

X O N Δ
P A R T N E R S

Eco-System Play for Real Time
Bidding in Online Advertising

Summer 2012

Outline

- Background
- Solution, Partnership & Value Proposition
- Approach to Market & Execution

- Insight – Includes Background on Display Ads Markets, RTB, DSP, Ad Exchanges, Network Acceleration, Data Center Hosting

Executive Summary

○ Overall Context

- Online advertising revenue growing annually (double digits), dominated by search, display, social, and mobile
- €14.7Billion in Europe, €16.3B (\$23B) in USA (2009), €44B (\$73B) Global
- >10% of overall ad spend corresponds to online advertising
- Business Models: CPM, CPC, CPA, dCPM

○ Key Directions

- Forward markets → Spot Markets
- Exchanges, and Real-time bidding provide greater efficiency → Need for performance-based RTB (with heavy algorithmic inference)
- Direct Analogies with Financial Trading (Algos, etc.), Broker / Exchanges
Hosting

○ Key Technologies

- Economics, IR, ML, OR, Game Theory, Stats, Social Sciences (estimating CTR/AR; auction systems; learning algorithms; targeting display advertising; behavioral targeting; social advertising), Network Caching, Network Acceleration

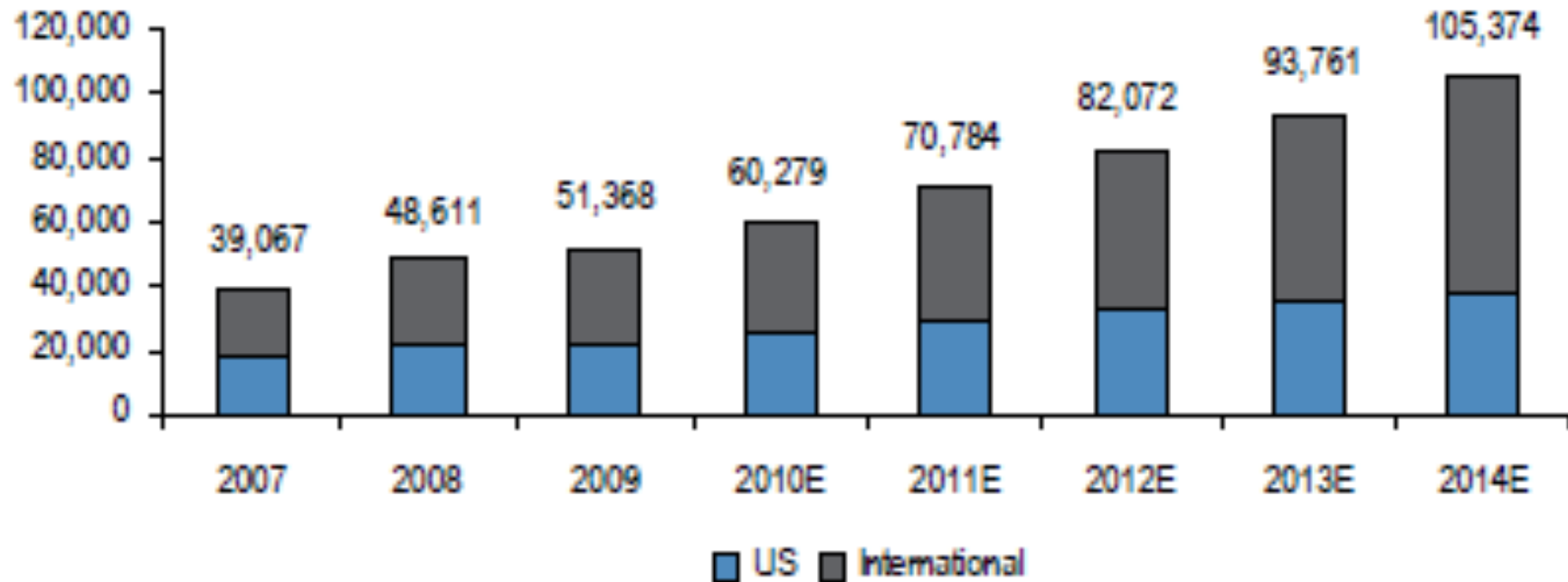
Fundamental Concept: Hosting Exchange Service for Online Ads

- **Build parallels between Exchange / Hosting for Market Derivatives and Markets for Online Advertisements**
 - In Derivatives (or others) hosted trading, buyers/sellers run algorithmics & high frequency algorithms to decide on what to buy/sell at what price based on data, followed by transaction
 - Hypothesis: Lower latency potentially producing better results, for same trading strategy, faster to bid normally wins
 - Analogy with Ads insertion for display advertising based on impact/price with fastest bid advantage
- **Build upon existing Private Exchange Services for Online Ads**
- **Extend Service to Hosting, leveraging time to transaction advantage, proximity to trading and availability of ecosystem**
- **Map time to transaction to business value proposition**

Search And Display Advertising Growth

We Expect Global Online Advertising to Reach \$105B by 2014

\$ in millions



Source: J.P. Morgan estimates.

Search + Display advertising only

Doubling in 4 years
Big international growth

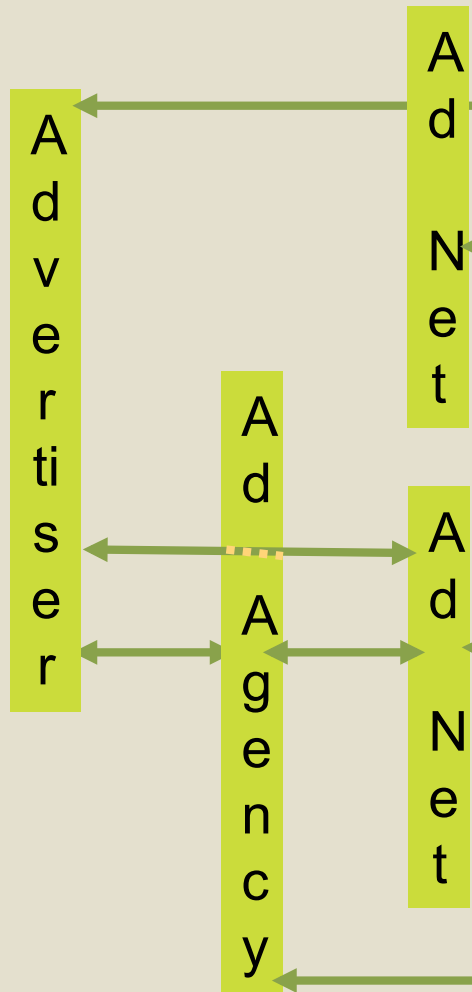
Display: from 37% (2012) → 43% in 2016

Of overall online ad revenue in US

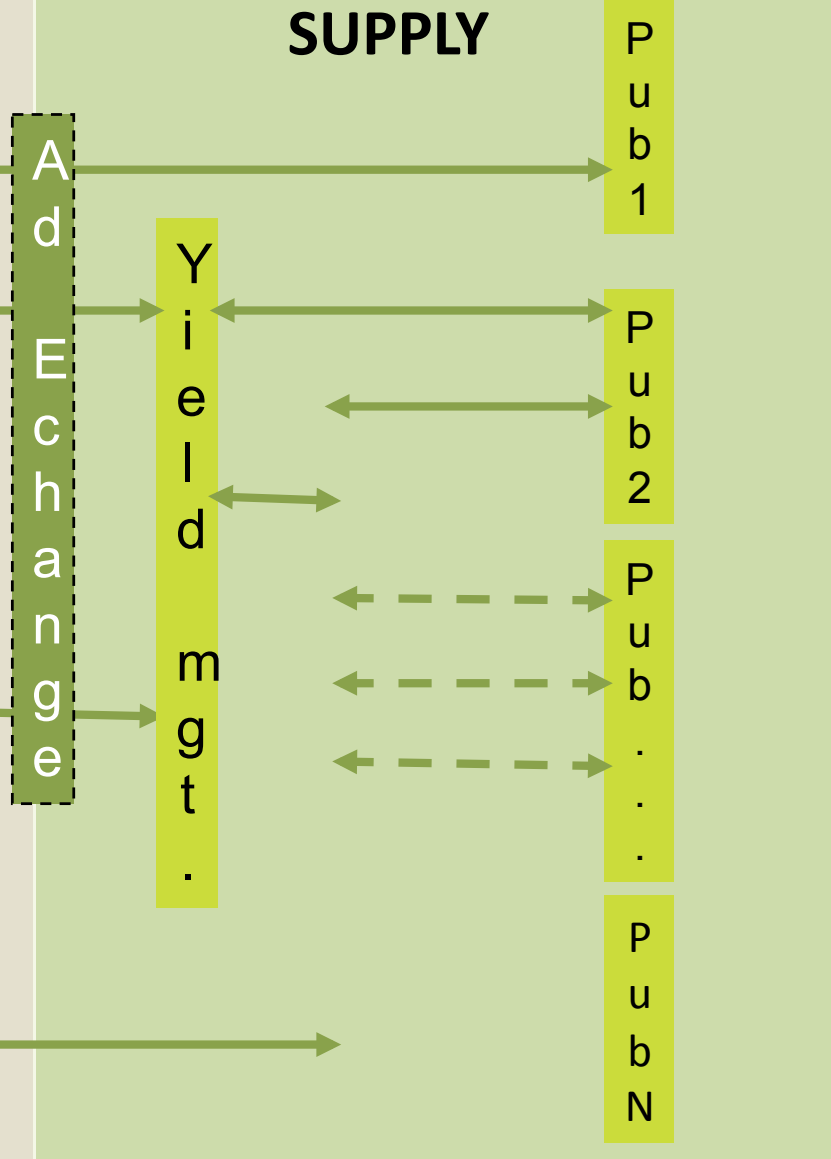
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- **Mobile display ad spending, including banners, rich media and video, will increase fivefold between 2012 and 2016, rising from \$1.01 billion to \$5.09 billion.**
 - Mainly fueled by video on desktop and mobile
- **Exchanges account for 14% of display impressions (\$1.7Billion in 2011); 8% via RTB**
- **Greater than \$3Billion worldwide**

Ad Exchange: auctioneer-centric marketplace

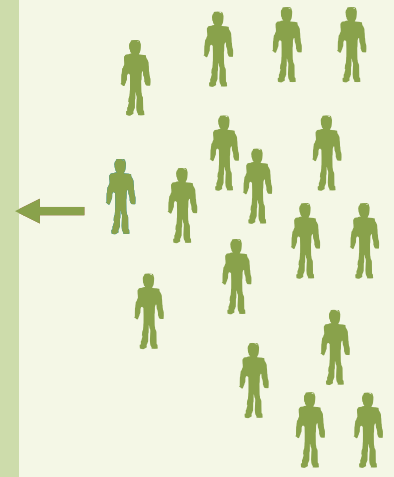
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SUPPLY



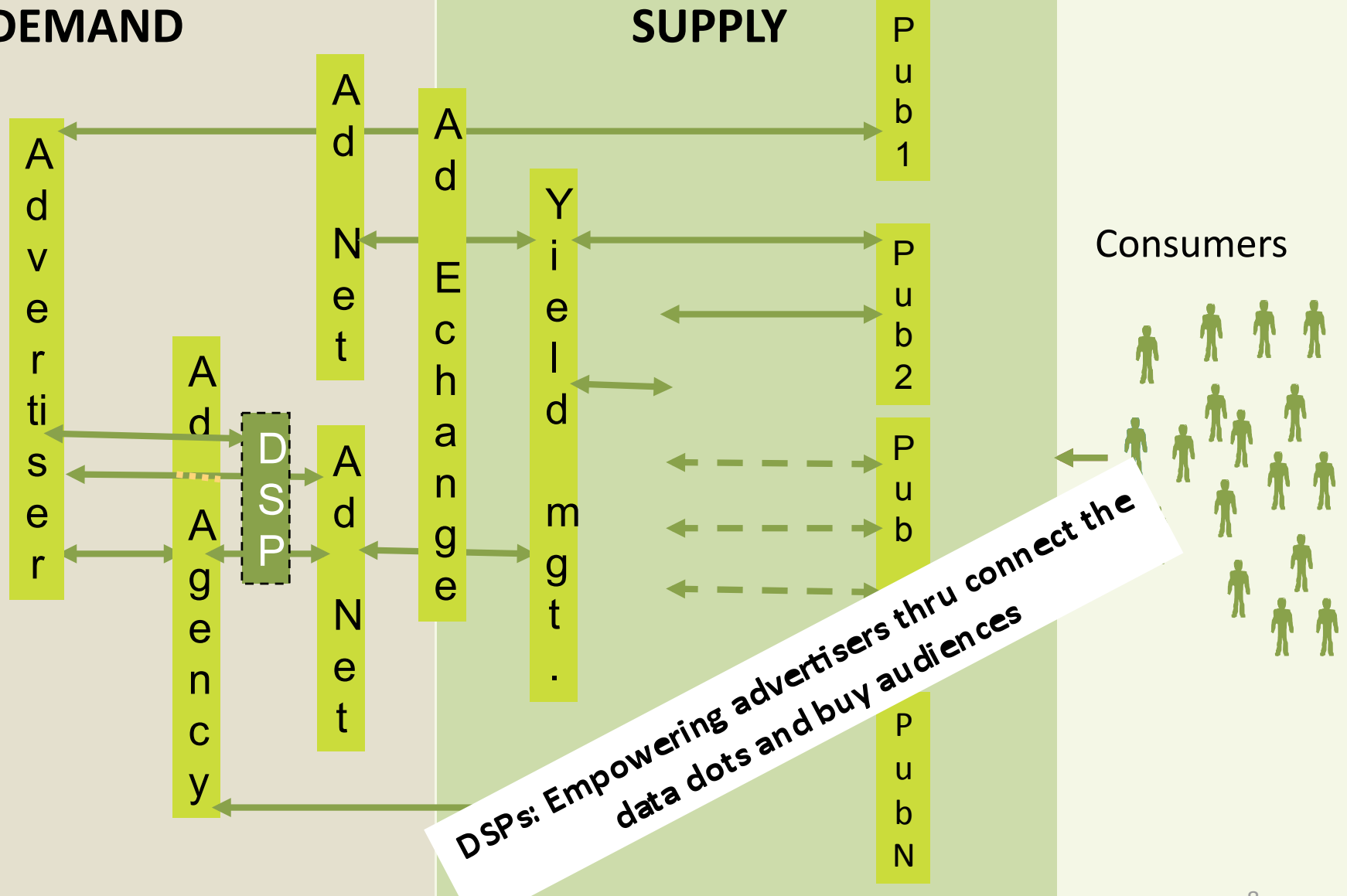
Consumers



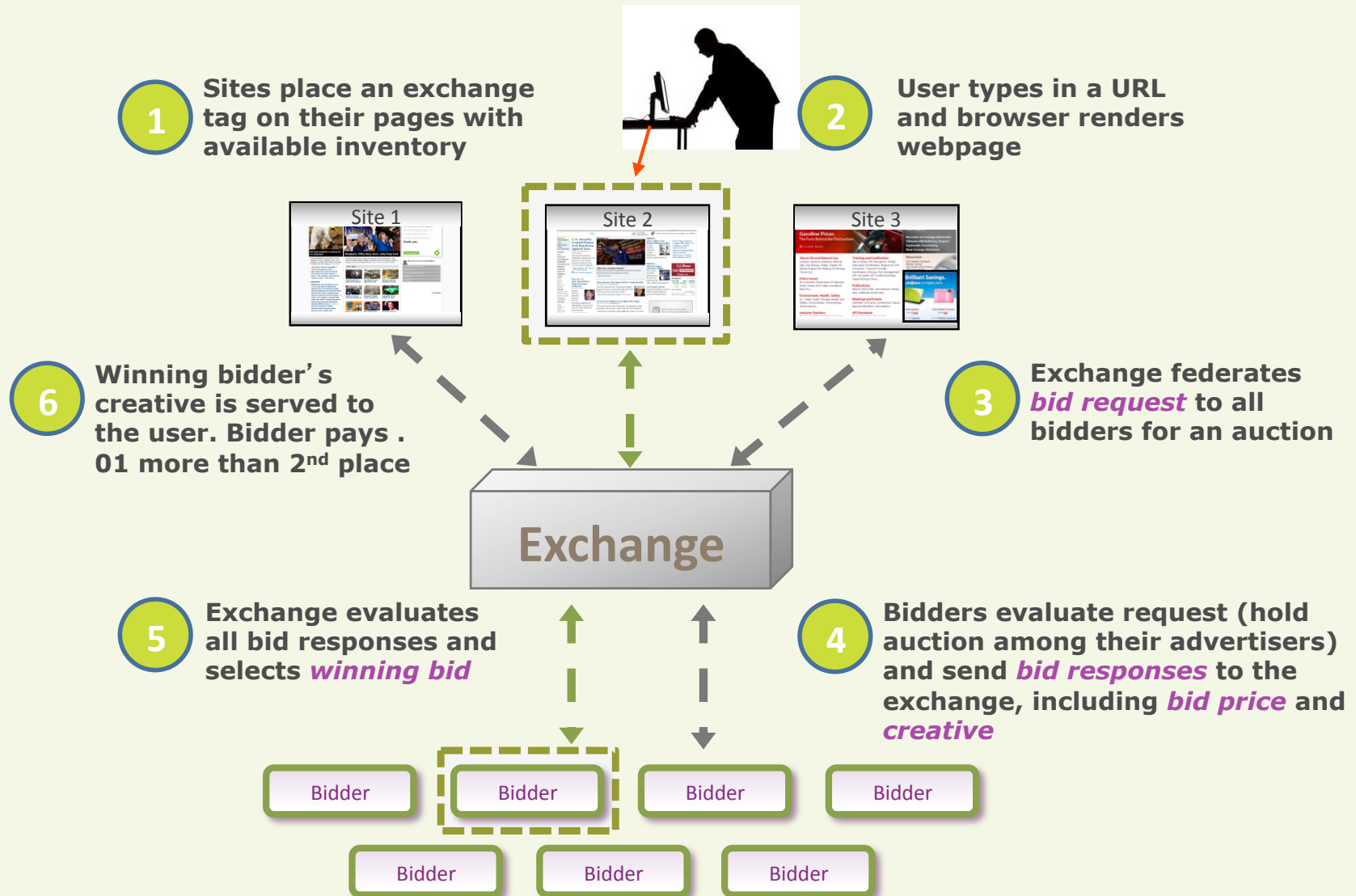
Demand-Side Platform: A trading desk for Adv.

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Demand-Side Platform: A trading desk for Adv.



