visited, the JavaScript code uses inlined JSON to display content fetched from Google's servers.
3. Google's servers use a cache of the page to determine a set of high-value keywords. Ads are served for those keywords based on the AdWords bidding system.
4. For site-targeted ads, the advertiser chooses the page(s) on which to display ads, and pays based on CPM, or the price advertisers choose to pay for every thousand advertisements displayed.
5. Search ads are added to the list of results after the visitor performs a search.
6. To protect against fraud, AdSense customers can specify the pages on which ads should be shown. AdSense then ignores clicks from pages other than those specified.

Google's AdSense program claims to place ads on third-party websites, where the ads are **relevant** to the site's content;

Each time a visitor visits a page with an AdSense tag, a piece of JavaScript writes an iframe tag, whose src attribute includes the URL of the page. Google's servers use a cache of the page to determine a set of high-value keywords.

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Changing stories and fuzzy details on specific dates are consistent with the way children who are victims of sexual abuse behave, an expert testified Monday at the Michael Jackson trial.

But under cross-examination, Anthony Urquiza acknowledged that his expertise did not extend to false allegations of sexual abuse, which he had not studied.

The testimony came as prosecutors in Jackson's child molestation trial tried to shore up earlier contradictory statements made by the pop star's accuser.

Jackson arrived late again Monday, walking with assistance into the Santa Maria, California, courthouse. Jackson offered a weak wave to supporters as he arrived, then made his way inside.

Santa Barbara County Superior Court Judge Rodney Melville, who threatened to jail Jackson after a similar episode on



Michael Jackson is escorted out of the courtroom shortly after arriving.

Image: [NEXT](#)

advertiser links [what's this?](#)

[MyCashNow - \\$100 - \\$1,000 Overnight](#)
 Payday Loan Cash goes in your account overnight. Very low fees. Fast decisions....
www.mycashnow.com

[Refinance Rates Hit Record Lows](#)
 Get \$150,000 loan for \$625 per month

Above, an article about Michael Jackson includes an irrelevant ad about payday loans

Adsense Content Matching Originally Based on WordNet

- AdSense technology is based upon a database of word meanings initially developed at Princeton, called WordNet
 - <https://wordnet.princeton.edu/>
- WordNet is a semantic lexicon for the English language. It groups English words into sets of synonyms called *synsets*, provides short, general definitions, and records the various semantic relations between these synonym sets.
 - The purpose is twofold:
 1. to produce a combination of dictionary and thesaurus that is more intuitively usable, and
 2. to support automatic text analysis.

AdSense Code

- Google AdSense creates the code, which the publisher copies and pastes into a web page or blog post at the point where it is to appear.
- This is an example of AdSense code for a 728-by-90-pixel ad. Google assigns the numbers following "google_ad_client" and "google_ad_slot."
- ```
<script type="text/javascript"><!--
google_ad_client = "xxxxxxxxxxxxxxxxxx";
/* 728x90, created 10/28/08 */
google_ad_slot = "xxxxxxxxxx";
google_ad_width = 728;
google_ad_height = 90;
//-->
</script>
<script type="text/javascript"
src="http://pagead2.googlesyndication.com/pagead/show_ads.js">
</script>
```
- When a webpage containing this code is displayed, AdSense counts the page visit. If the visitor clicks on the ad, s/he is redirected to the advertiser's website, and Google counts the click and credits the AdSense publisher's account
- Payments for clicks on ads range from a few cents to several dollars.

# Sample Google Conversion Code for Tracking Purchases/Sales

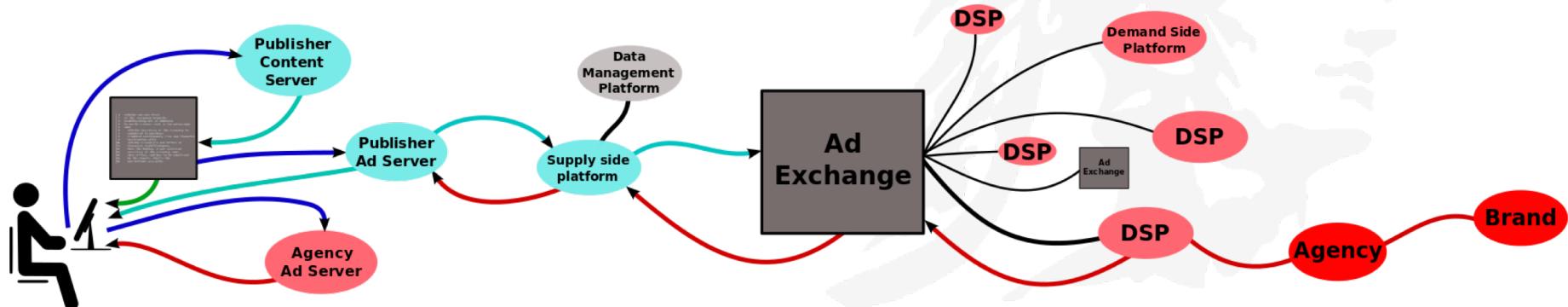
- Google/Yahoo offer tracking pixels
- Tracking pixels are small, typically transparent images on a web page that have special names which permit the loading of the web page to be tracked by a web server.

```
<!-- Google Code for purchase Conversion Page -->
<script language="JavaScript" type="text/javascript">
var google_conversion_id = 1072192880;
var google_conversion_language = "en_US";
var google_conversion_format = "1";
var google_conversion_color = "666666";
if (1) { var google_conversion_value = 1; }
var google_conversion_label = "purchase";
</script>
<script language="JavaScript"
src="http://www.googleadservices.com/pagead/conversion.js"> </script>
<noscript>
 </noscript>
```

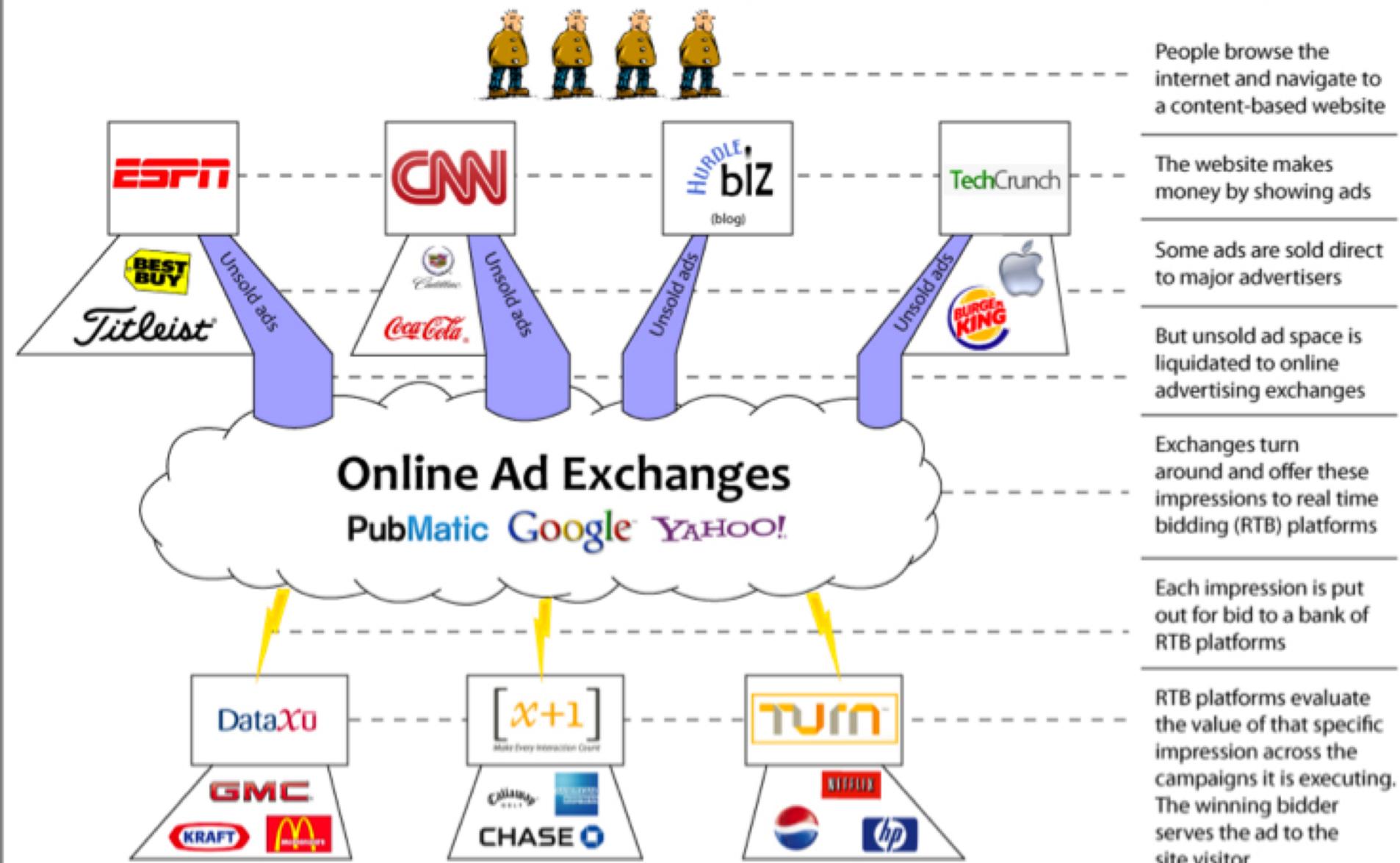
The code is inserted into a page; an external Javascript file is imported; A small image, a pixel, is placed on the page; When the page is requested, Google records the access

# Ad Exchanges and DoubleClick

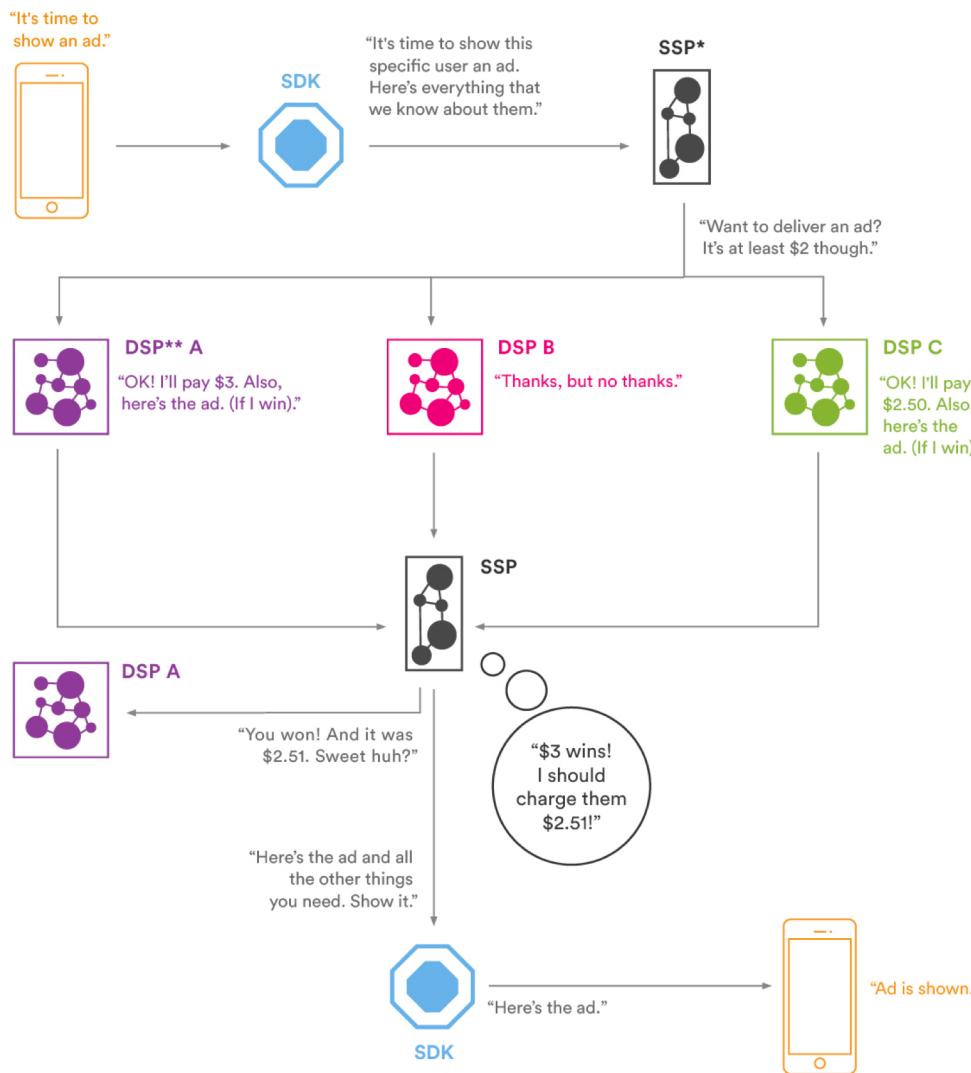
- An **ad exchange** is a technology platform that facilitates the buying and selling of media advertising inventory from multiple **ad** networks.
- Prices for the inventory are determined through technology-driven bidding
- The key function of an **ad network** is aggregation of **ad** space supply from publishers and matching it with advertiser demand
- DoubleClick **Ad Exchange** is a real-time marketplace owned by **Google** for buying and selling advertising.



# The Real-Time Bidding Paradigm in Online Advertising



## How real-time bidding (RTB) works



\*SSP = Supply Side Platform

\*\*DSP = Demand Side Platform

Take, for example, the moment in a mobile game app where the player watches an ad in-between the game levels. At that moment, the mobile SSP runs an auction with all of the advertisers interested to grab the attention of that audience (in this case, the mobile game player.) The advertisers make their bid, in a split-second the highest bidder is chosen, finally the ad gets “served” and shown to the player.