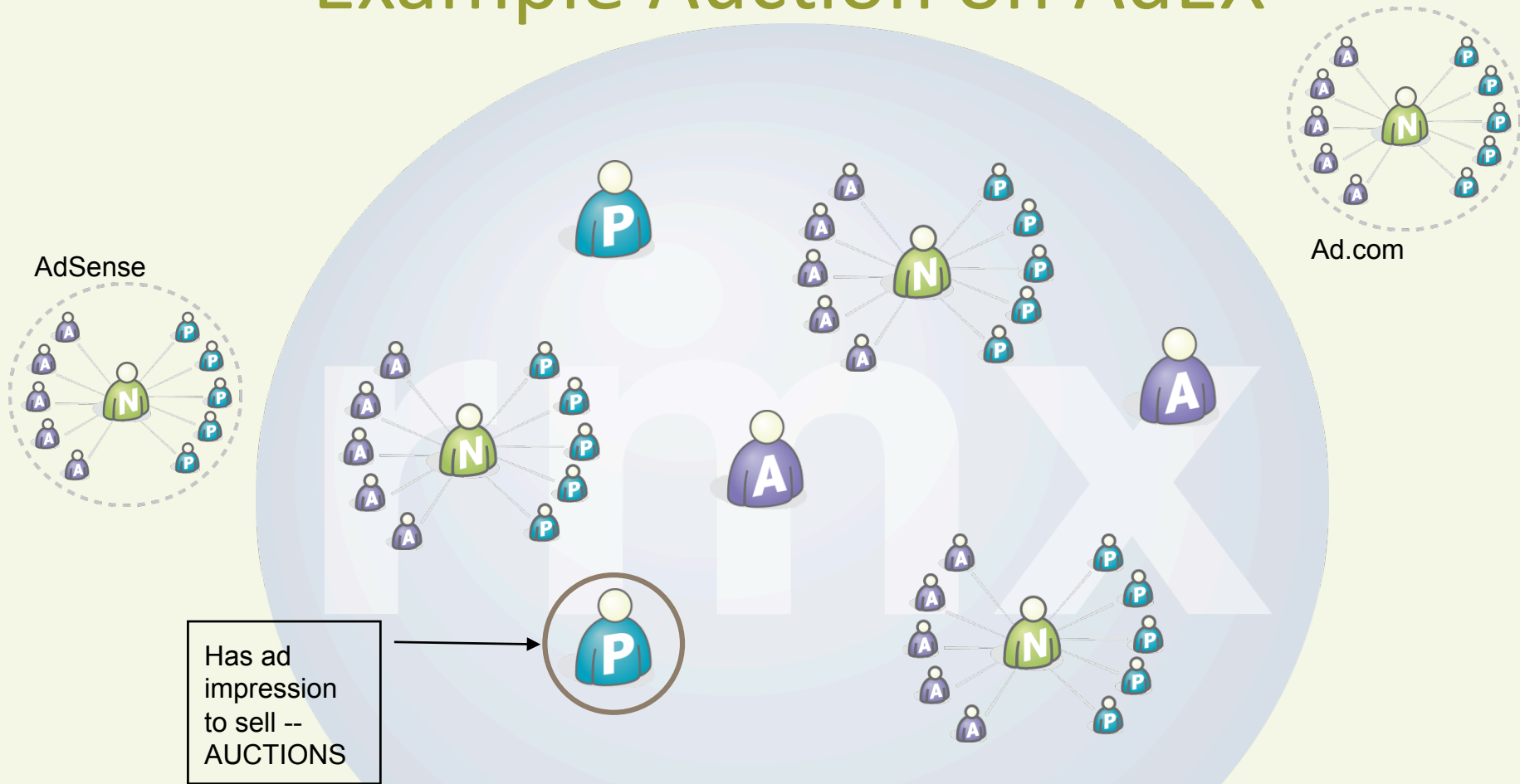
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

Example Auction on AdEX



Transparency and value

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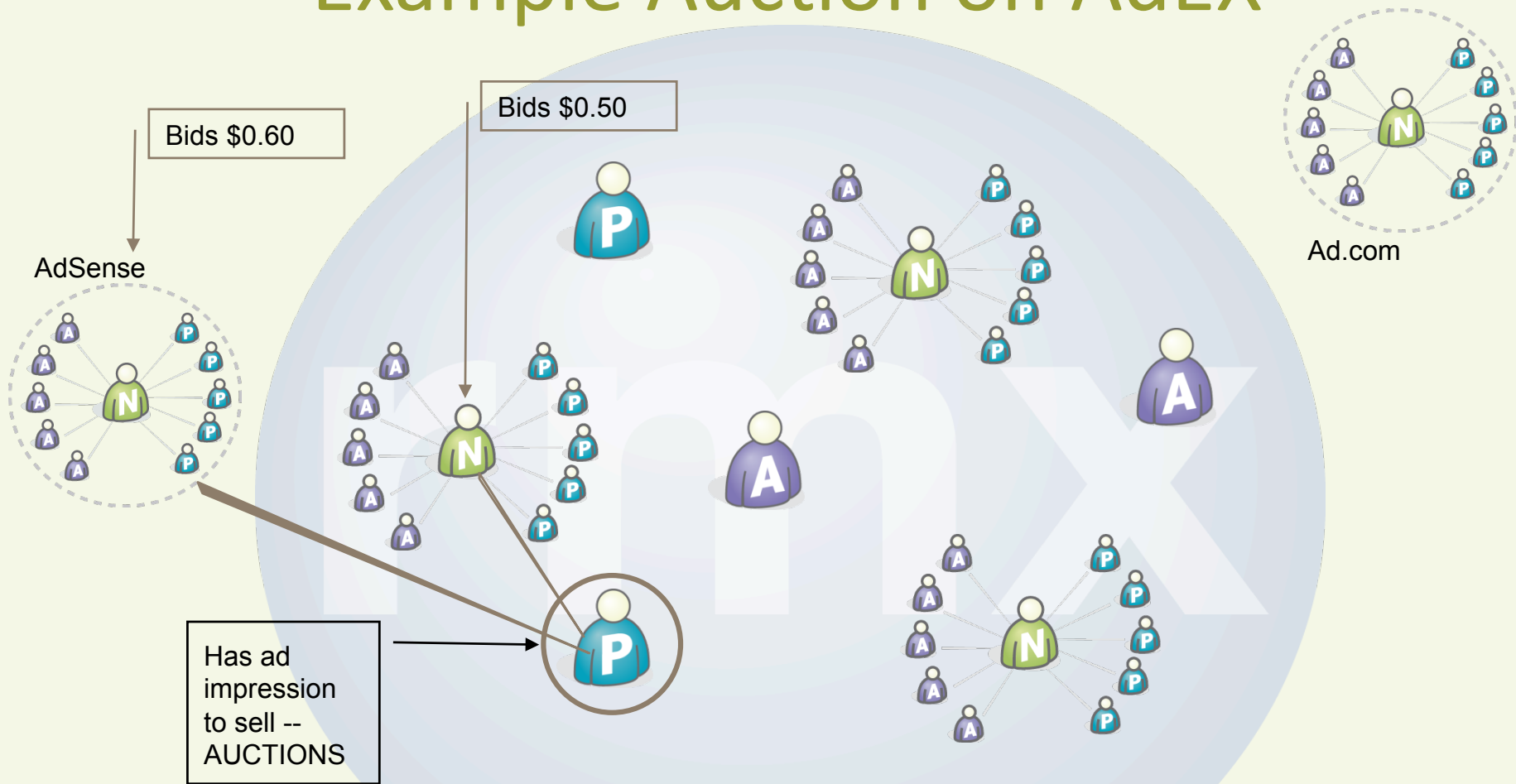
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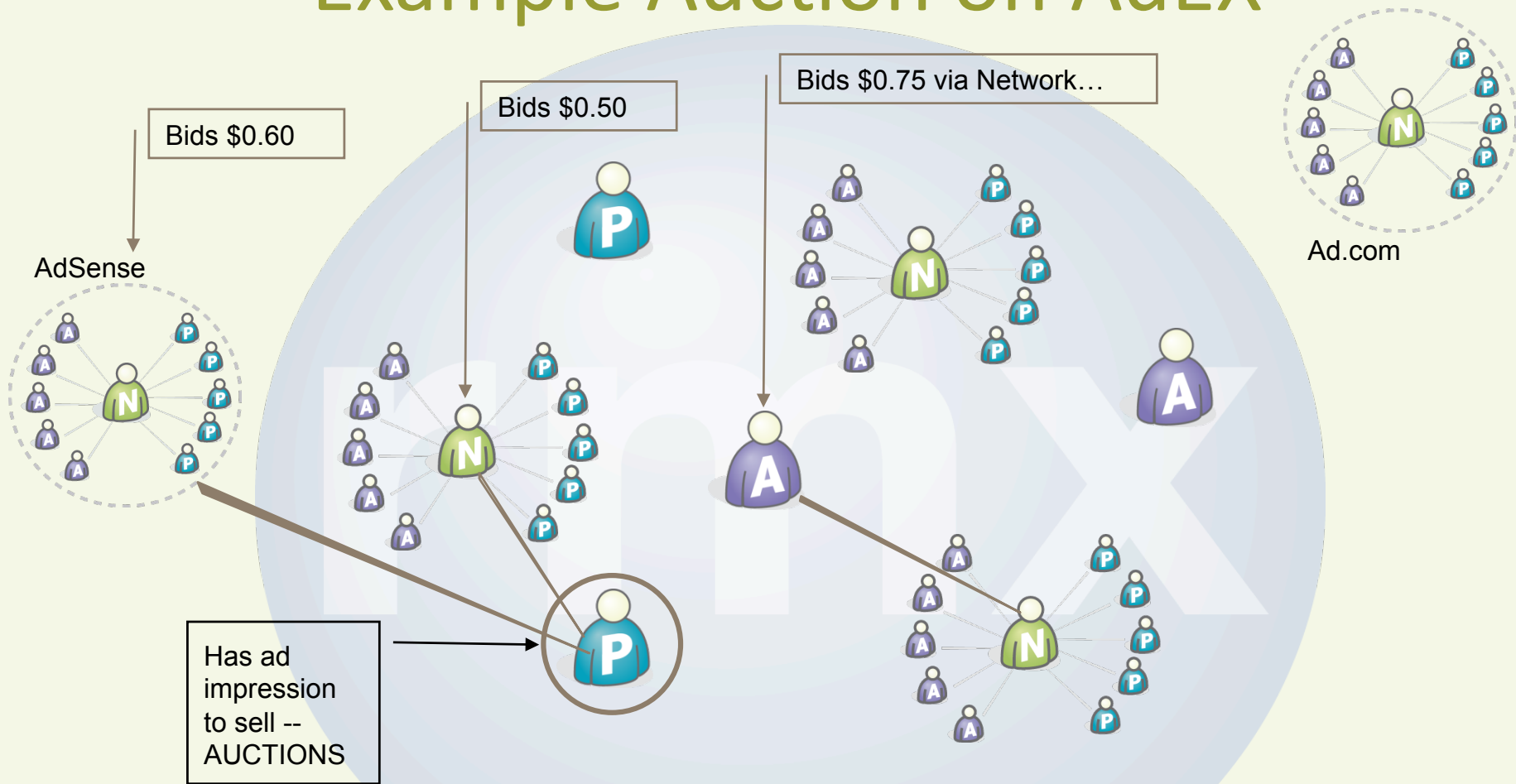
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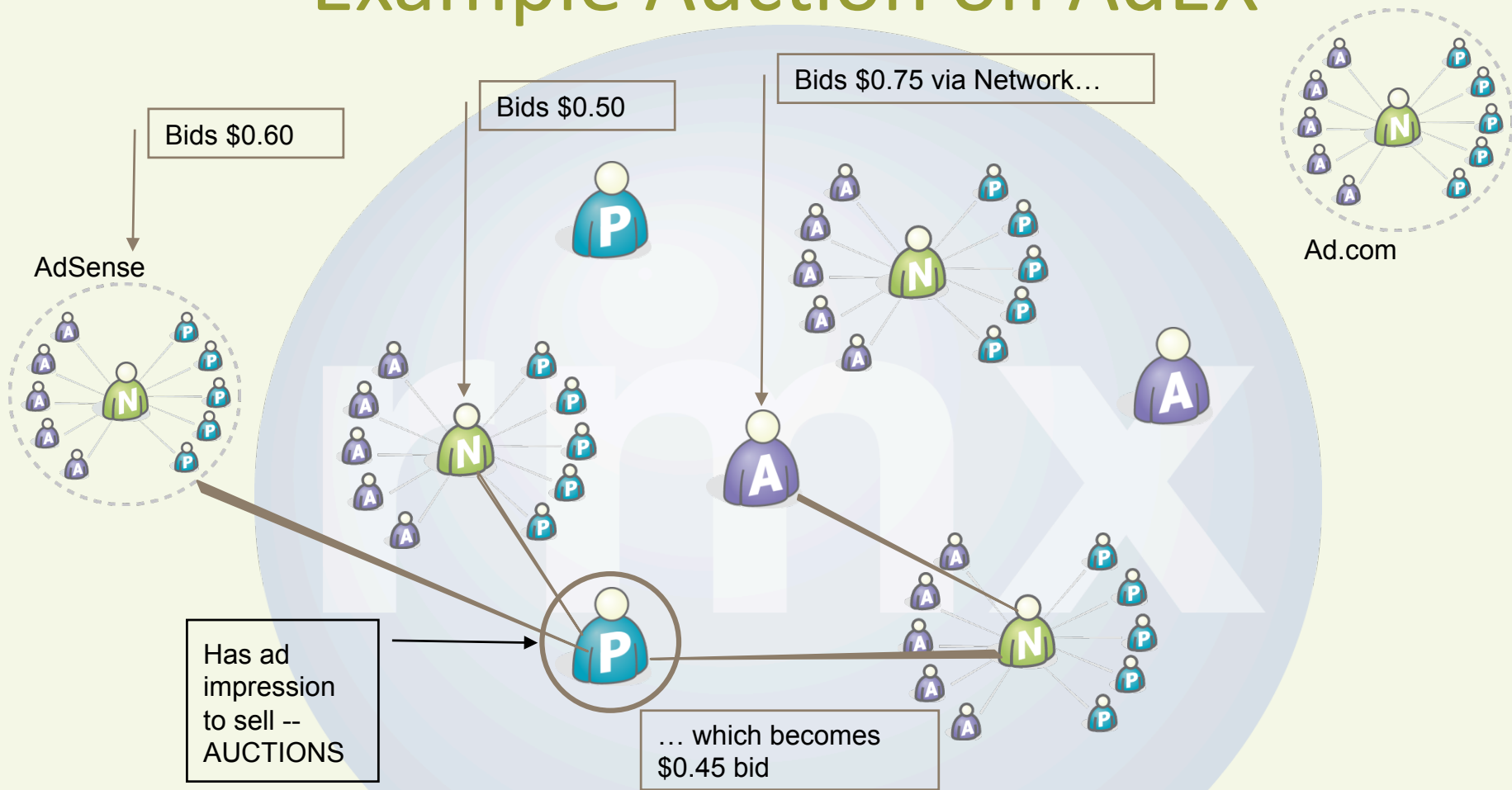
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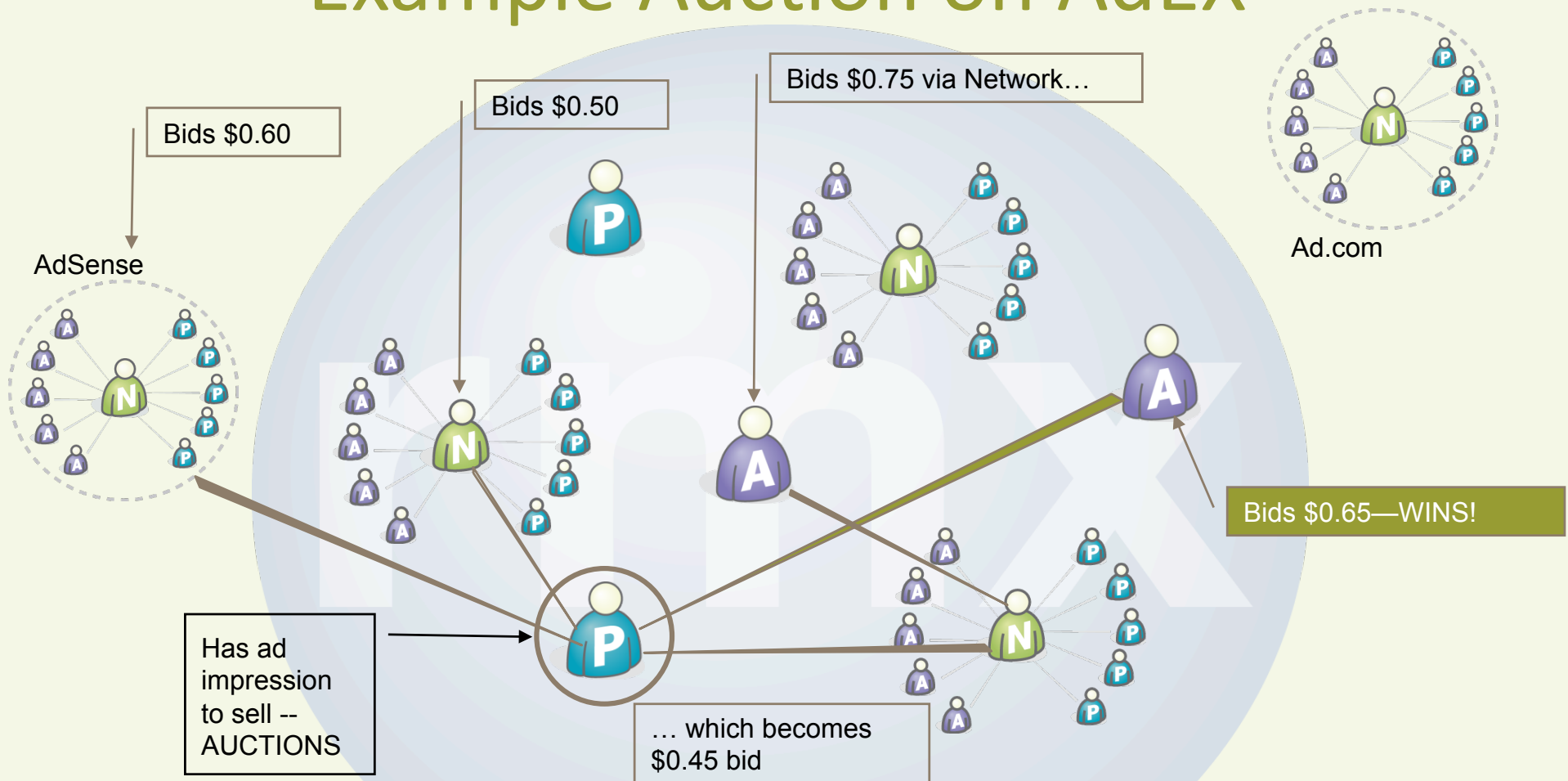
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Transparency and value

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Example Auction on AdEX



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RTB is going to be massive!