Both publishers and advertisers can set parameters for RTB – minimum prices and maximum bids, for example – as well as prioritize specific deals and inventory. This split-second process is illustrated in the infographic

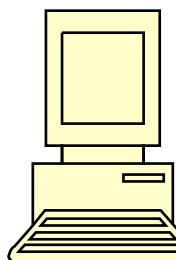
# Today's advertising model

Publishers

Trackers

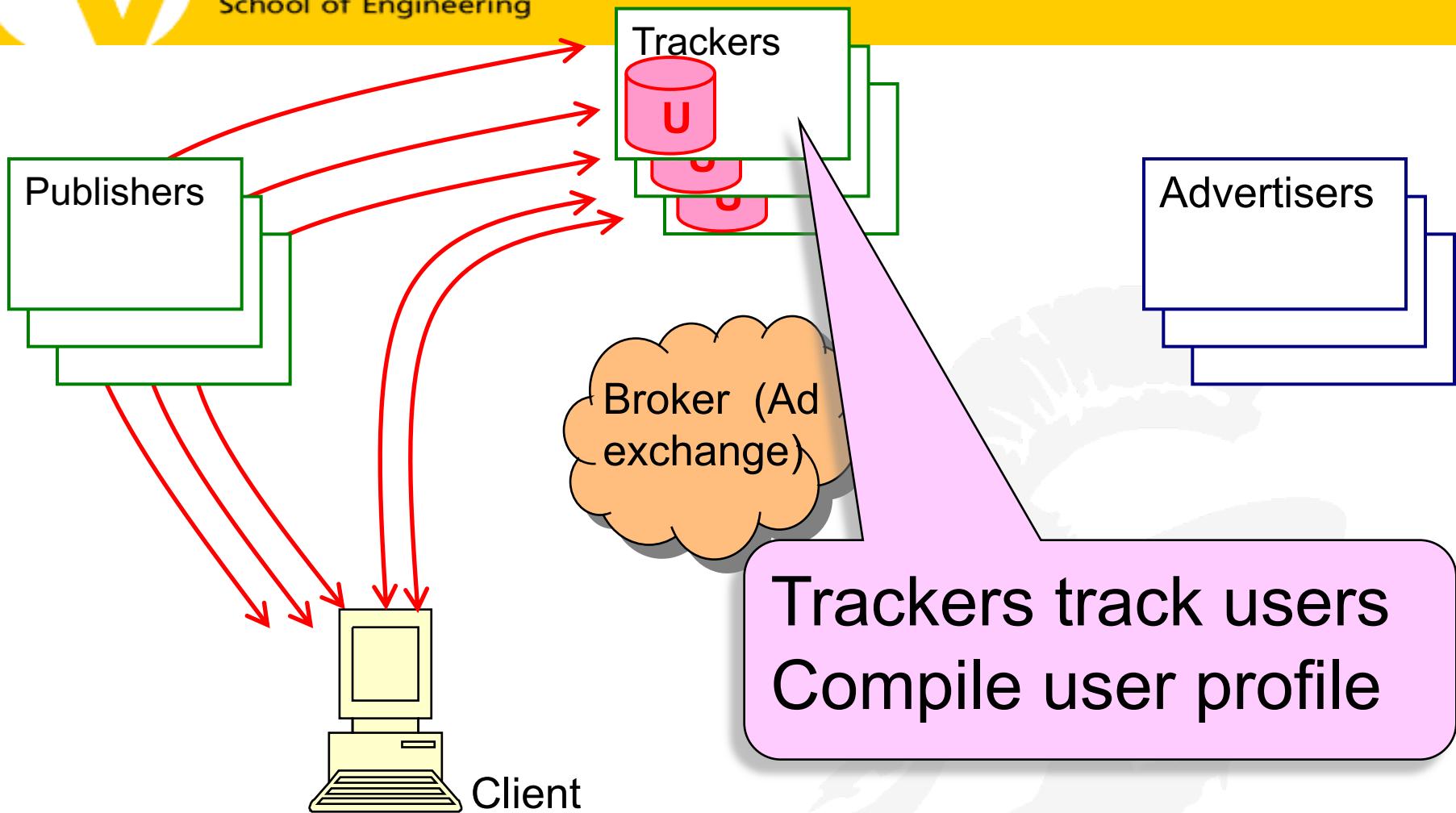
Advertisers

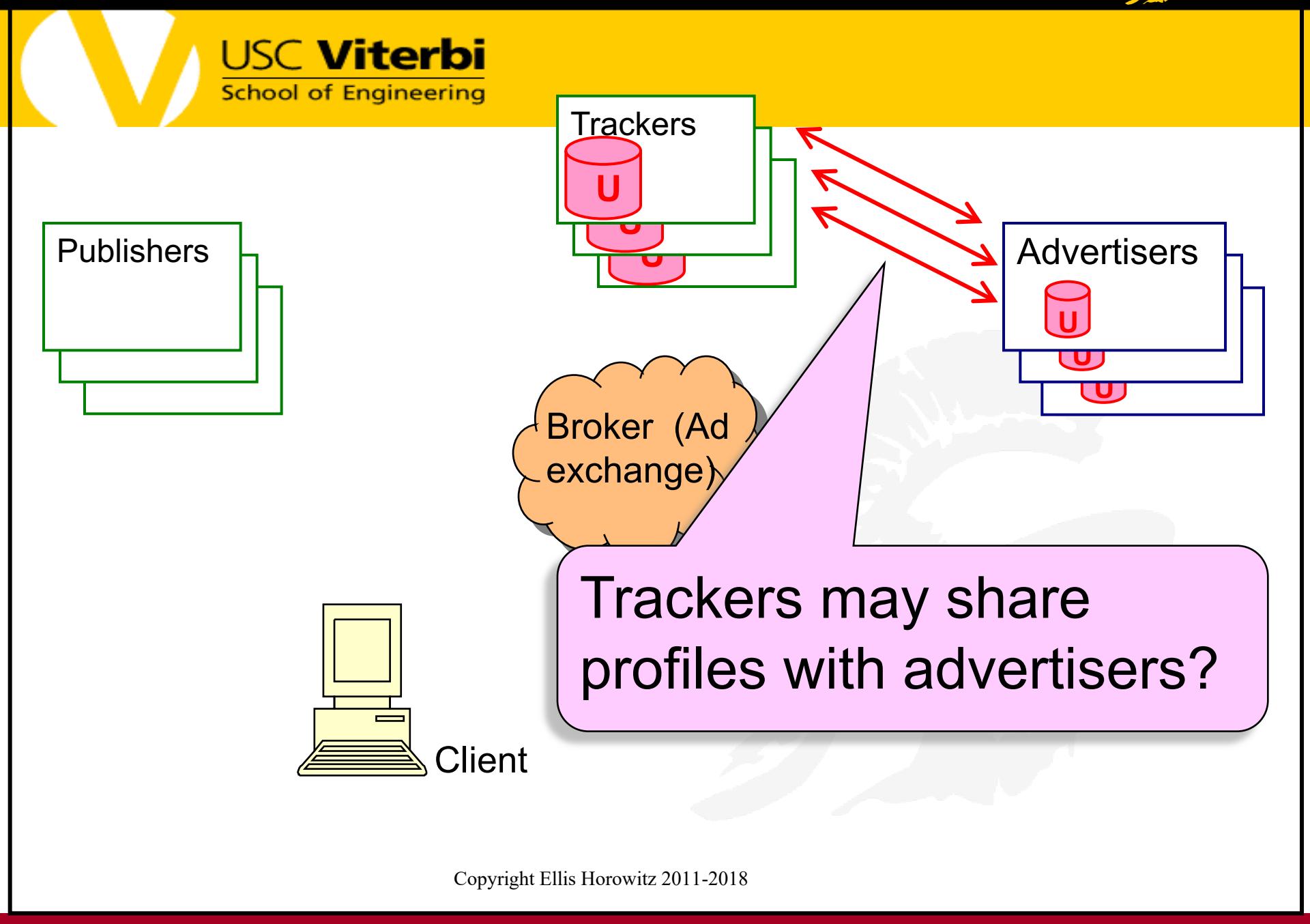
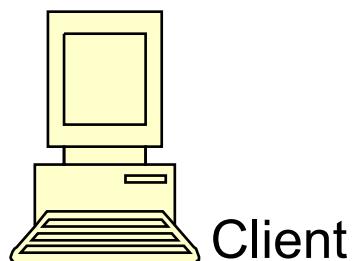
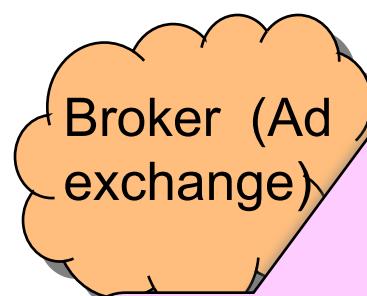
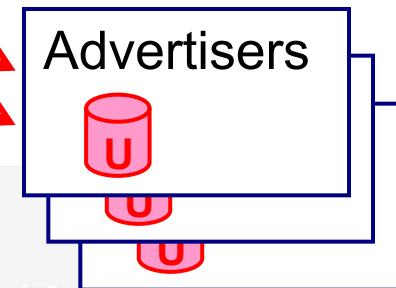
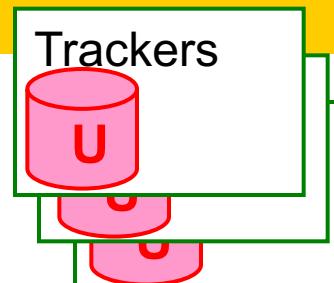
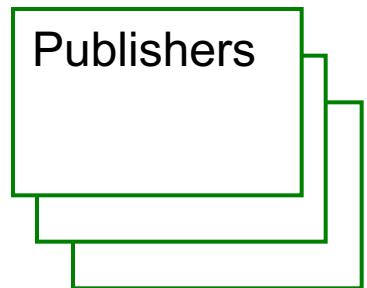
Broker (Ad  
exchange)