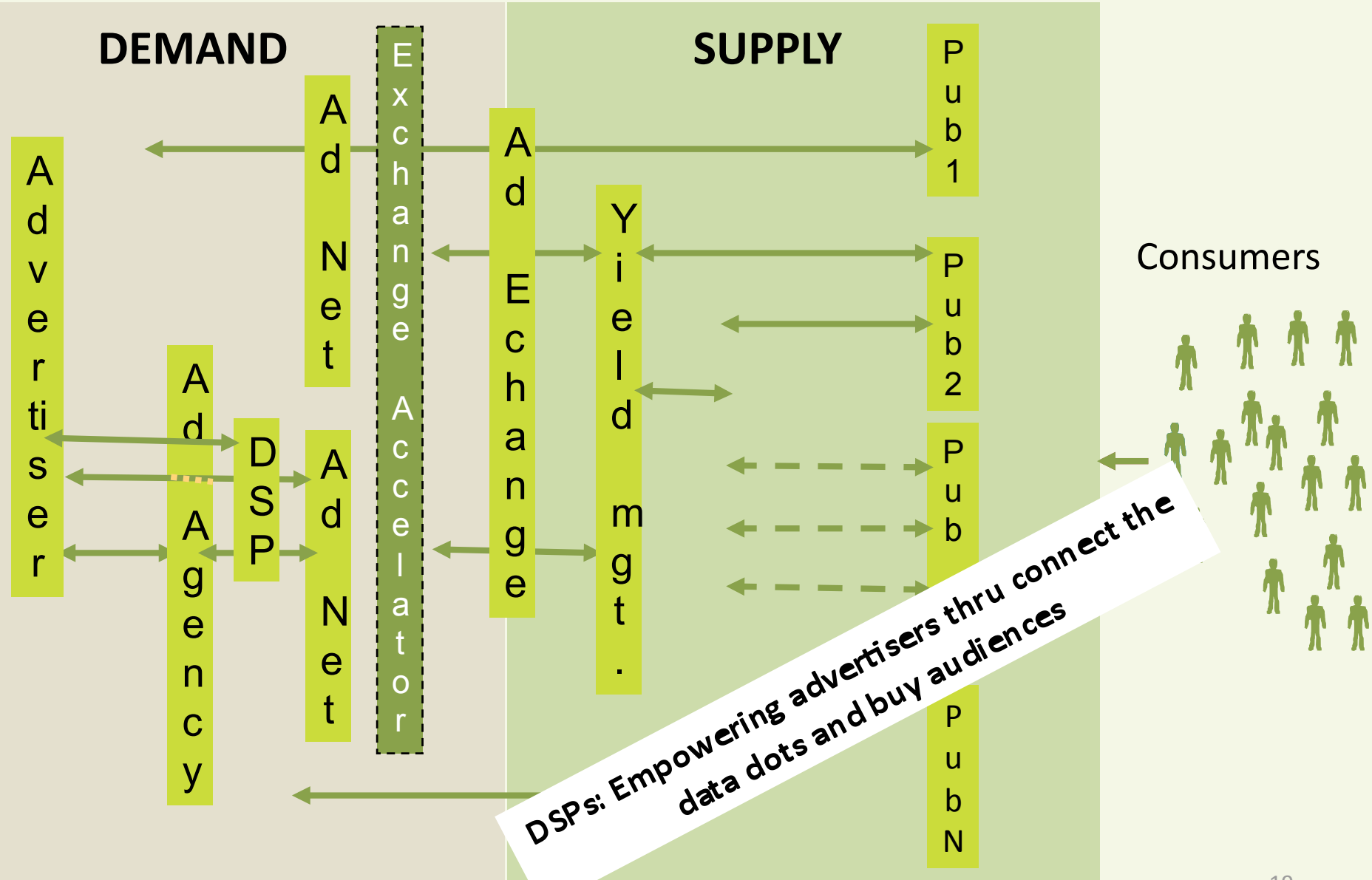
- Buyers must answer three essential questions about every available impression:
 - Do you want to show an ad here?
 - At what price?
 - With what message?

Leads to RTB market Growth and RTB Market Increased Competitiveness – Acceleration to provide Business and Technical Differentiation – How ?

Advantages of having RTB Acceleration

- **Advantages of exchanges**
 - High-quality 2nd – 4th tier inventory
- **Value Add Services provided to DSPs**
 - Seats/Licenses, facilitate Ad Exchange negotiation
 - Proximity to exchanges eco-system
 - Lower Network Capex / Opex
 - Focus on core competency
- **Proximity to Exchanges enables**
 - Better algorithmic inference (larger time budget for algo execution)
 - Avoid Missed opportunities (higher probability of bid within latency budget)
 - Faster experimentation (use faster feedback of winning bids to experiment and find optimal bids)

Exchange Accelerators buys time and seats For Networks, DSP, and Agencies



Targeted Service Offering: Online Ads Hosting Ecosystem



X O N Δ partners

Insight

Summer 2012

From Mad Men To Wall Street and beyond!

Banner

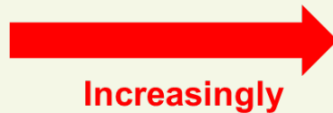
Click+Data

Personal

Social

- Set in New York City, *Mad Men* begins in 1960 at the fictional Sterling Cooper advertising agency on New York City's Madison Avenue.

2007



**Technology
Data Driven
Forward Market
Spot Markets**

**Human Intensive
Lots of guess work
Forward Market**

YoY: Double digit growth



Personalization



1st Generation

2nd Generation

3rd Generation

Advertising \$s Follow Eyeballs –
Ad Revenue per User = \$49 in 2011E vs. \$0 in 1994E

	1995E	2011E
Global Internet Ad Revenue	\$55MM	\$73B
Ad Revenue per User	\$9	\$49
Global Internet Users	6MM	1.5B

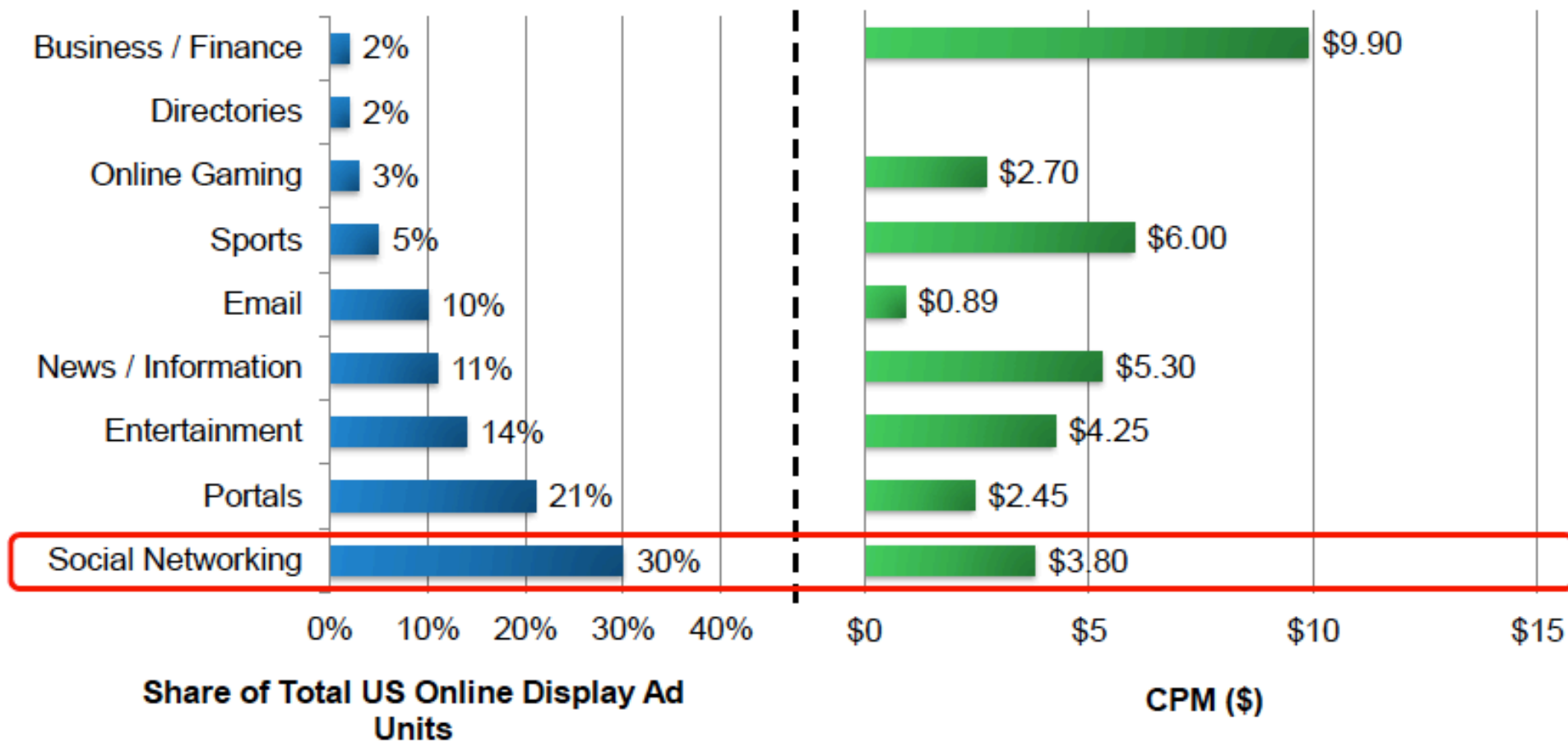
Source: Global online ad revenue per Jupiter Communications (1995), ZenithOptimedia (2011). Internet users per Morgan Stanley estimate (1995) and comScore (2011). We note that comScore reports a lower global Internet user # than International Telecommunications Union.

	Q2:10	Q3:10	Q4:10	Q1:11	Q2:11	Q3:11
Gross Advertising Revenue (\$MM)	\$6,562	\$7,032	\$8,167	\$8,306	\$8,716	\$9,335
<i>Y/Y Growth</i>	23%	22%	26%	28%	33%	33%
Aggregate Paid Clicks (MM)	12,651	13,157	14,669	15,245	15,004	16,876
<i>Y/Y Growth</i>	15%	16%	18%	17%	18%	28%
Cost per Click (CPC - \$)	\$0.52	\$0.53	\$0.56	\$0.54	\$0.58	\$0.55
<i>Y/Y Growth</i>	7%	6%	7%	10%	12%	4%

MM = Million=mille mille

Social Networking CPMs = Have Begun to Punch Closer to Their Weight

**Share of Total USA Online Display Ad Units (as of 8/11) + CPM (as of Q3:11),
by Top Publisher Categories**



Source: comScore, Display ad unit share as of 8/11, CPM data per Vivaki, as of Q3:11.

Advantages of having RTB Acceleration

- **Sponsored search accounts for 47 percent of 2009 full year revenues (\$10.7 billion);**
- **Display-related advertising revenues totaled \$8.0 billion; (~%32)**
- **Classifieds revenues (products such as YellowPages.com) accounted for 10 percent or \$2.3 billion;**

[IAB Report 2010]

% of total and billions

	2011	2012	2013	2014	2015	2016
Search	48.0%	49.4%	49.2%	48.1%	47.6%	46.9%
Banners	24.1%	23.4%	22.6%	21.8%	21.1%	20.5%
Video	6.3%	7.9%	9.8%	12.1%	13.6%	15.0%
Classifieds and directories	7.8%	6.4%	5.7%	5.3%	5.2%	5.2%
Lead generation	5.1%	4.9%	4.9%	4.8%	4.7%	4.6%
Rich media	4.9%	4.2%	3.8%	3.6%	3.4%	3.3%
Sponsorships	3.4%	3.5%	3.7%	4.0%	4.1%	4.2%
Email	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%
Total	\$32.03	\$39.50	\$46.50	\$52.80	\$57.50	\$62.00

Note: eMarketer benchmarks its US online ad spending projections against the IAB/PwC data, for which the last full year measured was 2010

Source: eMarketer, Jan 2012

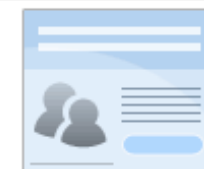
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www.eMarketer.com

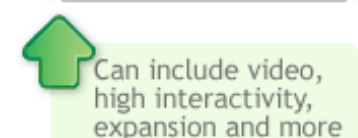
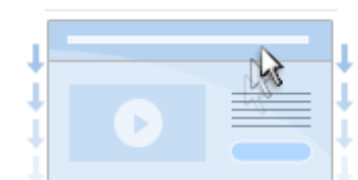
Text Ad



Standard Display Ad



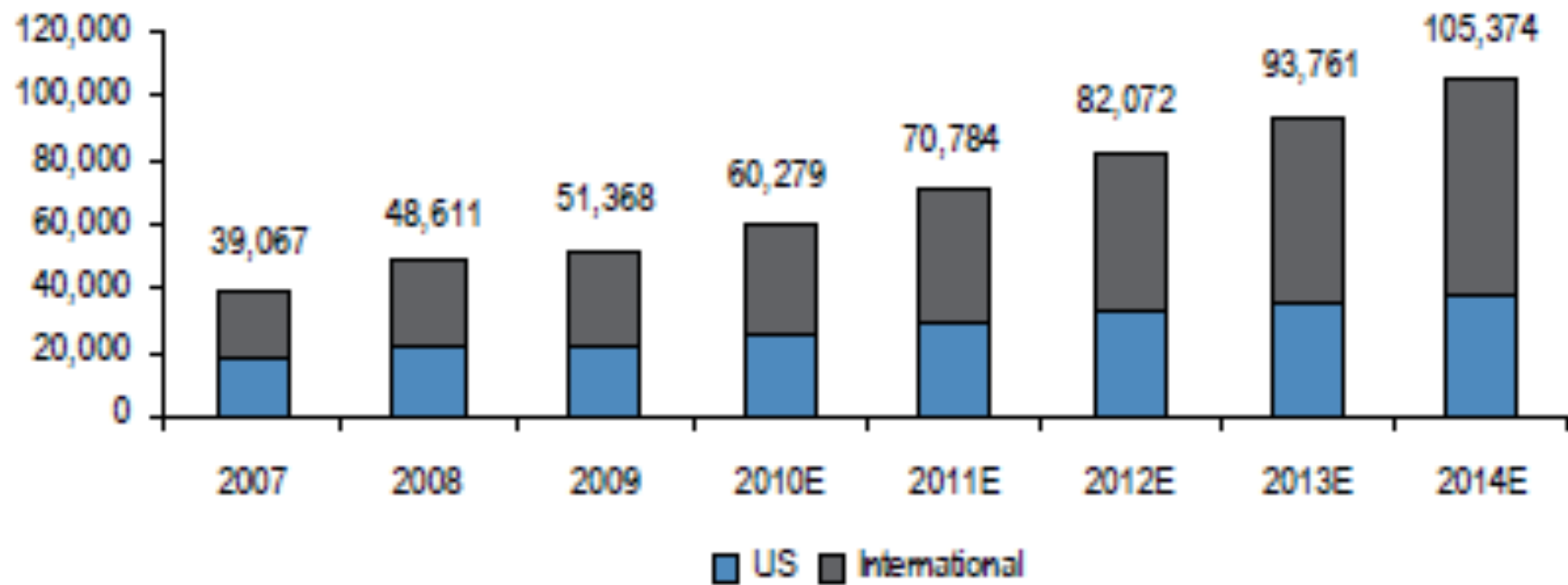
Rich Media Ad



Search And Display Advertising Growth

We Expect Global Online Advertising to Reach \$105B by 2014

\$ in millions



Source: J.P. Morgan estimates.

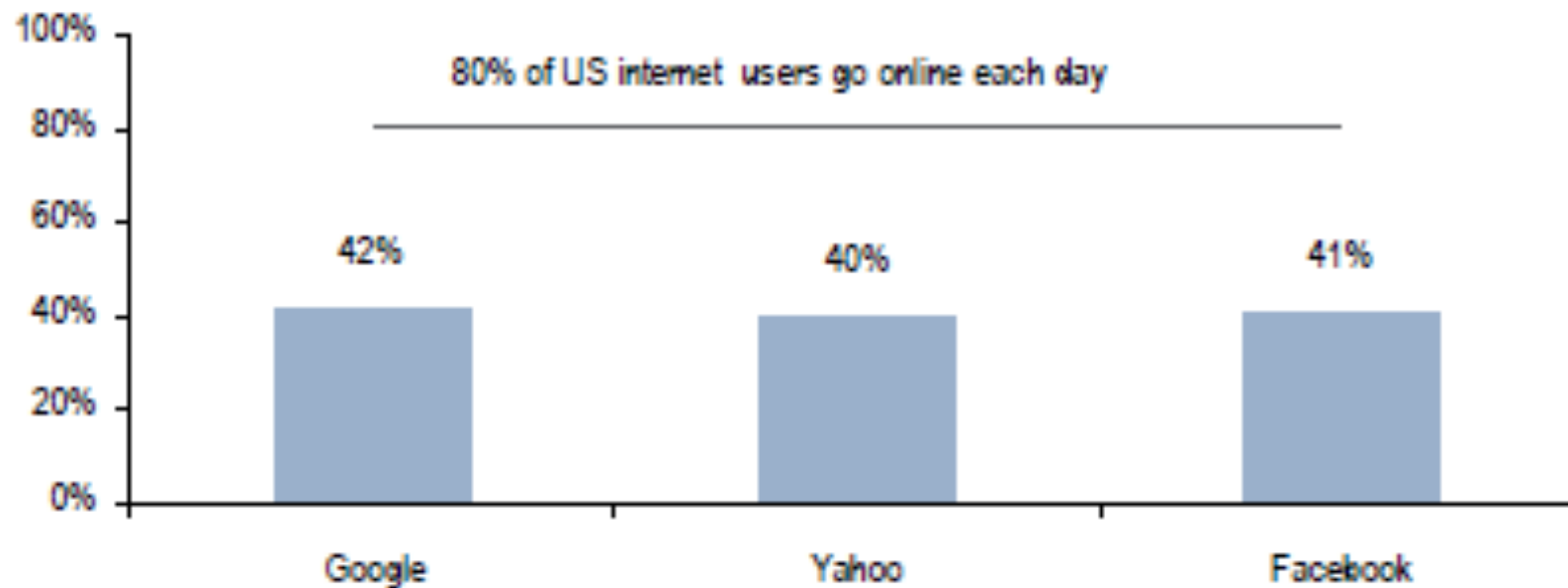
Search + Display advertising only

Doubling in 4 years
Big international growth

~40% of userbase visit major sites daily

Google, Yahoo! and Facebook Get Visited by ~40% of their User Base Each Day

Average # of Daily Visitors/Average # of Monthly Visitors

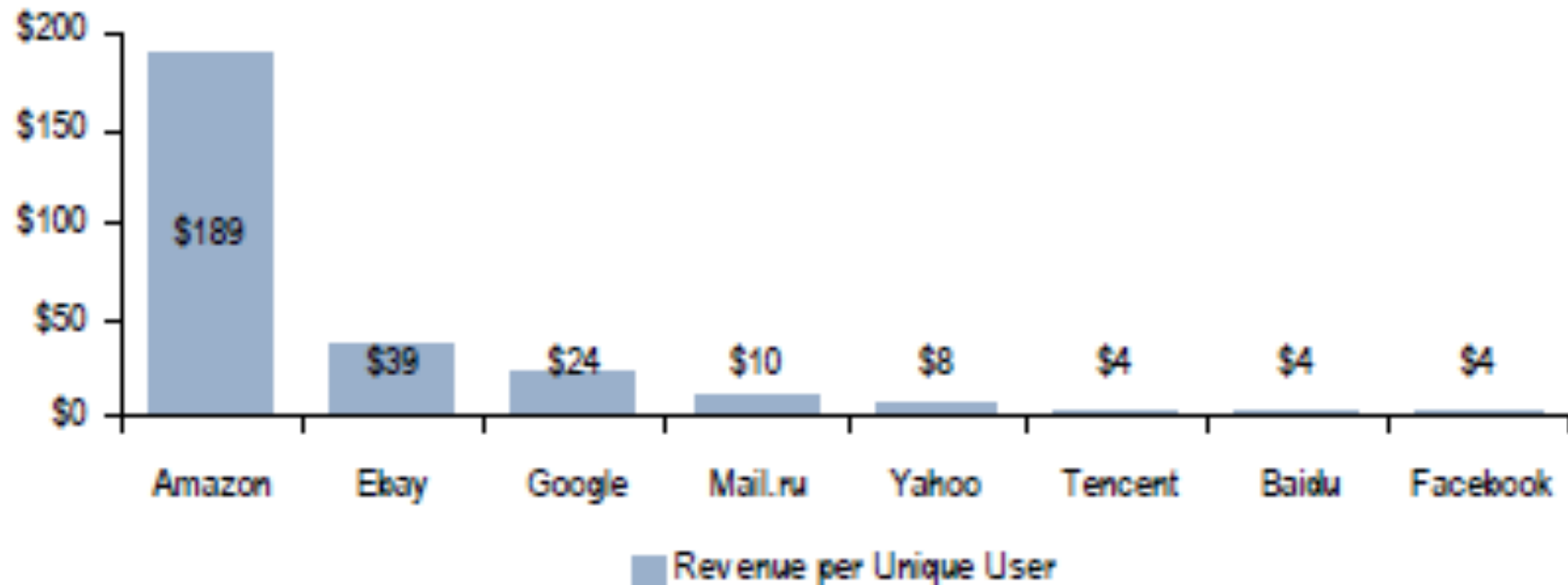


Source: comScore, J.P. Morgan estimates. Data from Jul-Nov 2010.