Client

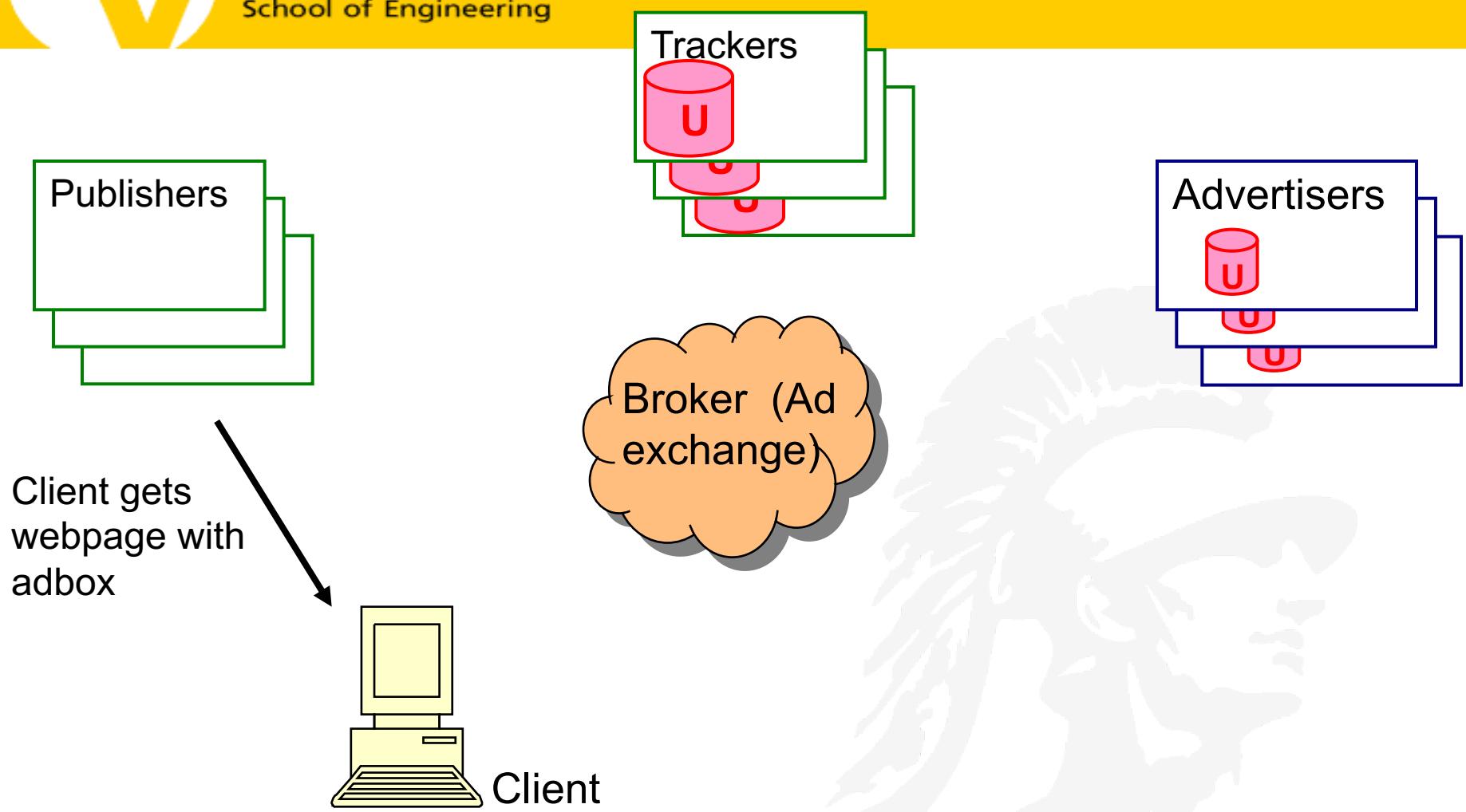
The cast of players

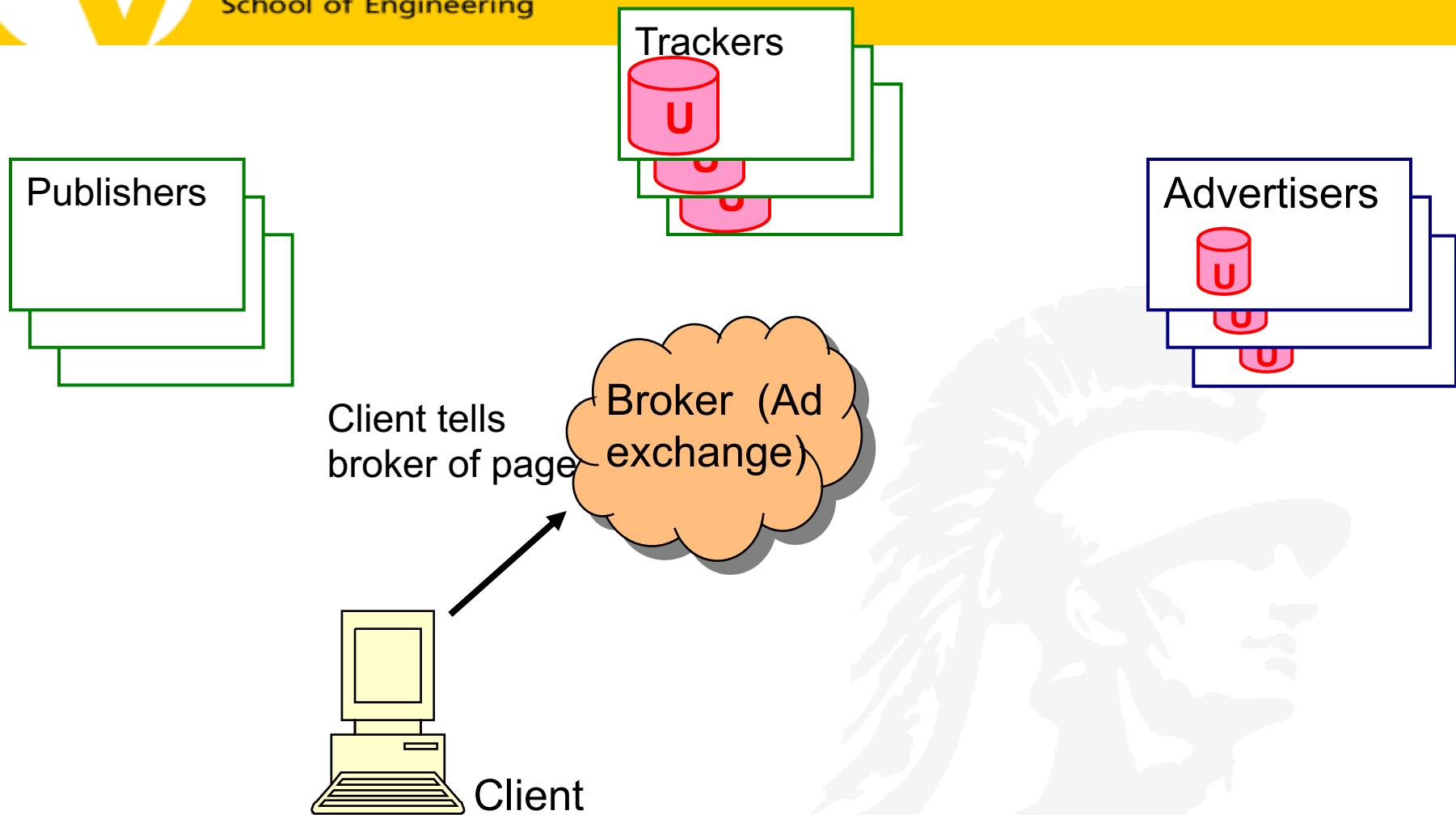


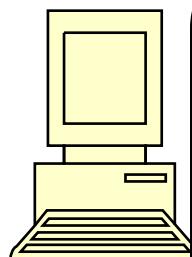
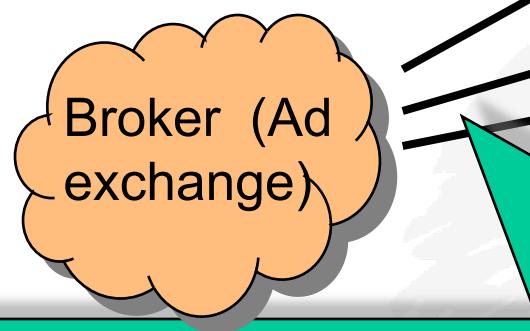
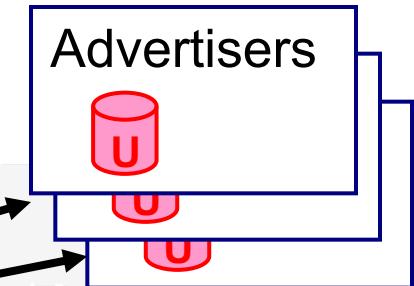
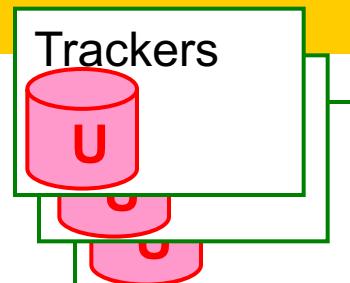
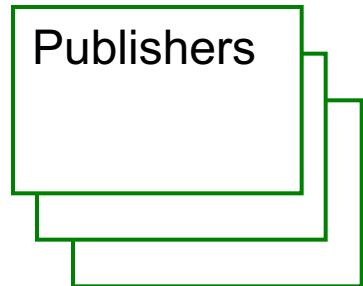


Trackers may share profiles with advertisers?

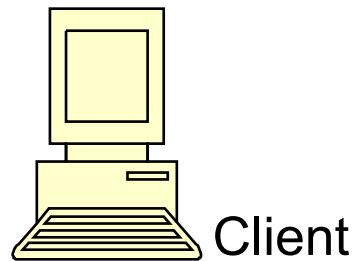
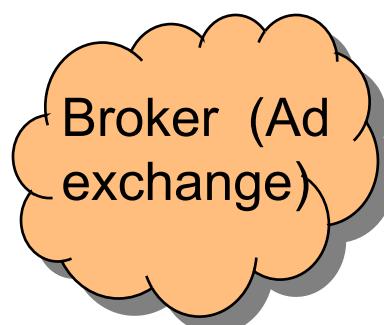
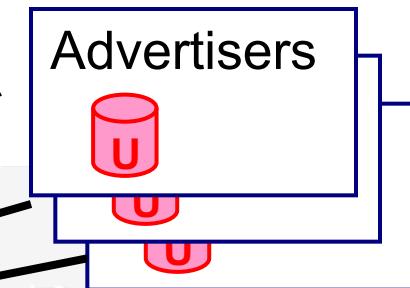
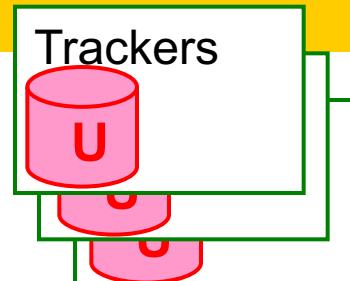
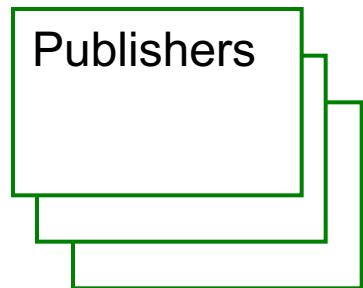
A large pink rounded rectangle containing the text. In the background, there is a faint watermark of a person's face and a globe.