Average user is spending 2 hours a day online

Google Generates 6X Revenue per user than Facebook per year

Globally, Google Generates 6x More Revenue per User than Facebook



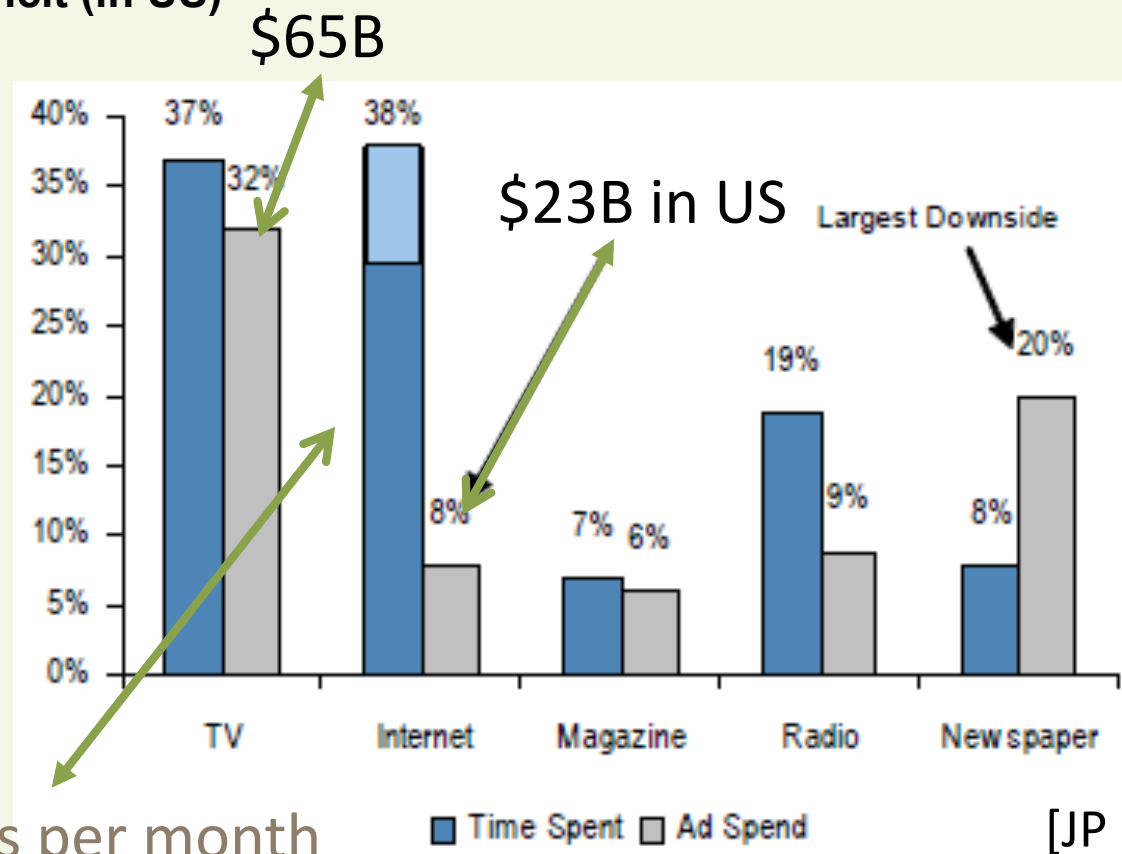
Source: comScore, Bloomberg, J.P. Morgan estimates.

Note: For public companies, F'10E revenue. Amazon, eBay, Google, Mail.ru, Yahoo! and Facebook unique users from comScore. For Facebook, revenue estimate of \$2.0B is based on press reports, as cited by Bloomberg 12/16/10. Tencent and Baidu usage numbers are J.P. Morgan estimates.

As of 12/2010

Big lag in Ad Dollars spend online

- Typically ad dollars have followed media consumption
- Despite people spending more time on the internet, there is a \$40 billion deficit (in US)



X O N Δ partners

60 hours per month

[JP Morgan, 2010]

Why the big lag in Ad Dollars spend online?

- **Advertisers and agencies are old fashioned**
 - Don't use mathematically sophisticated systems; human experts
 - Advertisers are broadcast oriented (TV, Newspaper, Radio etc)
 - Huge culture change
 - Real-time versus weekly/monthly
 - They speak the language of audiences and panels (not data mining, machine learning); social scientists
- **Accountability: Internet is still relatively new and largely unknown**
 - Apart from sponsored search (3.5% of online activity) other media types are largely not accountable (credit assignment) and underexploited; (in US \$14B versus \$8B)
 - Poor targeting
 - Guaranteed markets at spot market prices
- **Huge opportunity if history is anything to go by and**

Advertisers: CPM versus ROI

	CPM	ROI per \$1 Spent
Outdoor	\$1-5	
Cable TV	\$5-8	\$6.81
Radio	\$8	\$8.60
Online		\$19.83
–Display \$5-30	\$5-\$30	\$19.78
–Contextual	\$1-\$5	
–Search	\$1 - \$200	\$21.84
Social	\$0.2-\$5	\$12.57
Mobile	\$0.2-\$6	\$7.50
Email		\$44.93
Network/Local TV	\$20	\$6.81
Magazine	\$10-30	\$10.11
Newspaper	\$30-35	\$12.77
Direct Mail	\$250	\$7.34-\$15.28

ROI online is

2X offline

while

CPMs ~same

[ROI based on DMA Power of direct marketing 2010 (USA)]

Display: from 37% (2012) → 43% in 2016

Of overall online ad revenue in US

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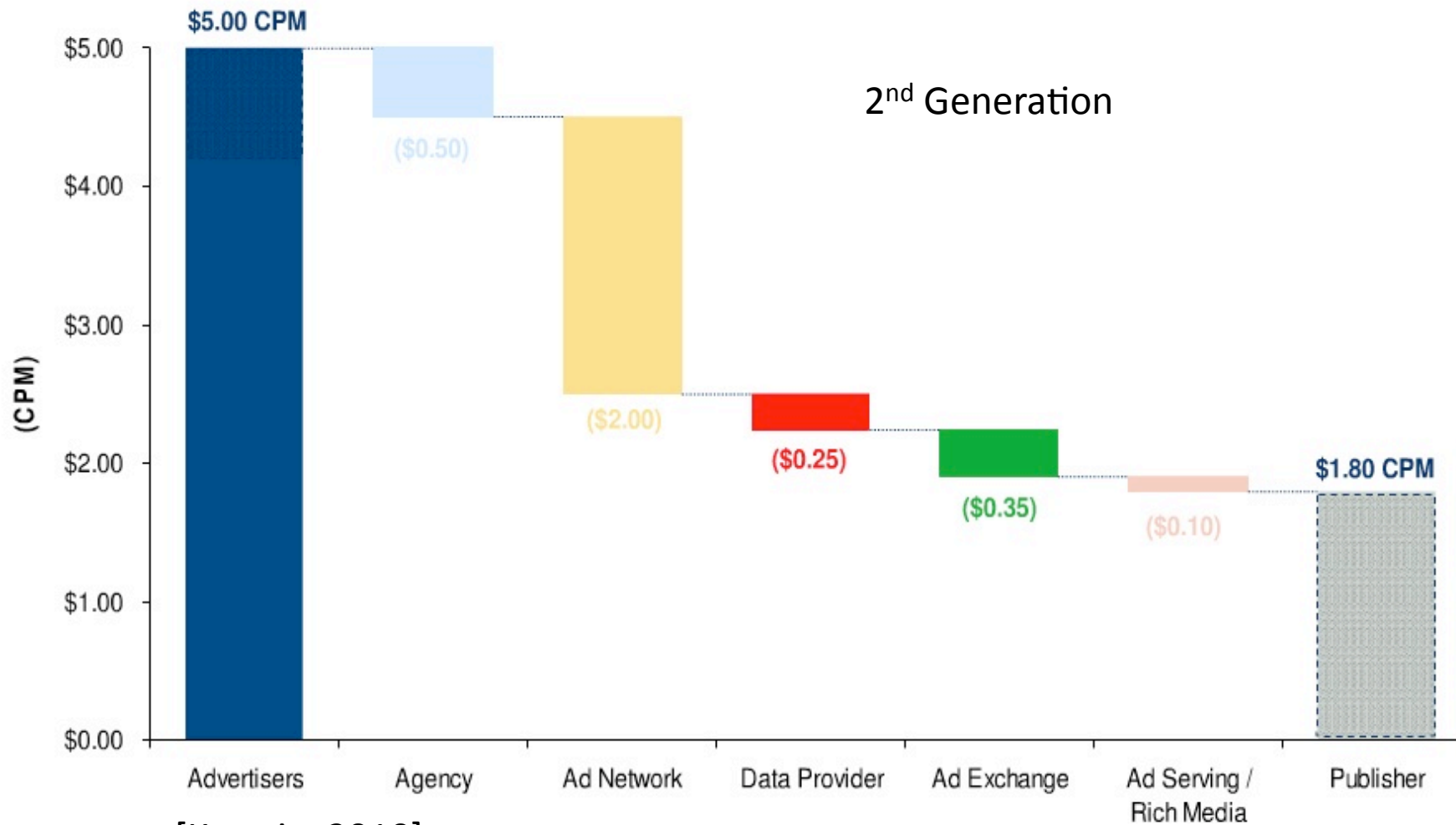
Challenges in display advertising

- **One of the major differentiators of display advertising from a ranking and ad selection perspective is that images and video lack the kind of machine friendly features that text provides.**
- **Humans interpret and understand images and videos in ways that are not expressible by TFIDF type measures.**
- **To complicate things, display ads have one or two orders of magnitude smaller CTRs than search.**
- **Solution**
 - Target audiences via behavioral targeting
 - Collaborative Filtering

The Network Stack (Display): Gen 2

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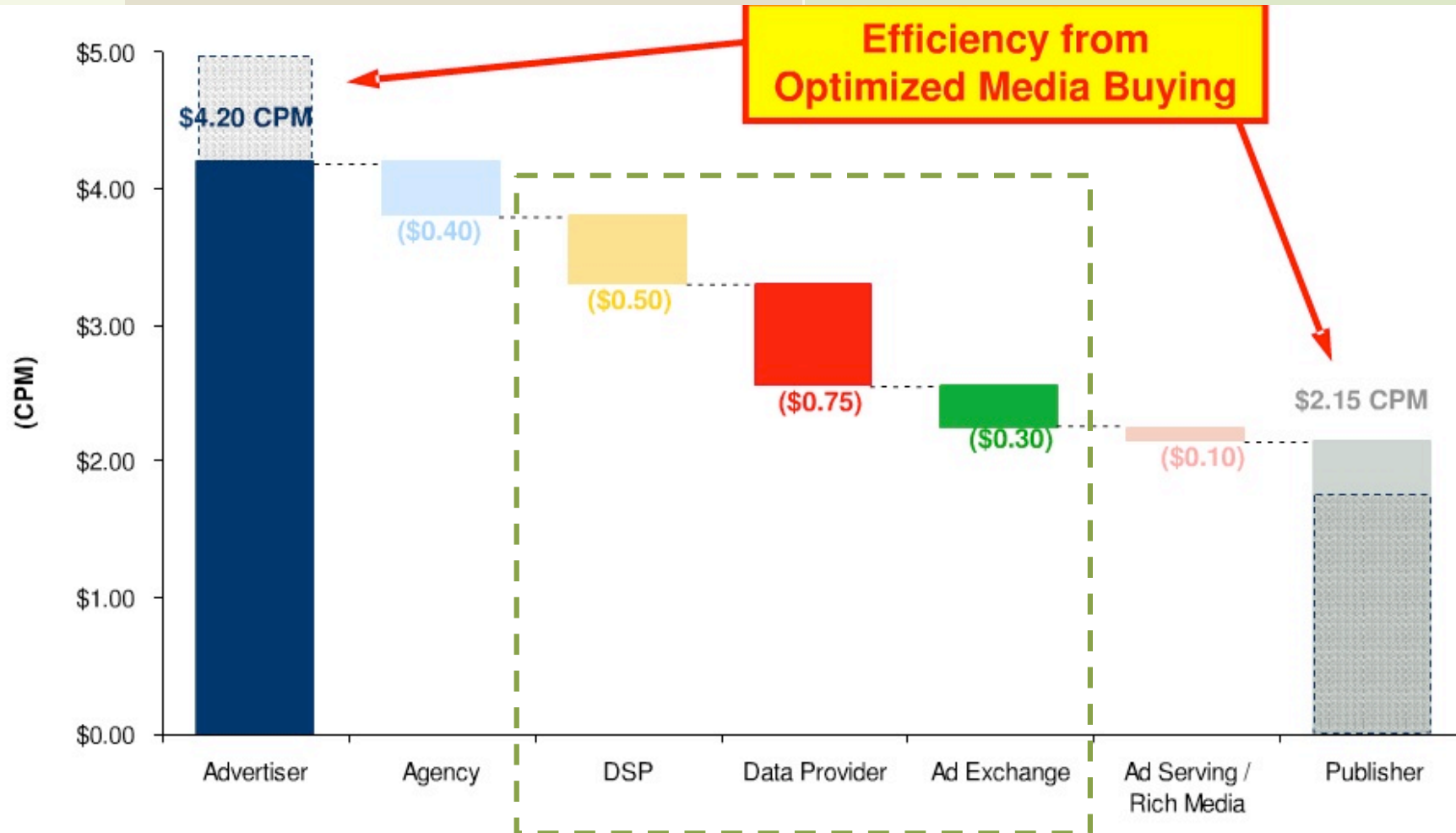
[Kawaja, 2010]

3rd Generation

Empowering advertisers thru DSPs and RTB to buy audiences

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Empowering advertisers thru DSPs connect the data dots and buy audiences

Media Buyer's view of the world

Media Source

(e.g., Exchanges)

Traffic	WeekDay	DMA	intent	demo	interest	PageUrlCode	RootDomain	Keyword	Clicks	conversions	max_bid_price
AdMeld	3	803		career IT	Parenting	172178	422	0	0	\$3.25	
AdMeld	3	623		Asian	Real Estate	588910	422	0	0	\$3.25	
Pubmatic	3	122	shopping - books	Age 18-24	gambling	366469	551	0	0	\$3.10	
AdMeld	3	122				304239	21487	0	0	\$3.09	
AdMeld	3	623	services - legal		Real Estate	180503	423221	0	0	\$3.09	
OpenX	4		shopping - CPG		fishing	543109	5929	0	0	\$3.09	
OpenX	4	500	auto - mazda	Age 18-24	travel	68274232	551	0	0	\$3.02	

Media Buying Rule #1 - Bid \$3.25 for all impressions from Admeld on wednesday when the visitor demographic is "career - IT" the visitor interest is "Parenting" the root domain is #17178 (maps to CNN.com) and keyword is 422 (maps to school)

The Media Buyer's nightmare: Part 1

(especially for trafficking display campaigns)

- **In the past, if this media buyer (on behalf of the advertiser or agency) wanted to buy media, they would work with a provider like Right Media, ValueClick, Google or one of the tens of thousands of publishers and ad networks out there**
 - Ad buys were achieved by either inputting rules-based buying instructions on various fragmented interfaces, working with an account rep, or using an API to communicate with an ad server.
 - Once these buying instructions were defined, a provider would serve an ad, and make a buy, when an impression occurred on that particular network or site fit within the defined criteria.

The Media Buyer's Nightmare: Part 2: optimizing

- **Media buyer would analyze, optimize**
 - Buyers could then login to run reports, optimize campaigns or make minor tweaks and changes. Media buyers (and their clients) who needed mass impression inventory would have to perform this task over dozens, if not hundreds, of sources to achieve scale, since in this highly fragmented space no provider has a dominant share of the inventory.
- **A big agency could work with as many as a thousand digital media vendors when you count the publishers, exchanges, ad networks, and intermediaries.**
 - Suddenly, buyers were logging into numerous interfaces, pulling and collating disparate reports and are left trusting dozens of black boxes to run their ads in the right places. Very simply, the fragmentation in the display space made digital media buying a nightmare.
 - Moreover, the vendor was in control of where the ads ran, which inhibited transparency and targeting for the buyer.

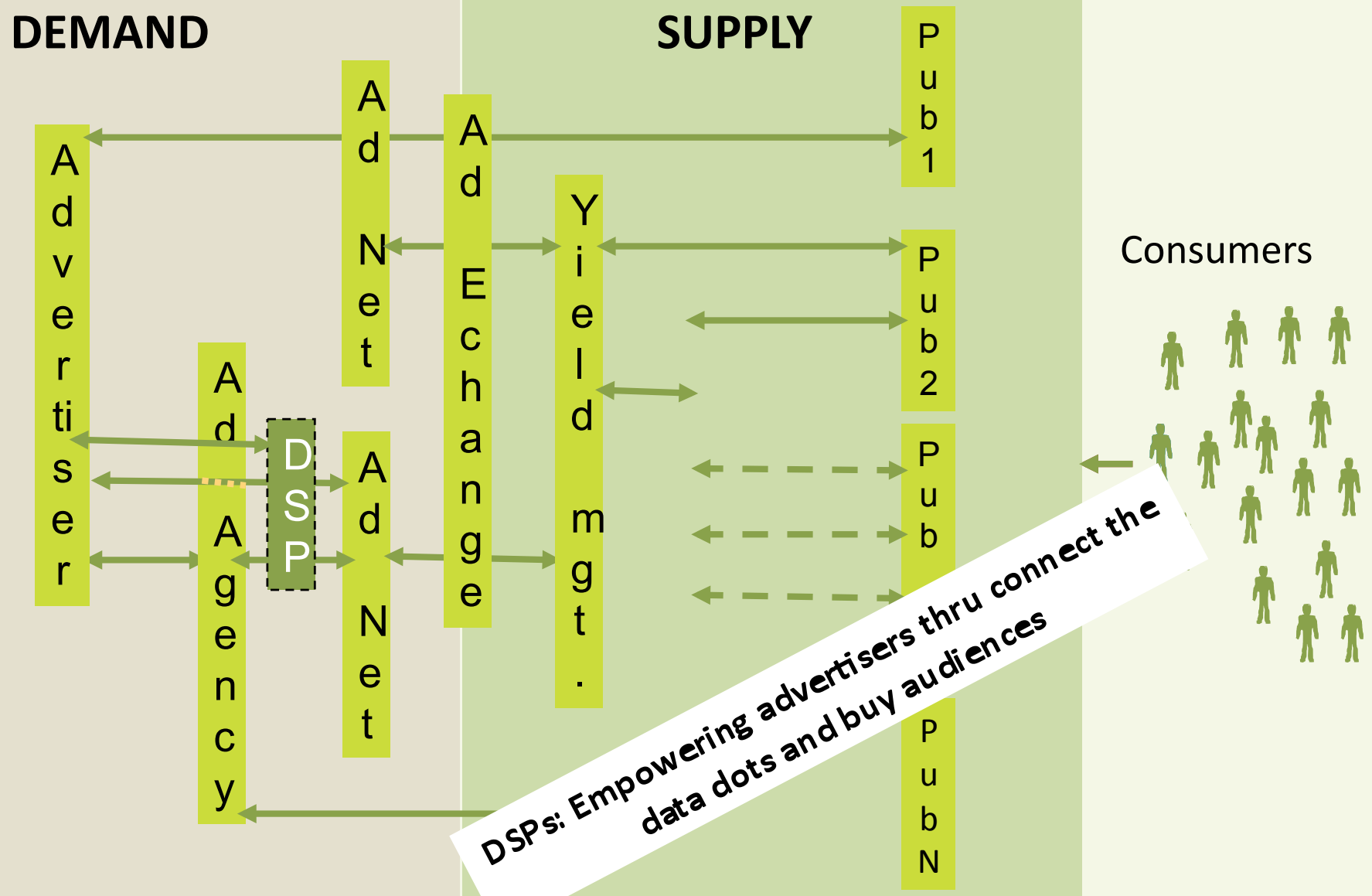
Demand Side Platforms (DSP)

- **Instead of each individual media buyer having to learn and rely on a incongruous collection of their vendors' ad software, they can instead use a single DSP (defined in a moment) to manage buying all in one place.**
 - This (DSP) single platform aggregates multiple inventory sources, making it possible to target very narrowly defined audience segments at scale using a single standard without fear of overlap.
 - Buyers can now use data they have collected and developed about their customers' target users and communicate with those users directly as individuals.
- **Opens up new media channels via RTB**
 - Changes the media buyer's nightmare.
 - The modes of buying shift from targeting inventory sources to targeting individual users, and in turn, audiences.

Demand Side Platform (DSP)

- **At its core, a DSP is software for transparent automated media buying across multiple sources using unified targeting, data, optimization and reporting.**
- **Empowering advertisers thru DSPs connect the data dots and buy audiences**

Demand-Side Platform: A trading desk for Adv.



DSPs: Empowering advertisers thru connect the data dots and buy audiences

Main DSP

Vendor	Monthly platform volume (imps)	Employee base: product development plus client service
AppNexus	26bn	80
DataXu	3bn	76
Invite Media by Google*	10bn+	85
LucidMedia Networks	2.5bn	20
MediaMath	10bn+	93
Turn	10bn+	108
X Plus One	2bn	67

[Forrester Wave: DSP, Q4, 2011]

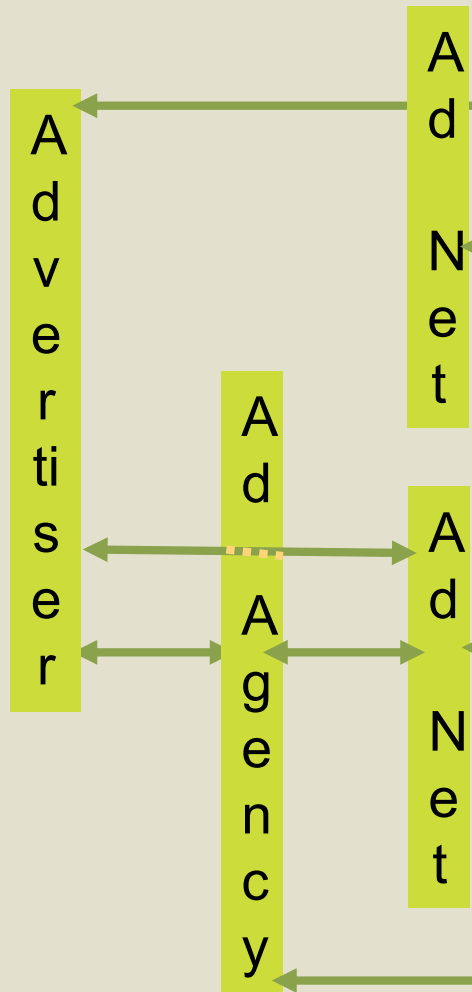
Ad Exchanges: a new Supply-Demand Marketplace

- **The ad exchange is a real time marketplace**
 - with an auction-based system where the participants – advertisers and publishers – transact on a common platform to purchase and sell online graphical advertising.
- **Currently, publishers sell remnant inventory**
 - on the exchange for advertisers to purchase through bidding on a user-friendly interface.
- **Ad Exchanges do not compete with ad networks**
 - targeting technologies, or publishers, but rather serve as a more efficient way for the exchange of inventory within these groups
- **Googles acquired DoubleClick, Yahoo acq RightMedia, etc.. \$11 in M&A in 2007**

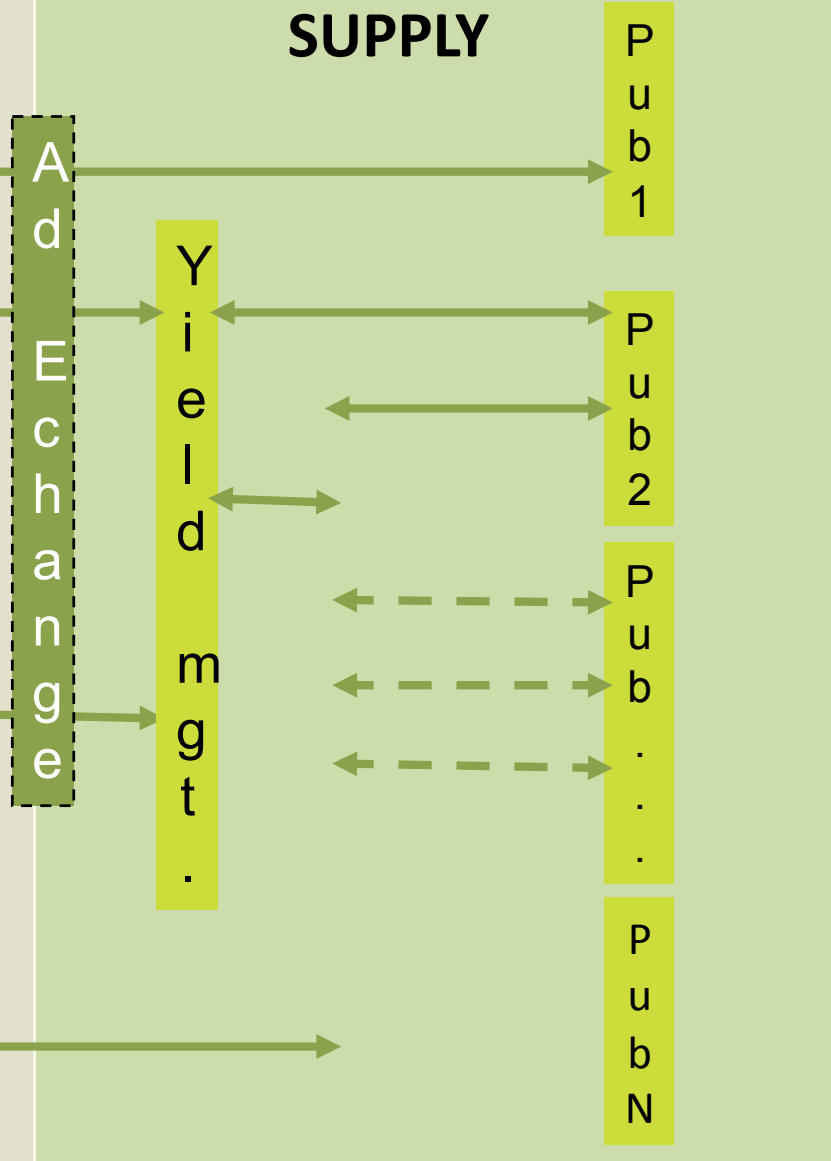
[Good intro: *S. Muthukrishnan, Ad Exchange: Research Issues, WINE 2009*]

Ad Exchange: auctioneer-centric marketplace

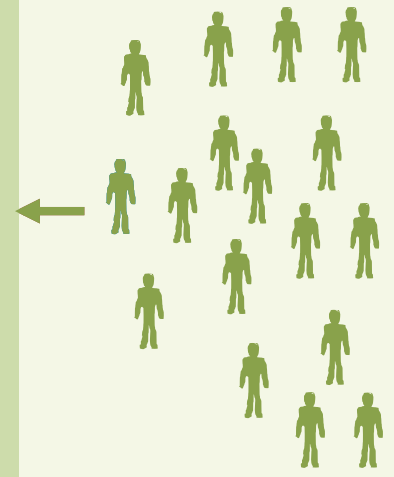
DEMAND



SUPPLY



Consumers



Ad Exchanges: a new SD Marketplace

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Why Ad Exchanges?

- **No discrimination (everyone can play almost)**
 - Elimination of intermediaries and their margins
 - Interests of smaller niche players safeguarded as existing relationships and budget sizes exert no influence and each bidder has equal access to the media
- **More efficient**
 - Transparent and dynamic pricing landscape due to open bidding process
 - Reduced operational friction due to improved clarity of placement of ad serving on a website
 - Enhanced efficiency due to simplification and standardization of business processes
- **Improved liquidity of ad inventory**
- **Increased role of technology to automate and provide a common platform**

DSPs Ties it all together

- **A DSP needs to be able to connect to many different inventory sources to create a huge pool of inventory of tens of billions of impressions a day.**
 - Most likely this involves using RTB or some other solution where the DSP can see the impression without the requirement to buy it.
- **The DSP must be able to provide global frequency capping across all the inventory sources**
- **The DSP should provide unified optimization, analytics, reporting and impression attribution. This is one of the most valuable pieces to a good DSP.**
- **The DSP should enable its users to leverage 1st, 2nd and 3rd party data across the entire pool of impressions.**
 - This means that clients should be able to map their user data, work with the DSP's data and buy third party data. This data should be usable in highly complex multivariate targeting routines.

DSPs Ties it all together

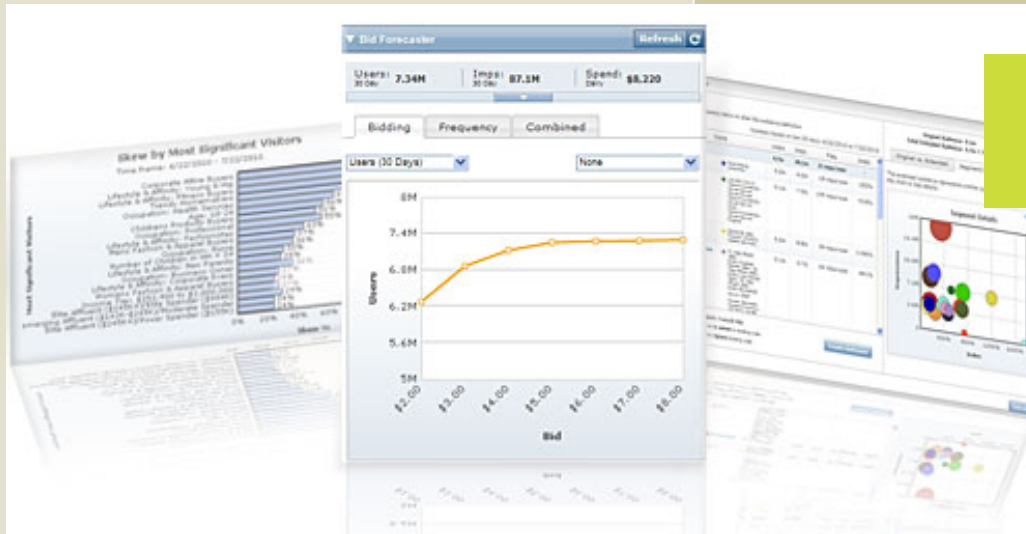
- **A DSP should be completely transparent in all aspects of the media and data buying process.**
- **There should be an interface that enables the buyer to manage all of their campaigns and transparently see costs, data, sites, conversions and impression attribution.**
- **The DSP should have cookie mapping and data sharing systems in place to enable integrations with third party data suppliers, agency data, analytics companies and client data. This process should be possible both on and off line.**
- **There should be no conflicts that would cause the DSP to do anything not in the best interests of its clients. This includes data, publishers, partners and exchanges.**

DSPs Provides Analytics and Decisioning

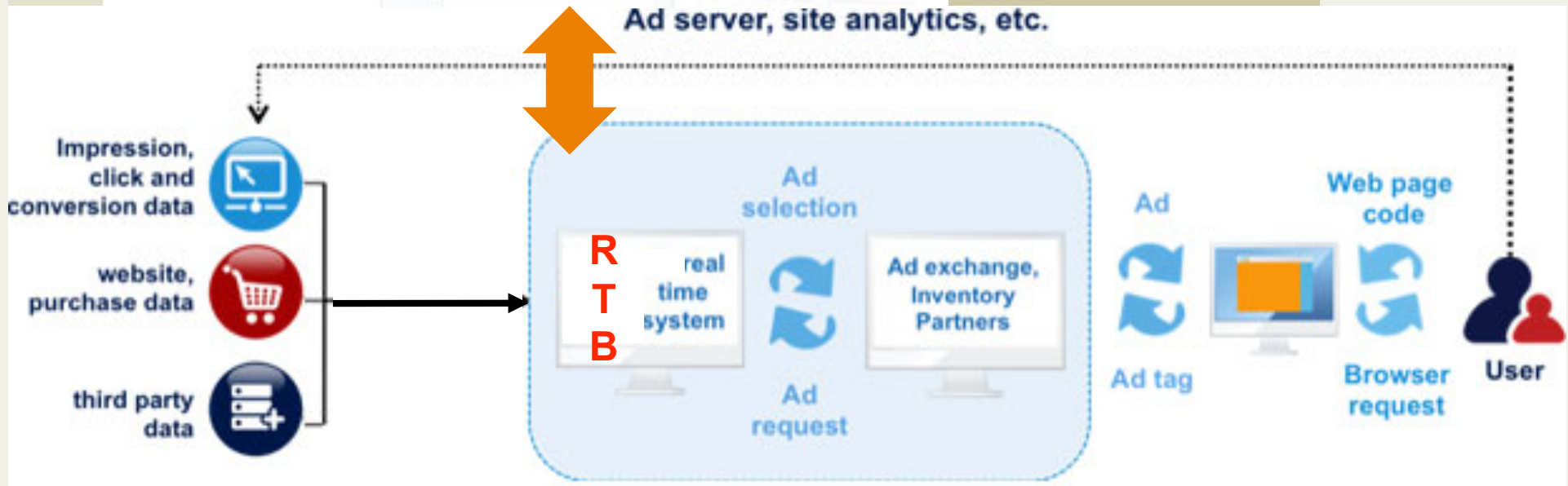
- **DSPs generally calculate the value of each impression in real-time individually relative to the various characteristics of the impression.**
- **This process enables efficient and effective media buying.**

Demand side platform <-> Exchanges

Advertiser



Speak the language of marketing folk



Behavior

Advertiser/DSP

Exchange

Publisher

Consumer

DEMAND

Exchange

SUPPLY

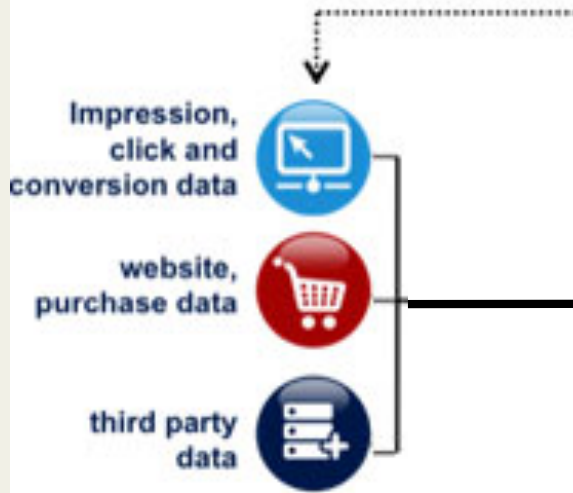
Demand side platform <-> Exchanges

Advertiser



Speak the language of marketing folk

- A DSP is a demand side trading desk; is a SaaS Connects to multiple ad exchanges and other media suppliers
- Campaign management tools to manually target or automatically optimize campaigns. Automated bid management capabilities (RTB).
- Advanced analysis and “decisioning” about the value and desirability of ad impression opportunities.



Behavior	Advertiser/DSP	Exchange	Publisher	Consumer
DEMAND	Exchange	SUPPLY		

Demand side platform <-> Exchanges

Advertiser



Speak the language of marketing folk

50 Billion Impressions
700,000 QPS

- A DSP is a demand side platform; is a SaaS
- Connects advertisers and exchanges and other media

management tools to manually target or automatically optimize campaigns.

Automated bid management capabilities (RTB).

Advanced analysis and “decisioning” about the value and desirability of ad impression opportunities.

Impression, click and conversion data



website, purchase data



third party data



B

Ad request

Ad tag

Browser request

User

Behavior

Advertiser/DSP

Exchange

Publisher

Consumer

DEMAND

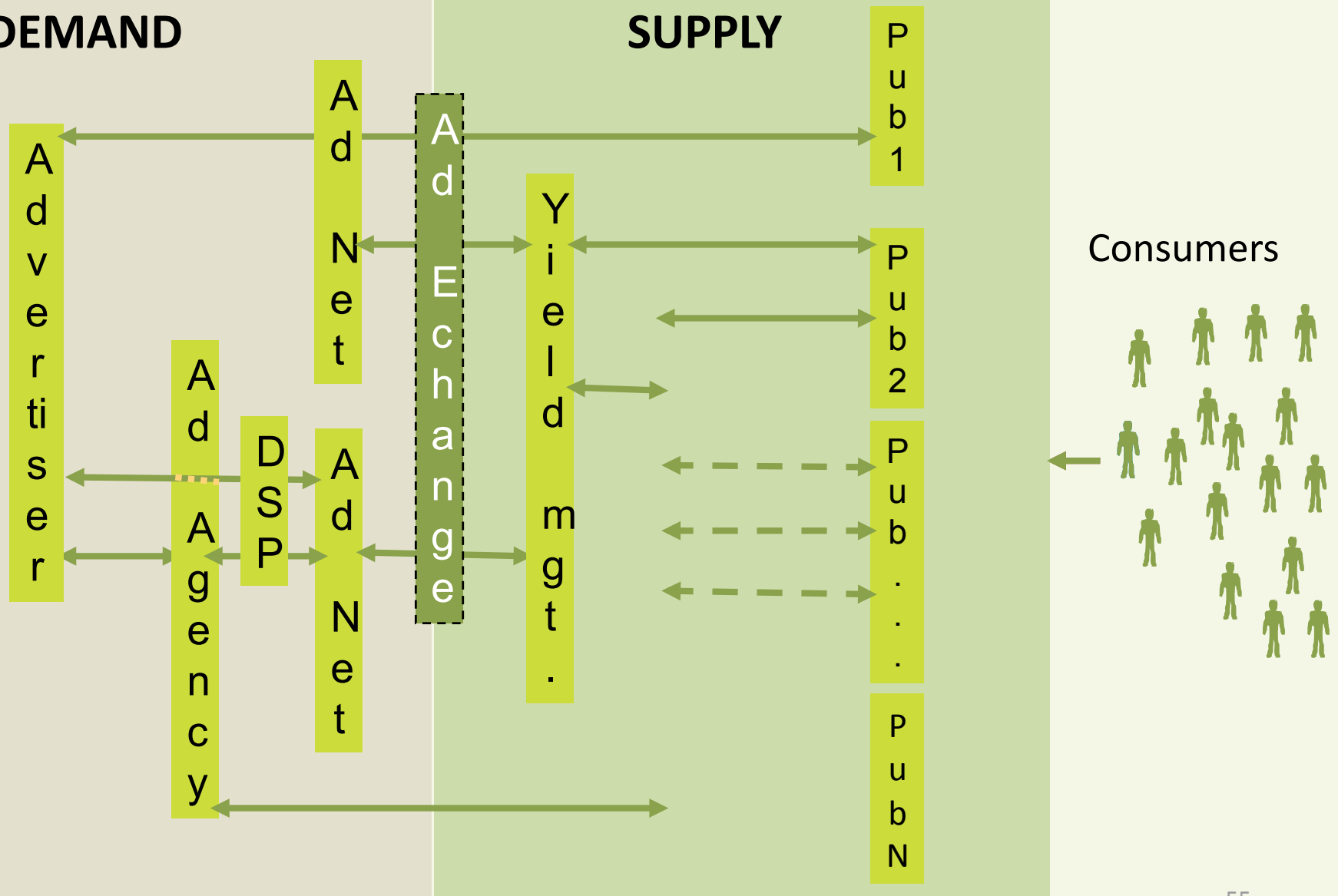
Exchange

SUPPLY

Ad Exchanges

DEMAND

SUPPLY



Ad Exchanges for Display Ads

- **Like stock market, premised on the free flow of information between buyers (advertisers) and sellers (publishers), transparency and accountability and maximum value for both sides of every transaction.**
- **Advertisers**
 - Better ROI, target inventory in a better way
- **Publishers**
 - Maximum value for inventory, clearing house
- **Intermediaries**
 - Publisher and Advertiser networks
 - Manage risks, best environment & services. Profit by arbitrage.
- **Good intro: *S. Muthukrishnan, Ad Exchange: Research Issues, WINE 2009.***