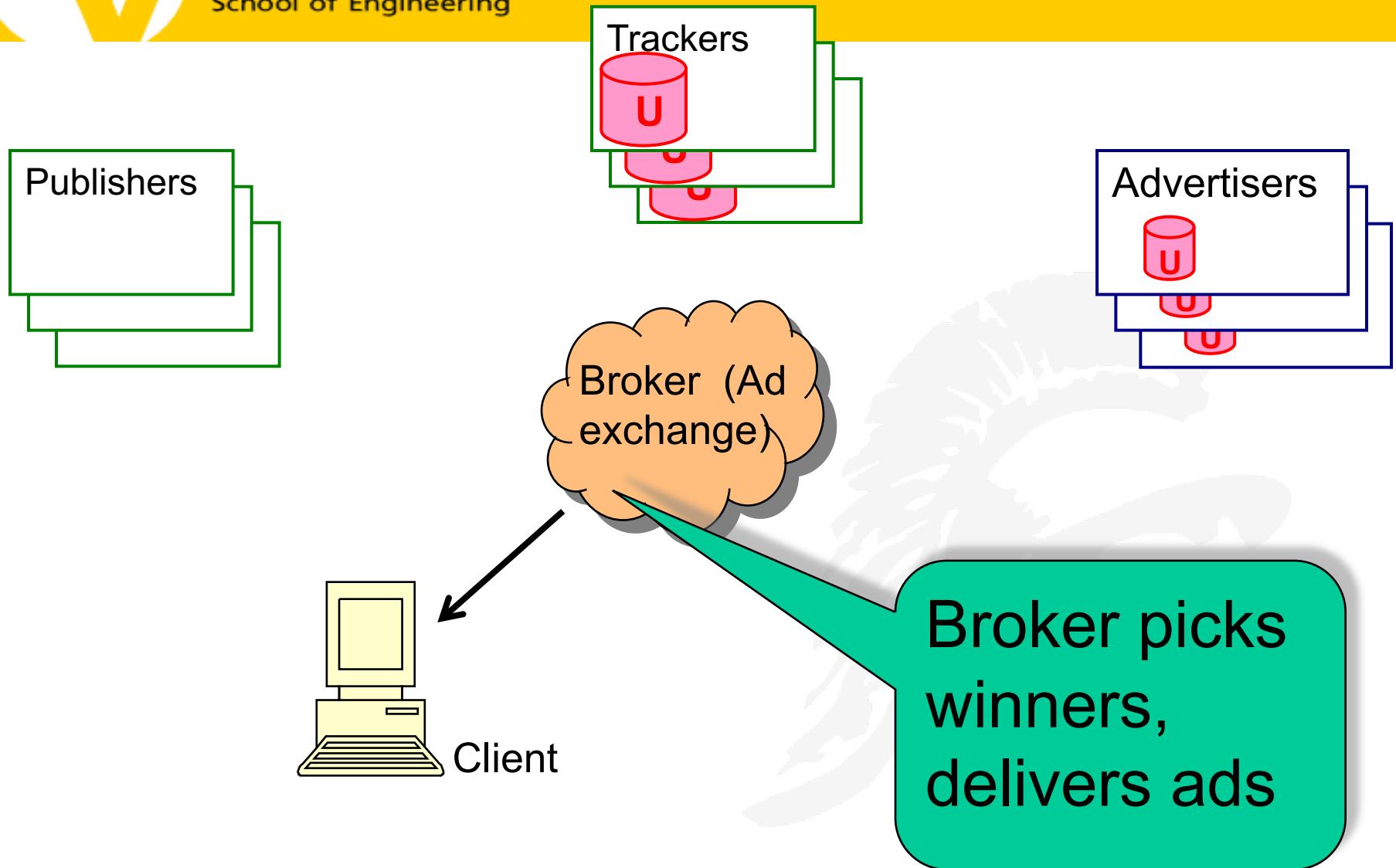


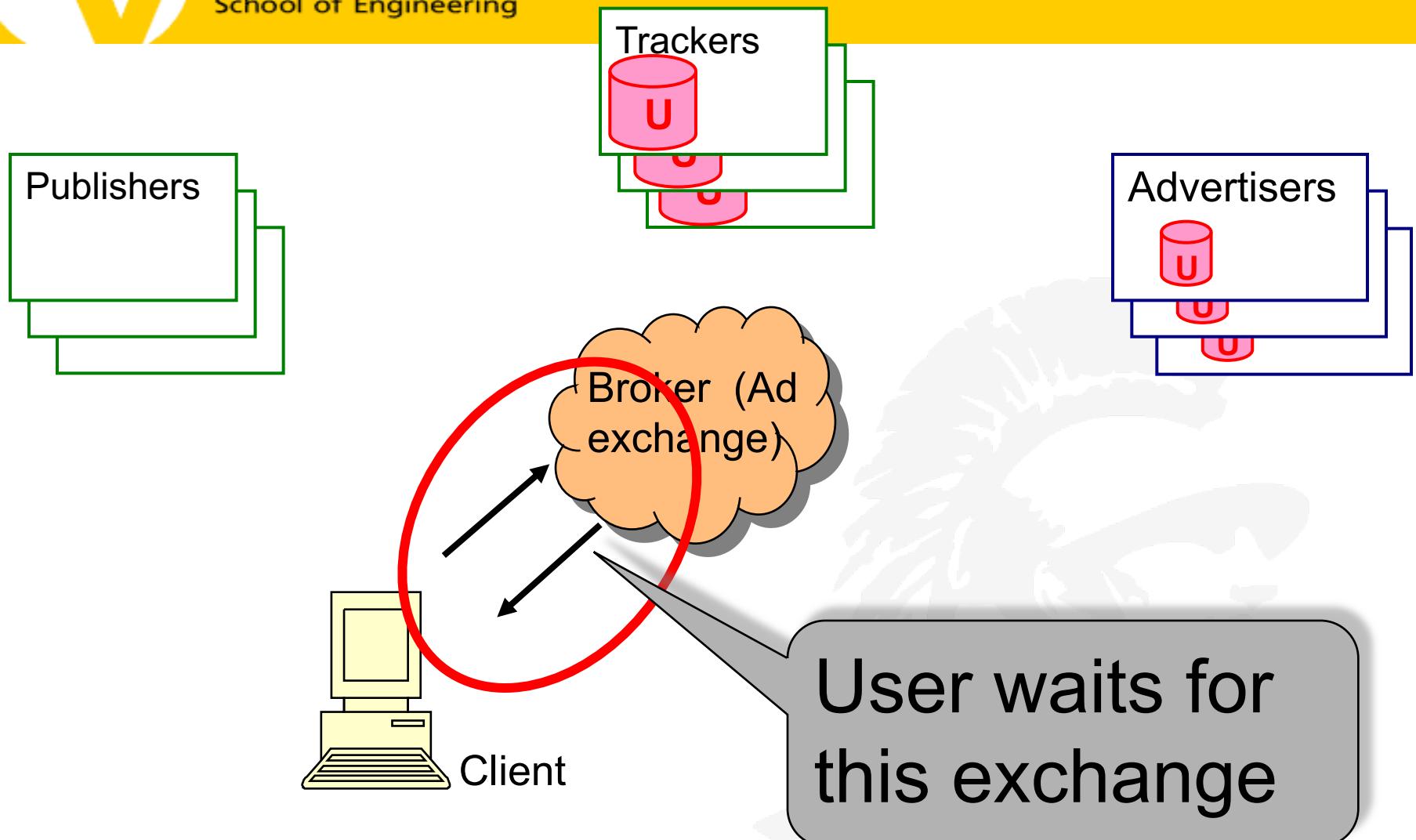


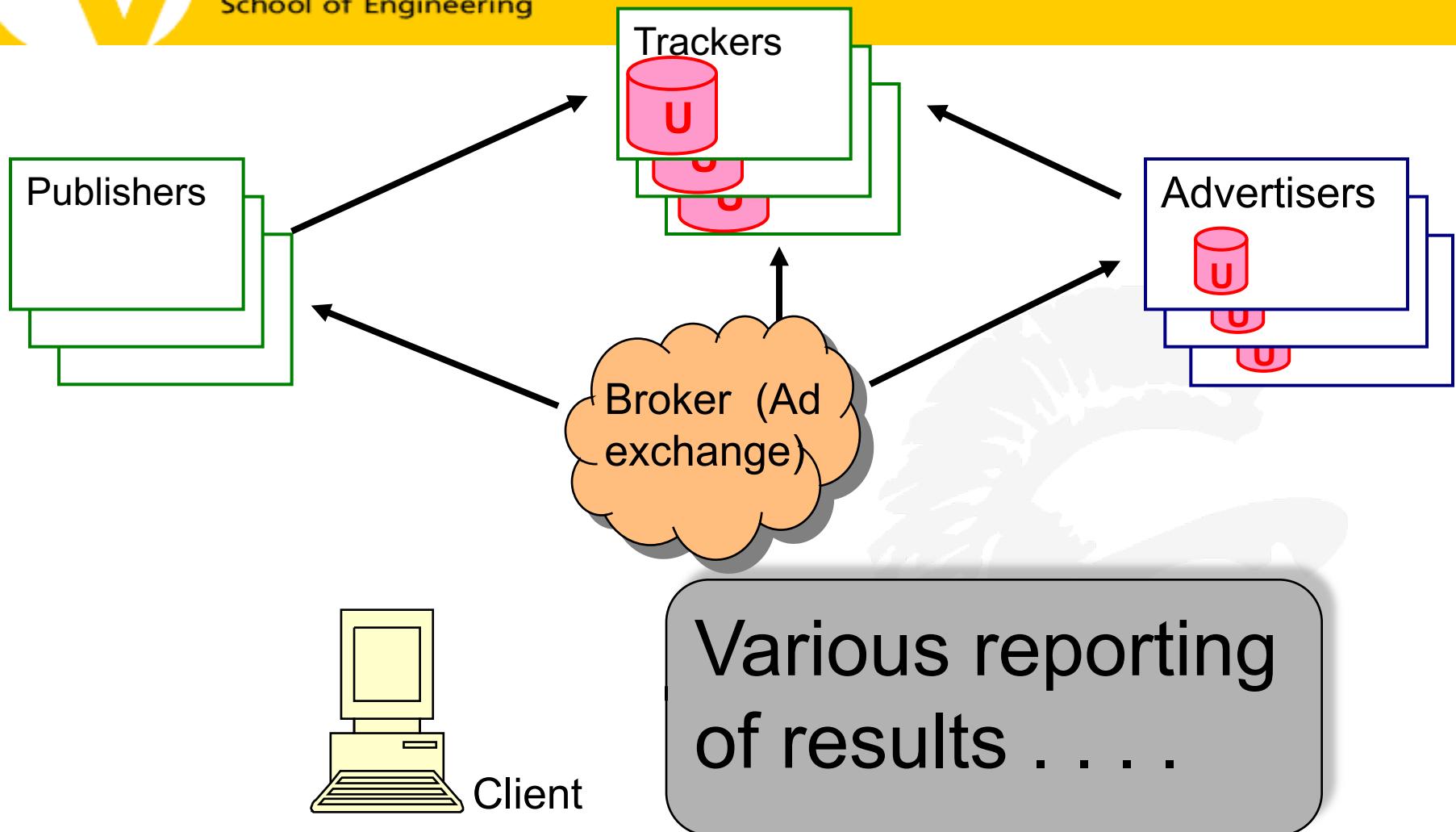
Broker launches auction  
(for given user visiting  
given webpage ....)  
Also does clickfraud etc.



Advertisers present bids and ads



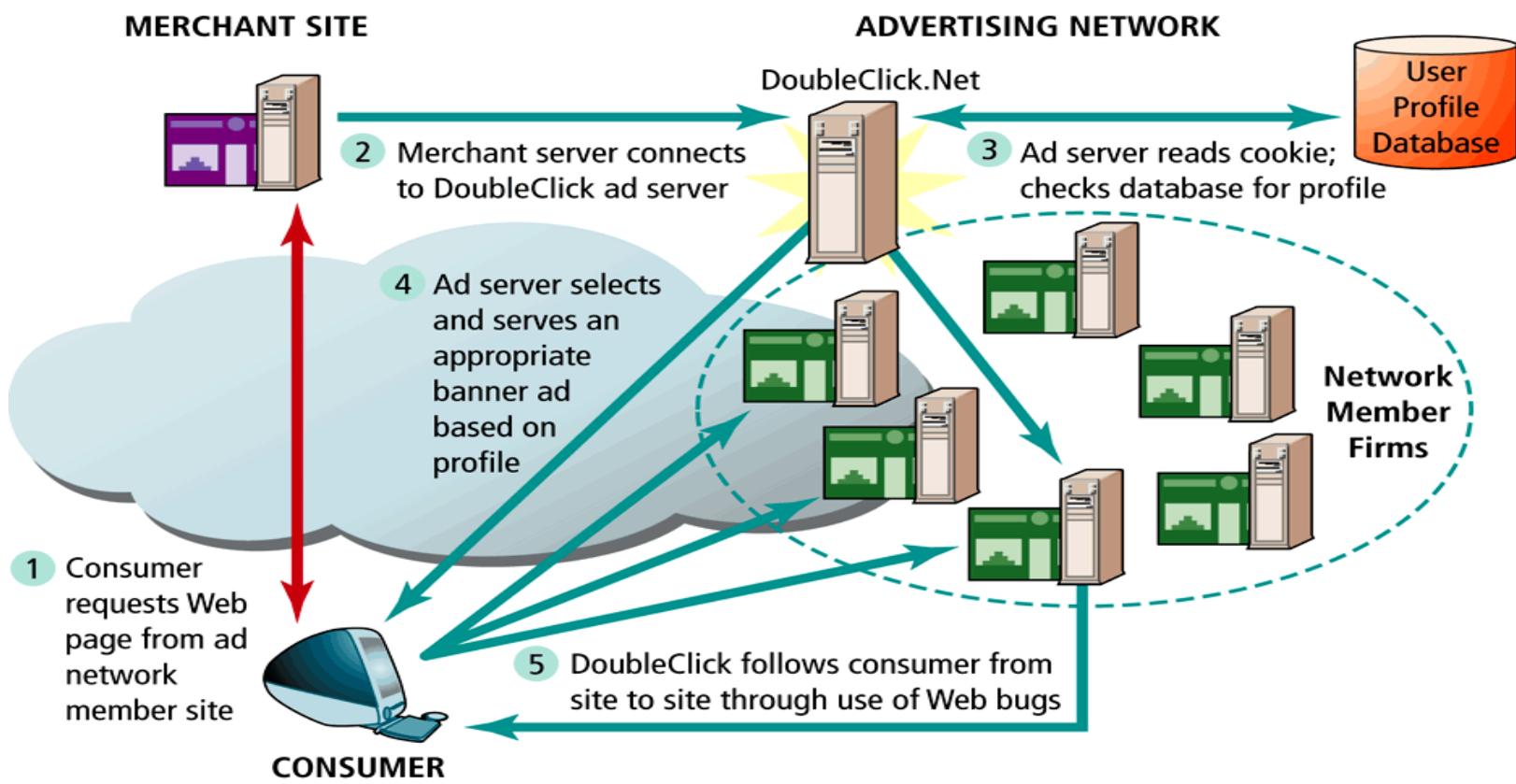




# DoubleClick's DART System

- In April, 2007 Google purchased DoubleClick for \$3.1 billion
- Doubleclick's technology is called the Dynamic Advertising Reporting and Targeting system, or DART,
- When a user calls up a Web page that employs the DART technology, a tag on the page signals Doubleclick's server to delve into its inventory of advertisements to find one -- and then another and another -- that matches the marketer's needs with the user's profile.
  - Different people can call up the same site at the same time yet receive entirely different advertisements.
  - Cookies are used to further refine the target by telling the DoubleClick server whether someone is a repeat visitor to a site or has already seen a specific advertisement.