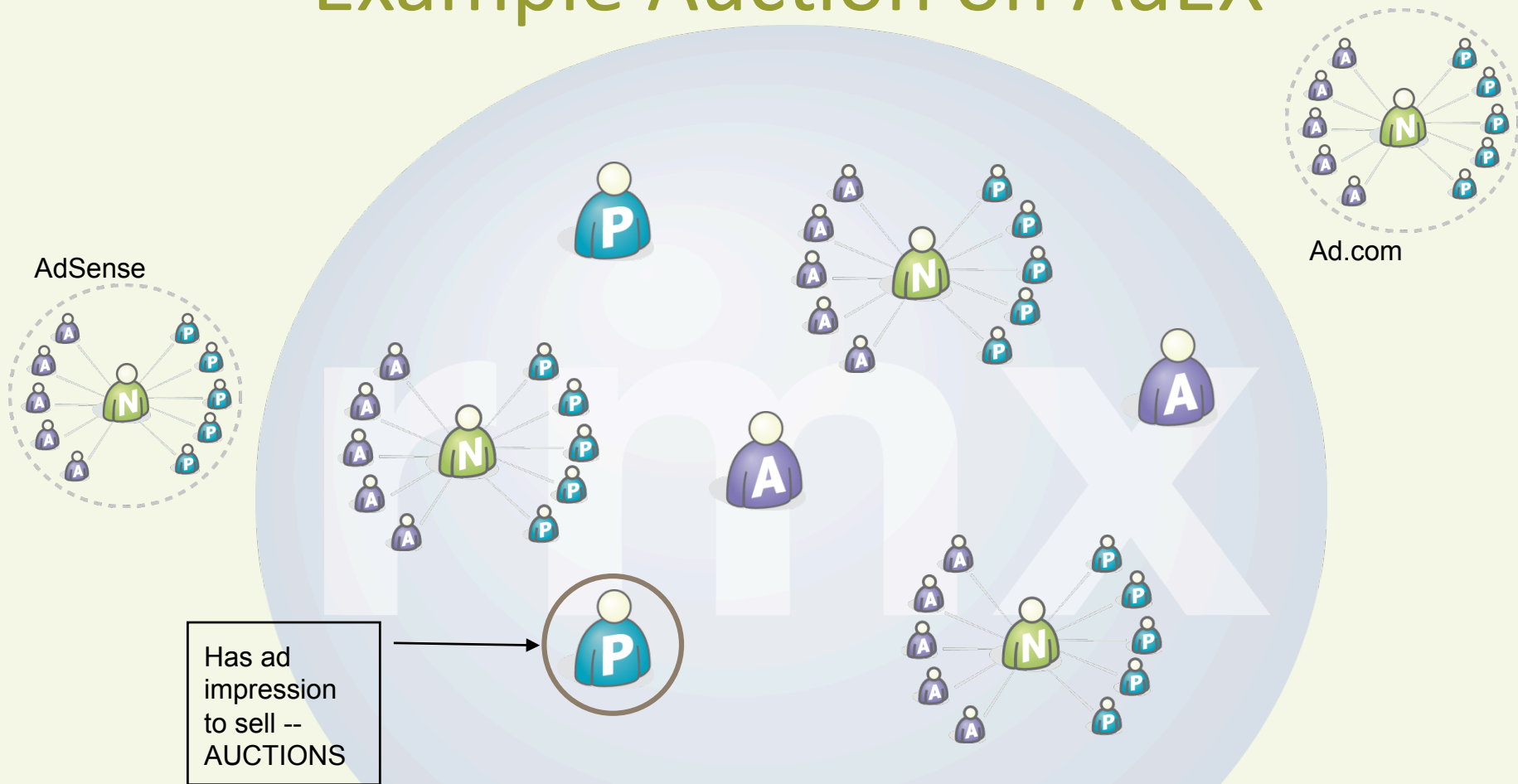
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

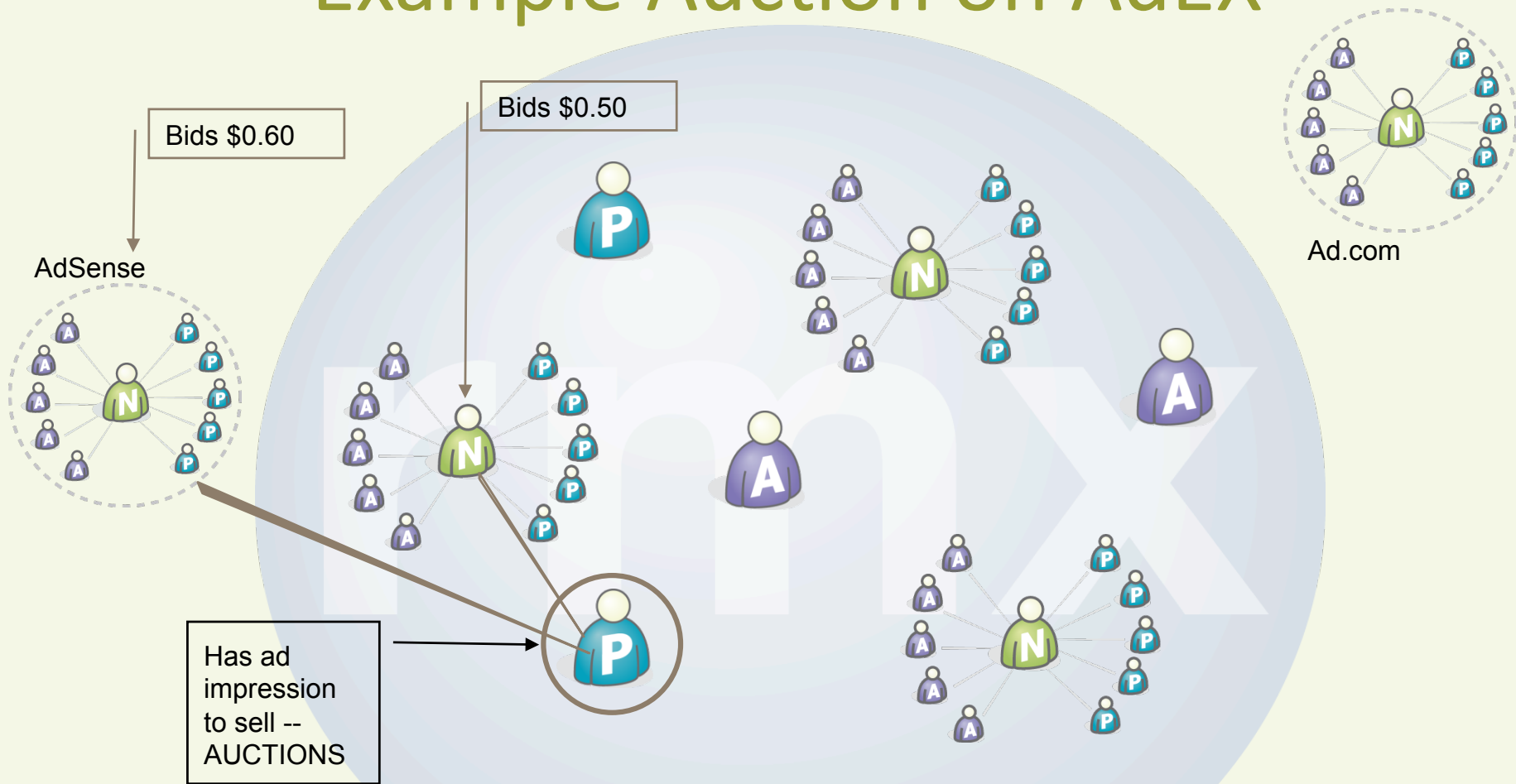
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

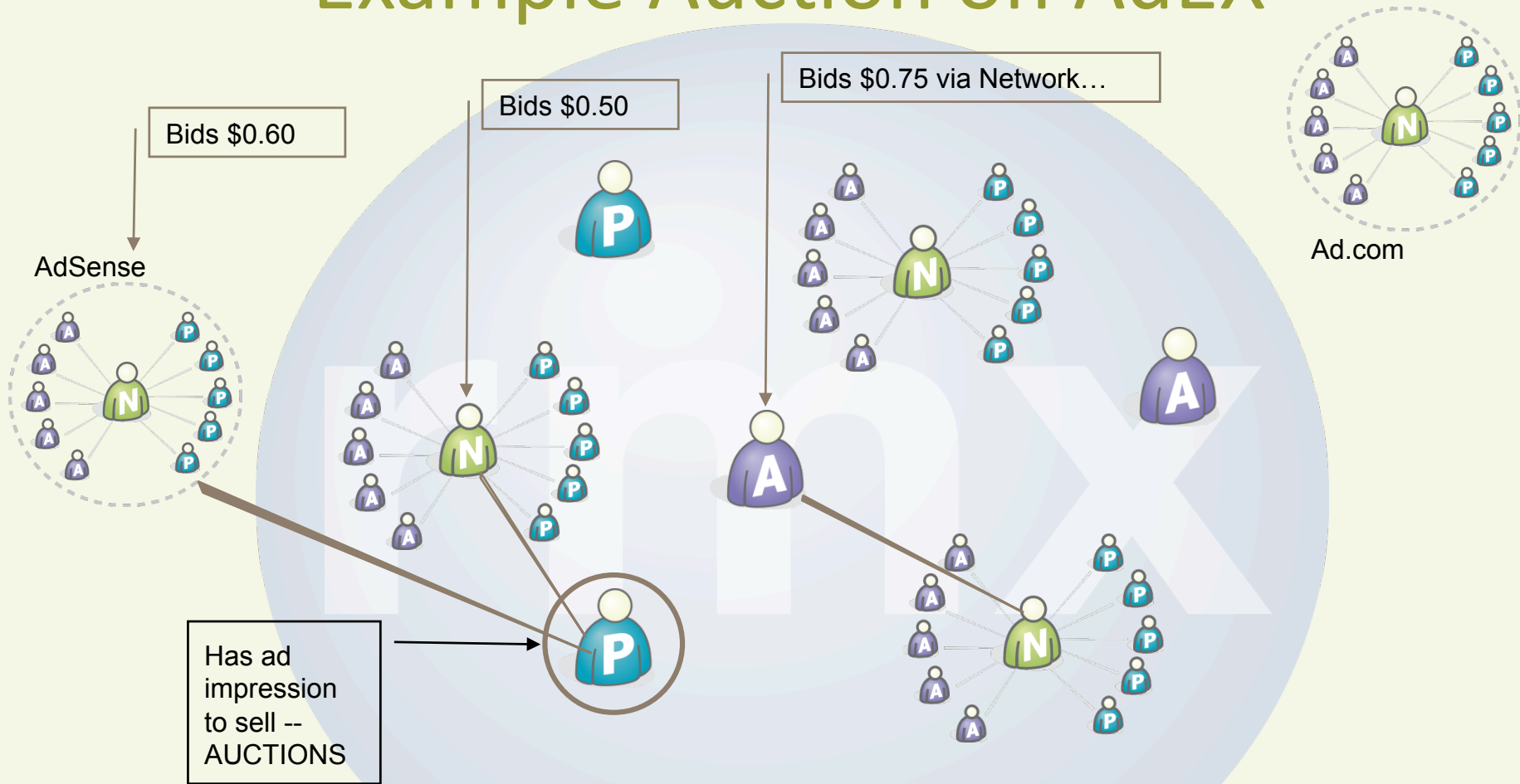
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

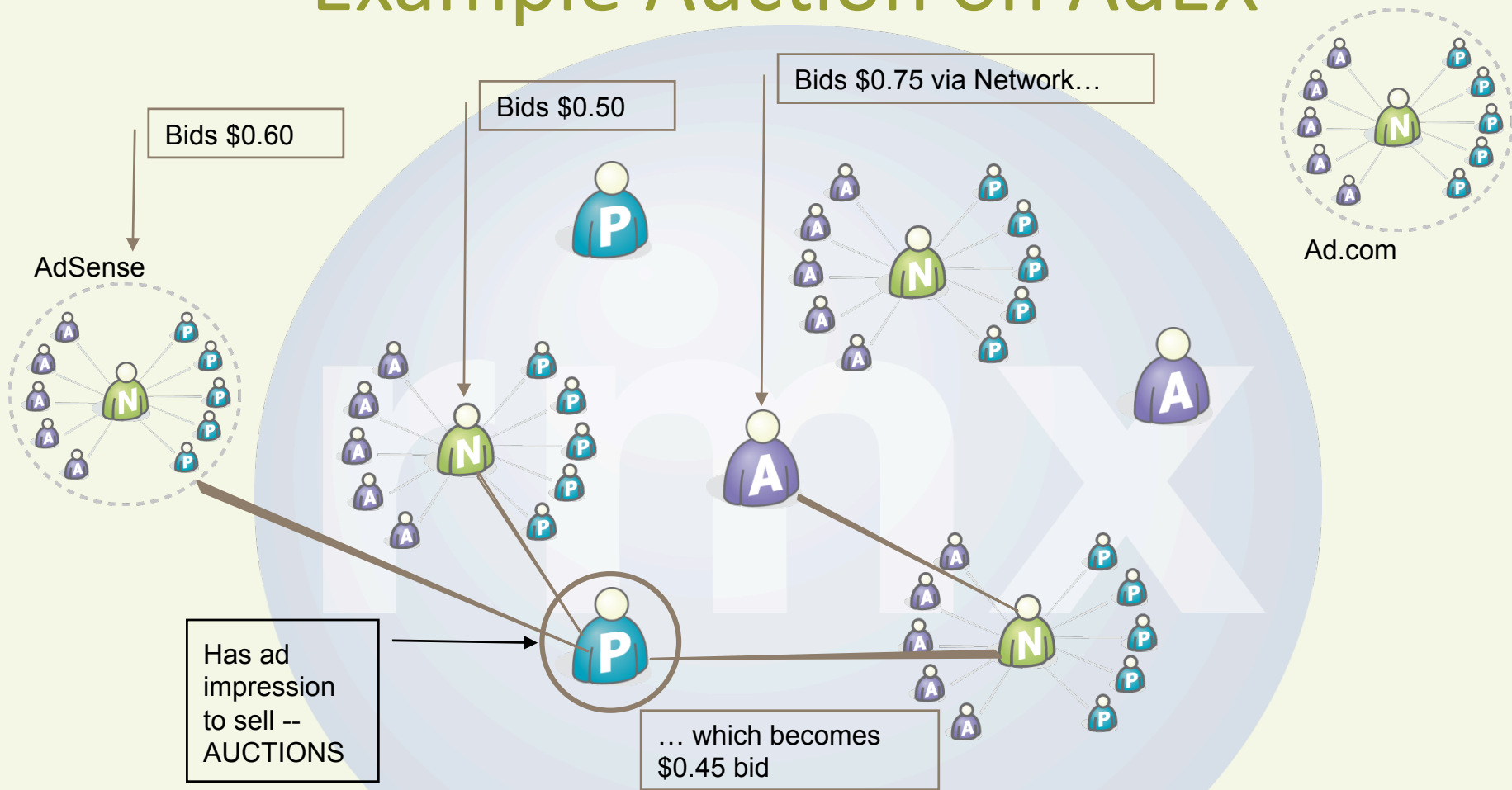
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

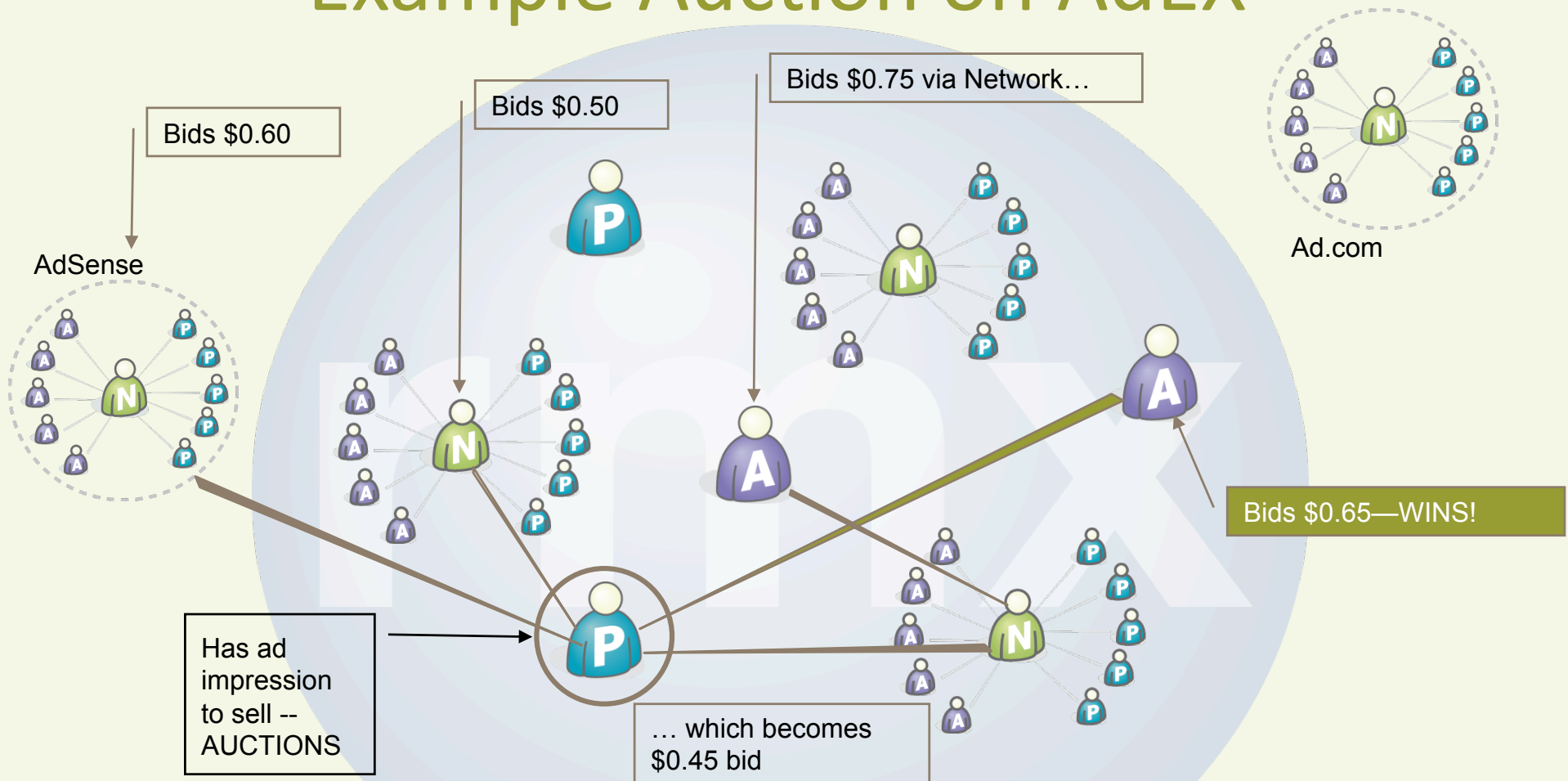
Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

Example Auction on AdEX



Transparency and value

[Deepak Agarwal, 2010]

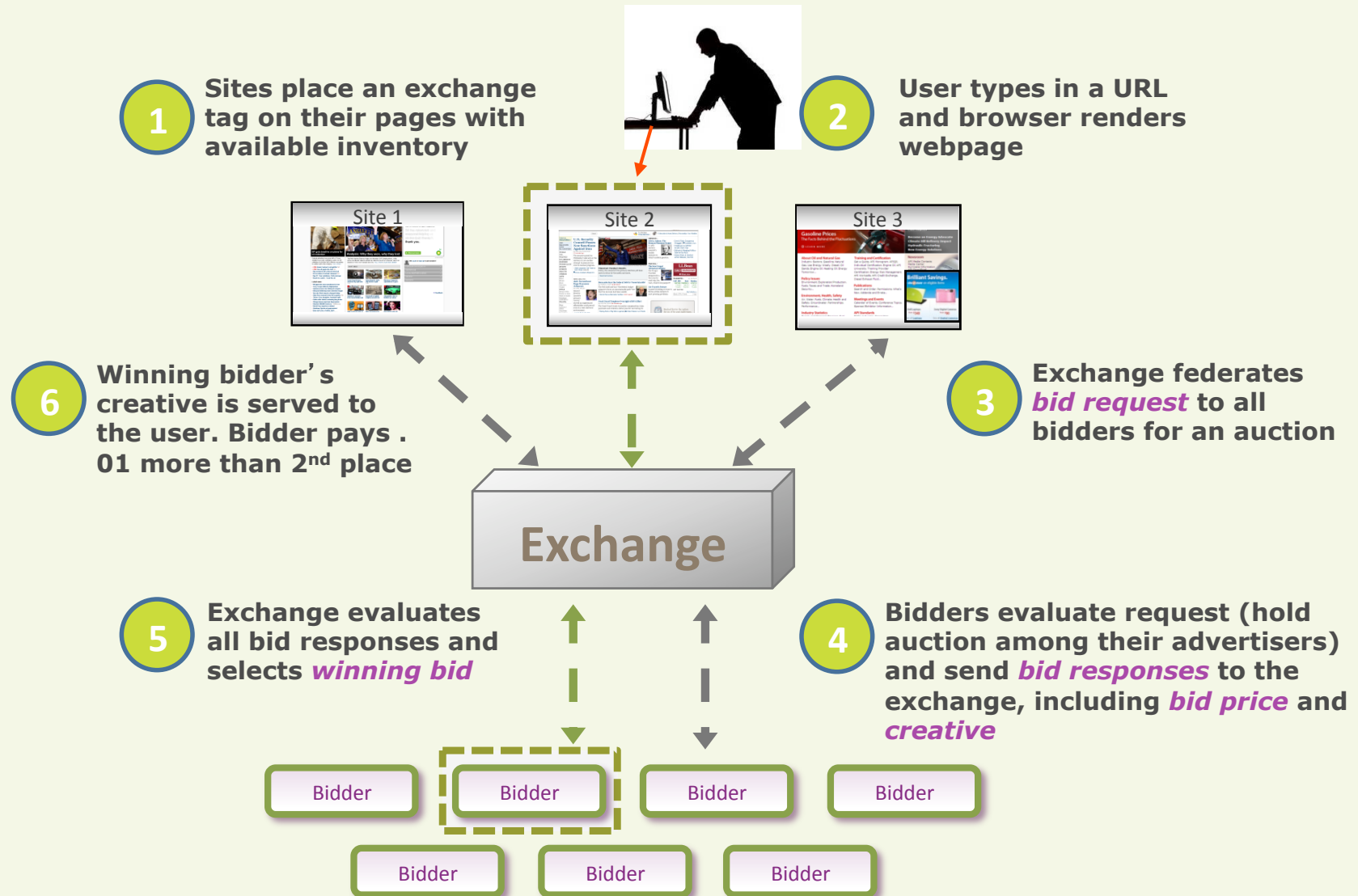
Ad- exchange (E.g., RightMedia)

- **Advertisers participate through different pricing types**
 - CPM (pay by ad-view)
 - CPC (pay per click)
 - CPA (pay per conversion)
- **To run auction, normalize across pricing types**
 - Compute eCPM (expected CPM)
 - Click-based ---- $eCPM = \text{click-rate} * CPC$
 - Conversion-based ---- $eCPM = \text{conv-rate} * CPA$
 - Require “absolute” response rate estimates

Ad Exchanges:

- **Who to broadcast to?**
- **How much to bid?**
- **Explore/Exploit**
- **Advertising and Recommender**
 - Methods in Recommender literature could/should be leveraged
 - Sponsored search broad match
 - [Andrei Z. Broder: Computational advertising and recommender systems. [RecSys 2008](#): 1-2]
- **Regression-based Factorization Model (RLFM)**
 - Flexible prior, predict factors through regressions
 - Agarwal and Chen, Regression based latent factor models, KDD 2009
 - Graepel et al. , Machbox, WWW 2009
 - Latter mention working to incorporate this in SS (in their ICML paper)

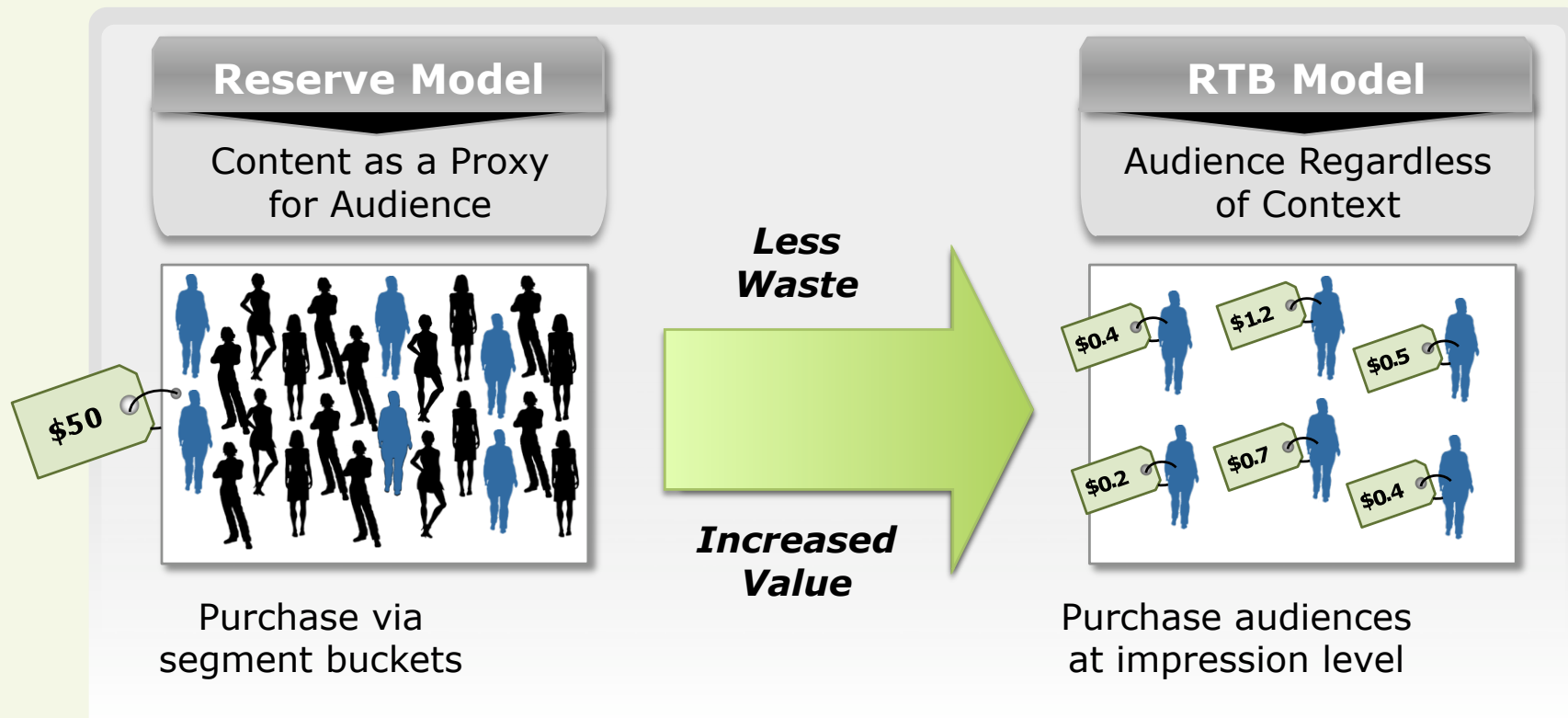
Demand-Side Platform: A trading desk for Adv.



What real-time bidding (RTB) means for marketers looking to buy display ads

- **When marketers buy ads using real-time bidding, they bid on impressions based on:**
 - The specific site
 - The location of the ad on the site
 - The number of impressions desired
 - Any potential cookie data for segmentation
 - Helps marketers buy audience instead of inventory
 - Helps publishers sell lesser inventory at higher prices
 - Targeting typically demographic and psychographic (less so behavioral, so sidesteps many privacy issues)

RTB: Reach the Right User at the Right Place in Real Time



X O N Δ partners

**Demand side
platforms (DSPs)
and advertising
exchanges:

two key elements
of the RTB
ecosystem (*ad
networks, too*)**

Methods Used by US Ad Agencies to Buy Online Advertising, Q3 2010

% of respondents

Through an ad network (Google, Yahoo!, yellow pages)

81.0%

Through traditional media (TV, print, radio sites)

61.9%

Direct from the publisher (expedia.com, ncaa.org, etc.)

46.0%

Through a DSP or exchange (Invite Media, Right Media, Acxiom, etc.)

20.6%

Through self-services (e.g., FatTail's PageGage)

9.5%

Other

3.2%

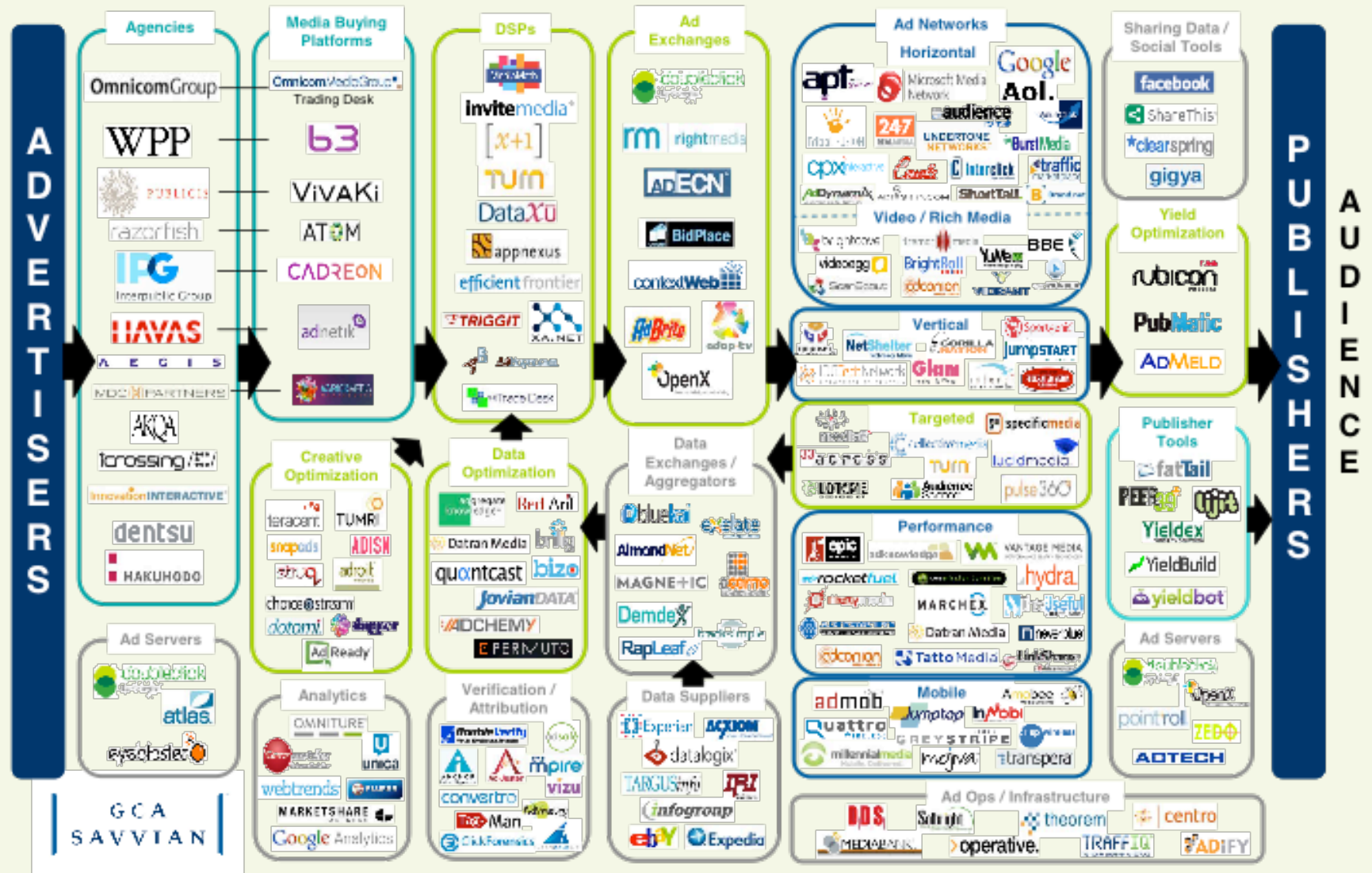
Source: STRATA, "3rd Quarter 2010 Survey Results," provided to eMarketer, Oct 19, 2010