# How an Advertising Network such as DoubleClick Works



## DoubleClick Cookies and Web Beacons

- **DoubleClick places small (1x1 pixels) GIF files on the site that allow DoubleClick to load cookies on your machine.**
  - DoubleClick can then track your movements across multiple sites.
  - It can potentially see the search strings that you type into search engines (due more to the way some search engines implement their systems).
- **DART cookies include:**
  - the number of unique users their advertisements were displayed to
  - how many users clicked on their ads or paid listings, and
  - which ads or paid listings they clicked on
- **Because it can gather so much information about you from multiple sites, DoubleClick can form very rich *profiles*. These are still anonymous, but they are rich.**

# DoubleClick Cookie Info

	<b>Before Opting Out</b>	<b>After Opting Out</b>
<b>Cookie Value</b>	Unique, e.g., <code>id=8000002cd6f0880</code>	Generic, <code>id = OPT_OUT</code>
<b>Targeting Criteria</b>	<b>Cookie-derived information:</b> <ul style="list-style-type: none"> <li>• Ad frequency limitation</li> <li>• Ad sequencing</li> <li>• User list</li> </ul>	Not Applicable
	<b>Ad Tag information:</b> <ul style="list-style-type: none"> <li>• Site name</li> <li>• Web page</li> <li>• Key values</li> </ul>	<b>Ad Tag information:</b> <ul style="list-style-type: none"> <li>• Site name</li> <li>• Web page</li> <li>• Key values</li> </ul>
	<b>Header fields information:</b> <ul style="list-style-type: none"> <li>• Operating System type</li> <li>• Windows version</li> <li>• User's local time</li> <li>• Location information from IP address</li> </ul>	<b>Header fields information:</b> <ul style="list-style-type: none"> <li>• Operating System type</li> <li>• Windows version</li> <li>• User's local time</li> <li>• Location information from IP address</li> </ul>
<b>Will You Still See Ads?</b>	<b>Yes</b>	<b>Yes</b>

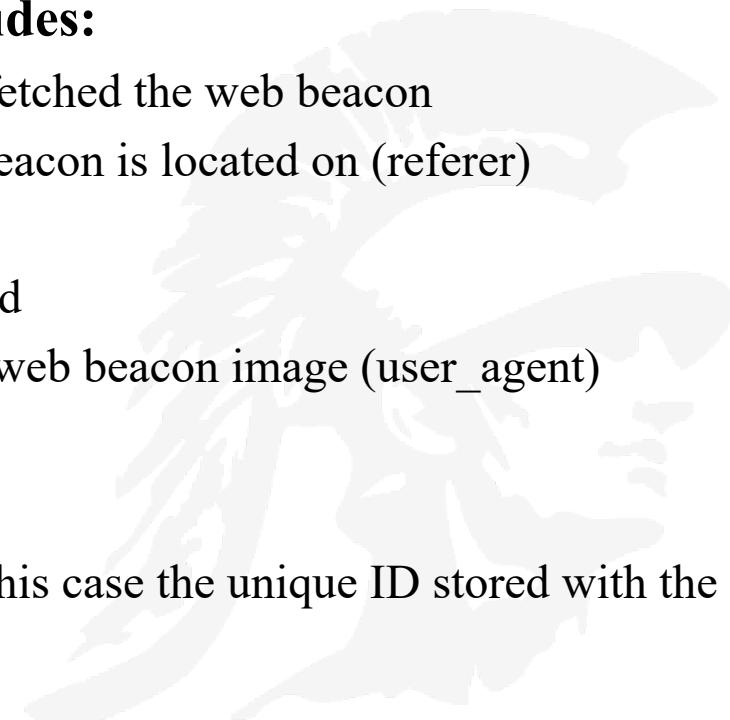
Doubleclick provides a mechanism for users to opt-out of their ad serving mechanism; This is done by replacing the unique identifier in your cookies by a generic value

# Web Beacons

- **Web beacons are small strings of HTML code that are placed in a Web page. They are sometimes called “clear GIFs”, pixel tags, web bugs, or tracking bugs**
- **Web beacons are most often used in conjunction with cookies**
  - Because a Web beacon is only 1 pixel high by 1 pixel wide, it appears invisible on your computer screen.
  - If Web beacons were made larger (e.g., 100 pixels high by 100 pixels wide), it would take much longer for your Web page to load and would clutter up the page that you have requested.
  - <img height="1" width="1" src=http://ads.doubleclick.com/myimg.gif>

## What Information is Sent to a Server When a Web Beacon is Viewed?

- **The HTML code (a web beacon)**  
`<img height="1" width="1" src=http://ads.doubleclick.com/myimg.gif>`  
will initiate a request to the web server at ads.doubleclick.com
- **Information sent to the server includes:**
  - The IP address of the computer that fetched the web beacon
  - The URL of the page that the Web Beacon is located on (referer)
  - The URL of the web beacon image
  - The time the Web Beacon was viewed
  - The type of browser that fetched the web beacon image (user\_agent)
  - Any previously set cookie values
- **Challenges**
  - A user's IP address may change; in this case the unique ID stored with the cookie helps keep track of the user



## Ad Exchange and Real Time Bidding (RTB)

- An *Ad Exchange* is a platform in digital advertising;
- *RTB* is a protocol for two digital advertising companies to transact.
- **Ad Exchanges** were originally created to connect and bring efficiency to digital advertising markets.
- **The problem**
  - Ad Networks often had too much demand from buyers or too much supply from sellers on their networks. To correct the imbalances, networks would strike individual deals to buy and sell ads from each other. This led to a proliferation of ad-hoc relationships causing ads to be passed from network to network several times before finally being purchased
  - These “daisy-chains” produced several problems including latency, multiple networks taking fees for a single ad, and a lack of transparency on what was actually being purchased
- **The solution**
  - The Ad Exchange created a single point of integration for networks eliminating issues of latency and increasing efficiency in deals between networks.
  - The Ad Exchange only allowed separate networks on the same exchange to transact with greater efficiency. The benefit to end marketers and publishers was a more liquid marketplace with greater pools of advertising supply and demand.
- **The Ad Exchange consolidated the integration of ad networks**

## Ad Exchange and Real Time Bidding (RTB)

- **RTB was created as a protocol to connect the many different platforms of digital advertising (e.g. Ad Exchange, Demand Side Platforms, Sell Side Platforms, Ad Networks, etc)**
  - RTB allowed these entities to buy ads on an individual ad opportunity basis. The RTB allowed buyers to determine a potential advertising opportunity's value in real-time (typically less than 100ms) based on granular data such as anonymous user information, time of day, device type, ad position, and more.
- **How things work today**
  - Several companies have created their own “exchanges” as a way for buyers to access their unsold supply
- **Ad Exchanges are not the only ones using RTB today. Most platforms in ad tech today are RTB enabled**