120996

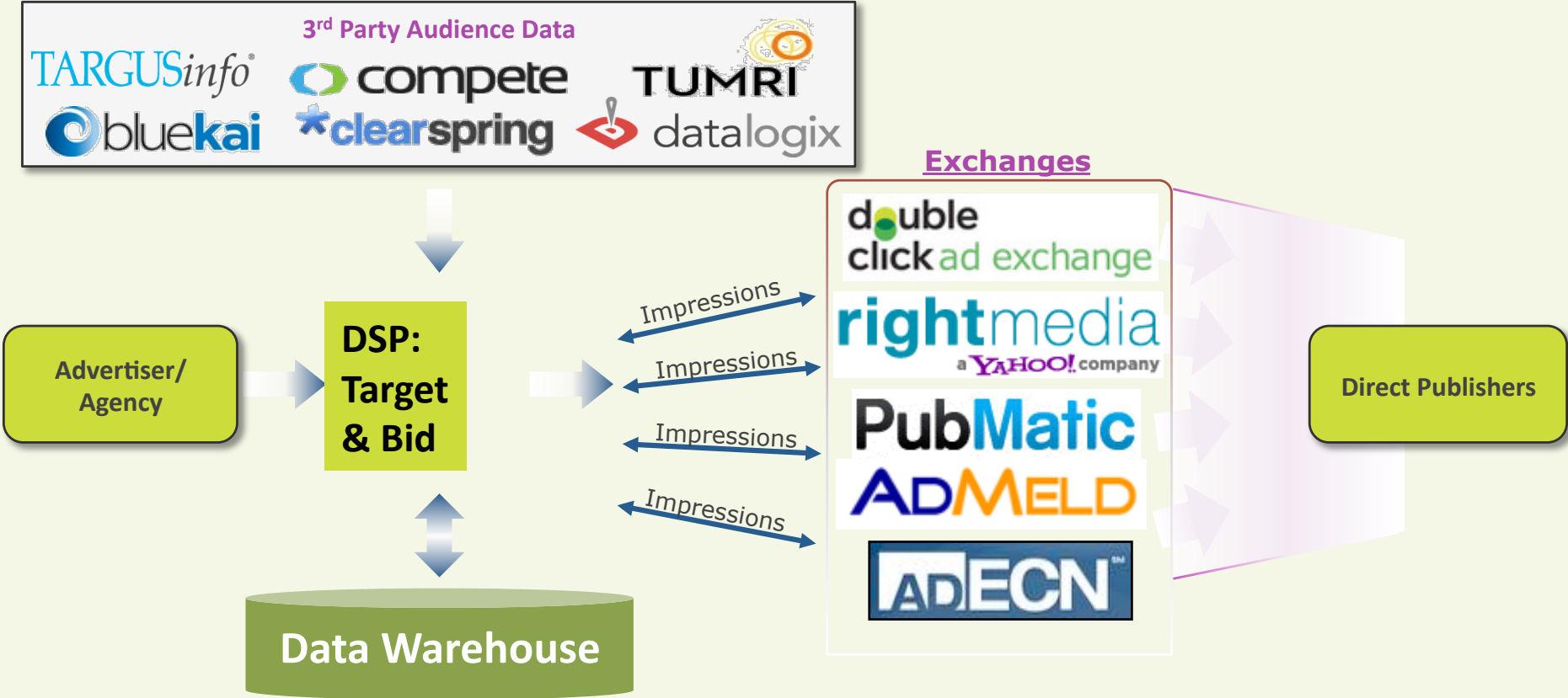
www.eMarketer.com



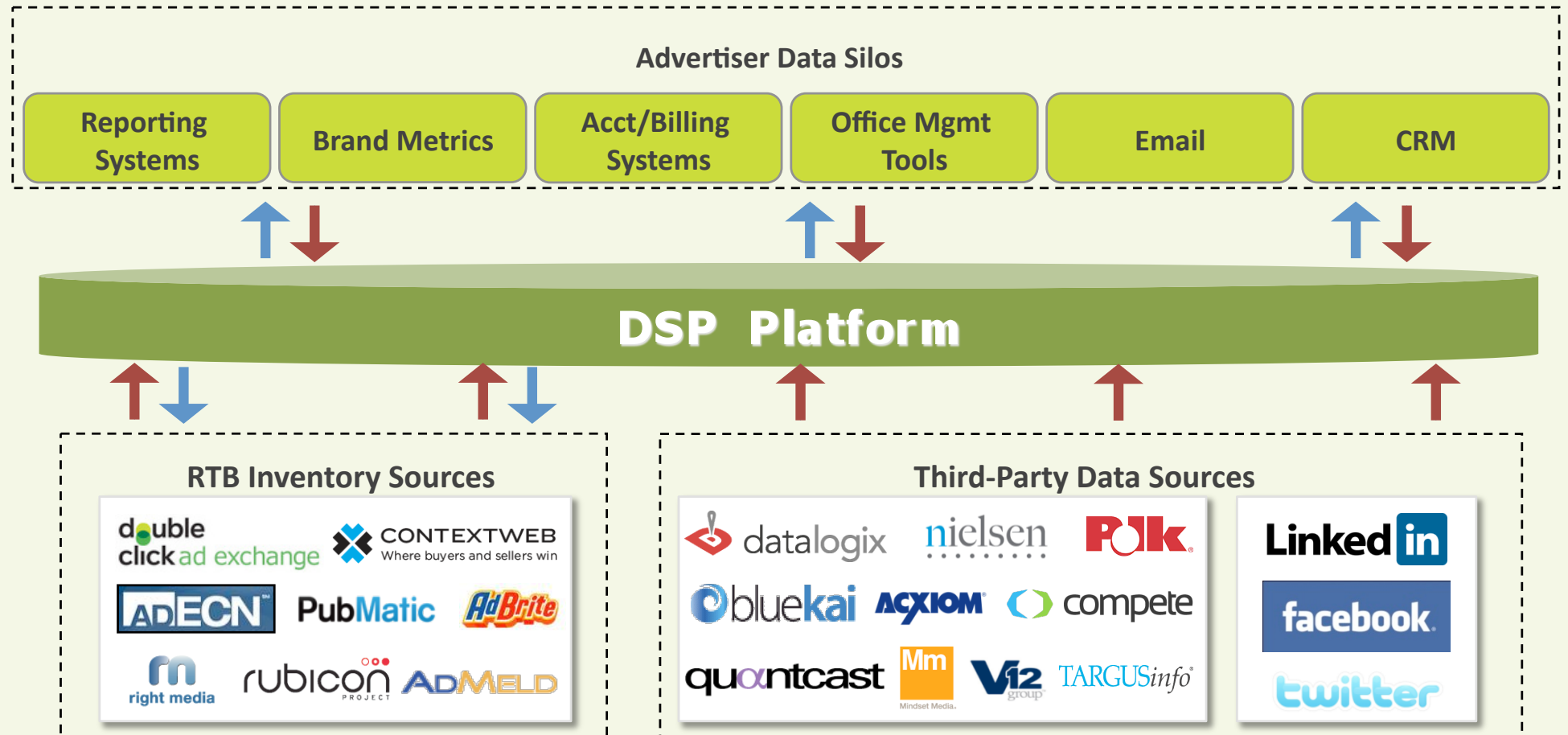
The Crowded Display Ad Tech Landscape



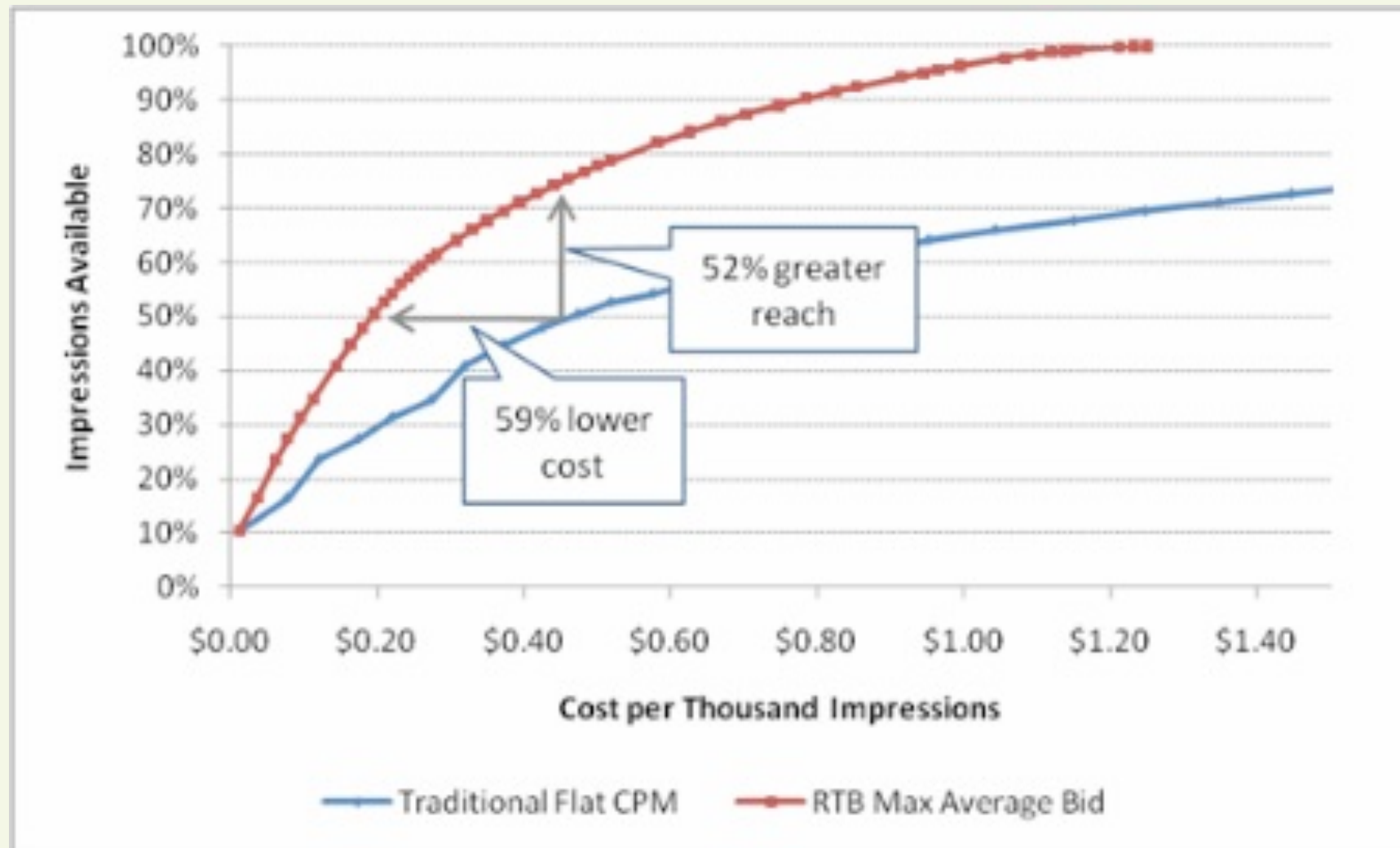
Real-Time Audience Acquisition



Increased Data-Based Audience Targeting



Increased Data-Based Audience Targeting



sample of 200 million display impressions

[Chris Kane, <http://www.imediaconnection.com/content/28654.asp>]

Publishers extend their sales reach by putting inventory on exchanges or other real-time platforms

Advantages of Making Their Ad Inventory Available on an Exchange or Other Real-Time Bidding Platform According to Online Publishers in North America, Feb 2011

% of respondents

Higher sell-through

48%

Ability to tap bigger budgets

47%

Access to more/undiscovered buyers

41%

Access to better targeting technology

28%

Ease of use/efficiency

21%

Better price for our audience quality/characteristics

11%

Note: n=33; "most" or "very" important on a 6-point scale

Source: DigiDAY and Google, "Real-Time Display Advertising State of the Industry," Feb 23, 2011

125573

www.Marketer.com

Private Exchanges: Publisher sells to Brands they trust

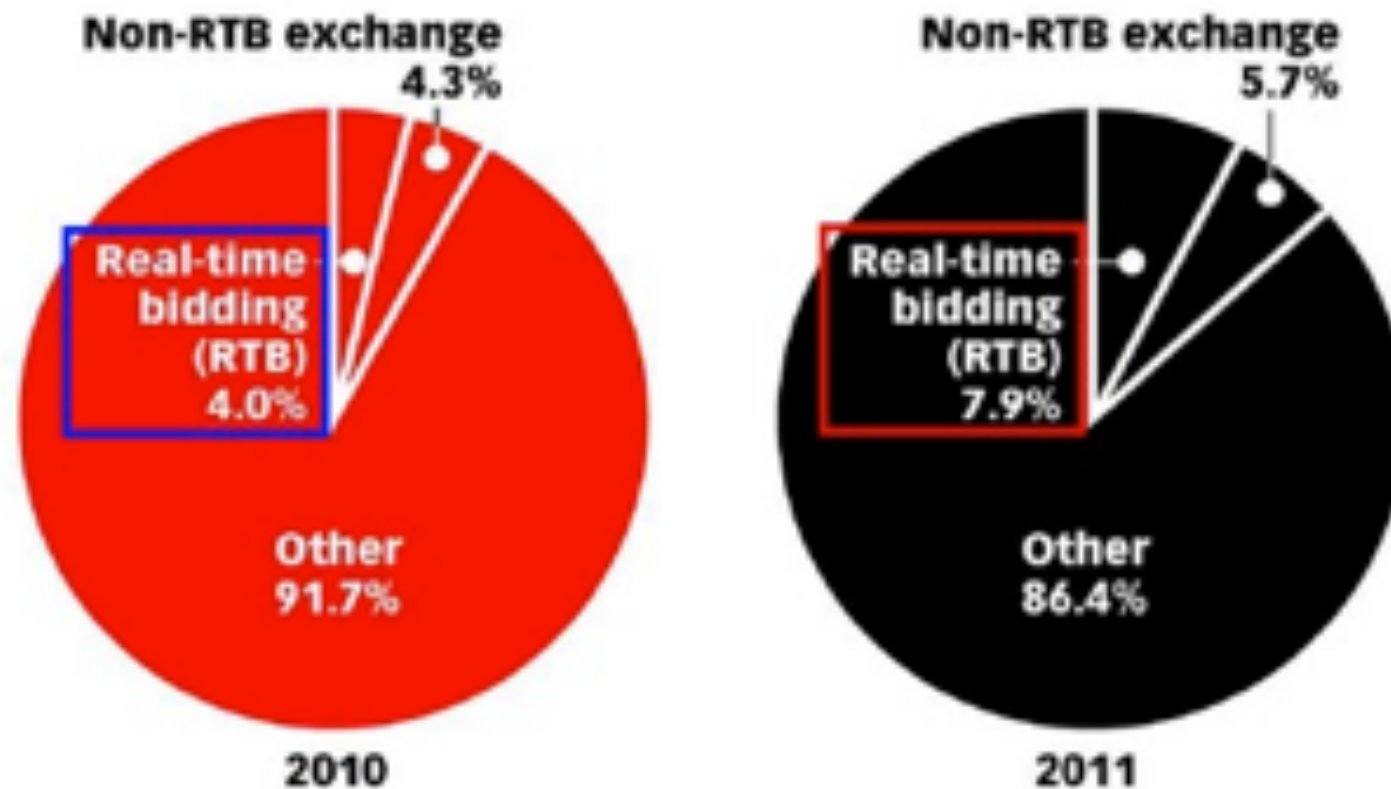
- Marketplace in which **one** large publisher sells inventory based on its segmented user base
- While many are a single publisher, some are **small**, related groups of publishers
- Also can be **large** groups (ex: QuadrantOne, which sells inventory from hundreds of newspaper sites)
- Often fueled using **RTB** technology

With RTB

- **Buyers must answer three essential questions about every available impression:**
 - Do you want to show an ad here?
 - At what price?
 - With what message?

RTB's share of display spending is still small, but growing rapidly

US Online Display Ad Spending, by Type, 2010 & 2011 % of total



Source: Forrester Consulting, "RTB Hits the Mainstream" commissioned by Admeld, Feb 10, 2011

Figure 2 Forrester Wave™: Demand-Side Platforms, Q4 '11

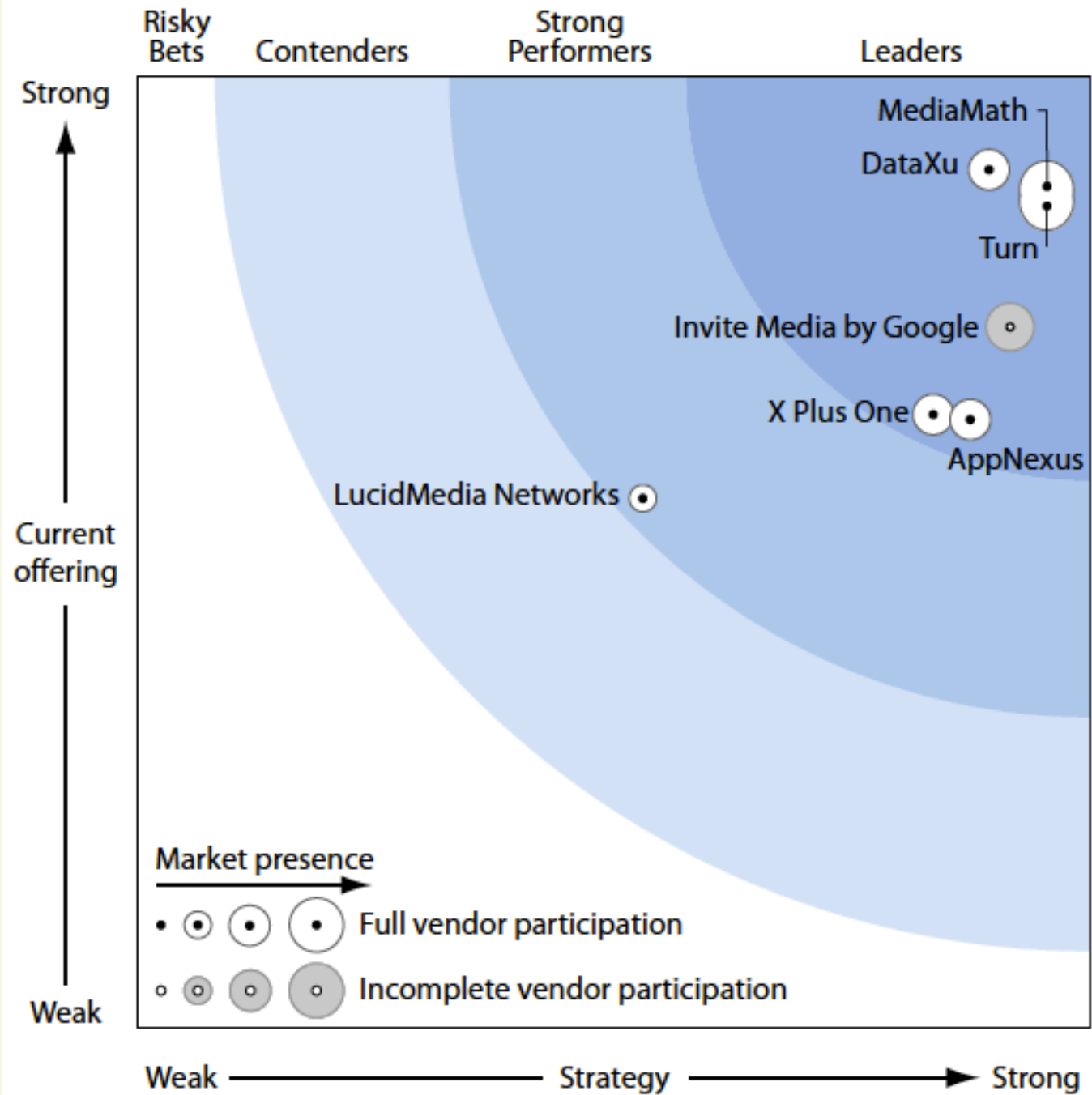
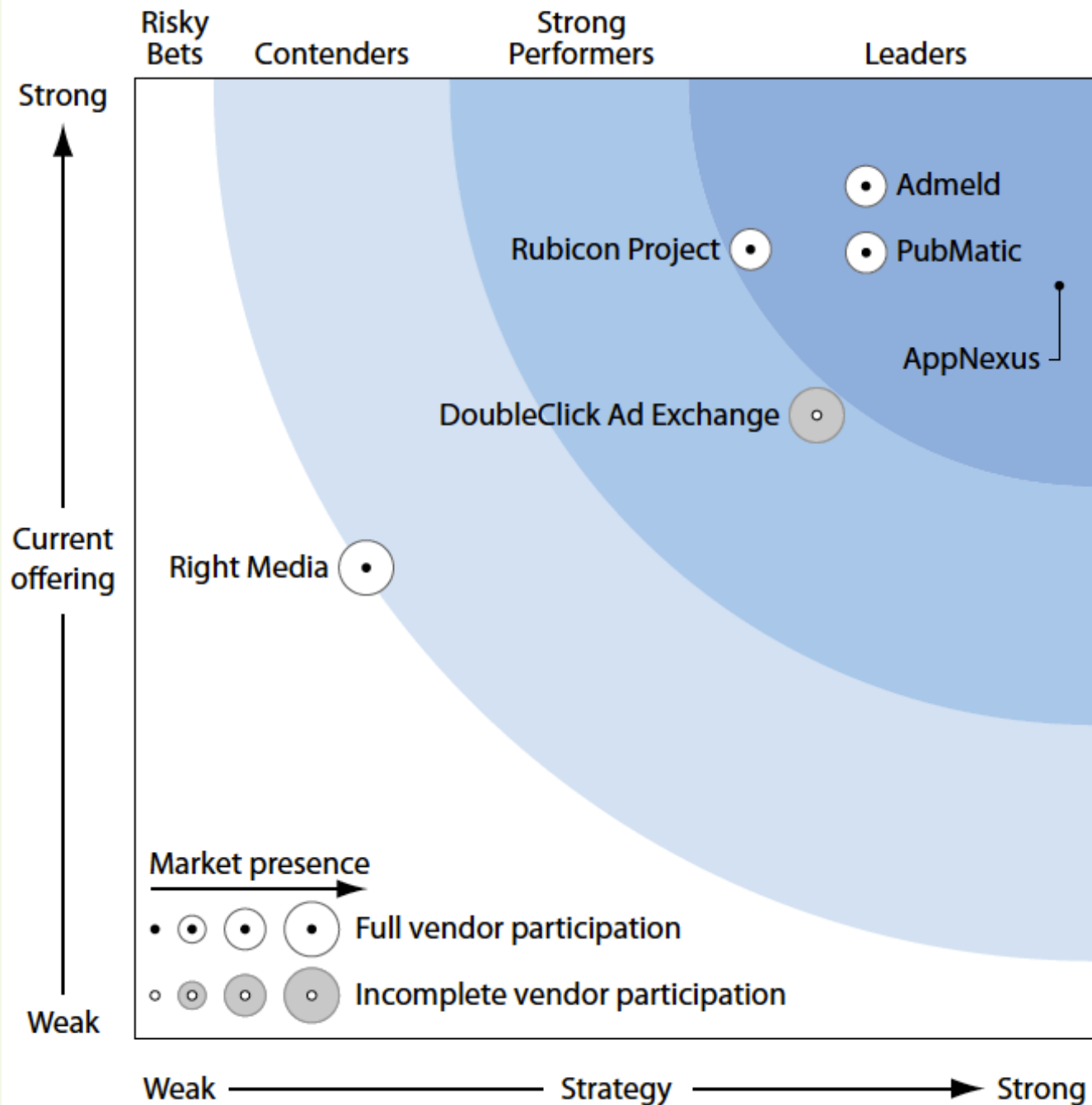


Figure 2 Forrester Wave™: Sell-Side Platforms, Q1 '12



Advantages of having RTB Acceleration

- **Advantages of exchanges**
 - High-quality 2nd – 4th tier inventory
- **Services provided**
 - Seats/Licenses
 - Proximity to exchanges
 - Focus on core competency
- **Proximity to Exchanges enables:**
 - Better algorithmic inference
 - Avoid Missed opportunities

Mobile Exchanges

- **Mobile advertising, while on a big growth curve, is going through some of the same evolutions as online advertising, though in some cases at an accelerated rate.**
- **One emerging development is the launch of new private ad exchanges that help bring together premium publishers with top brand advertisers, creating a somewhat rarified arena for the two parties to do business.**
- **E.g., Nexage, MediaLet**



Display: from 37% (2012) → 43% in 2016

Of overall online ad revenue in US

- **Total display ad spending, comprising banners, rich media, sponsorships and video, will climb from \$12 billion in 2012 to \$26.66 billion in 2016 in US.**
- **Mobile display ad spending, including banners, rich media and video, will increase fivefold between 2012 and 2016, rising from \$1.01 billion to \$5.09 billion.**
 - Mainly fueled by video on desktop and mobile
- **Exchanges account for 14% of display impressions (\$1.7Billion in 2011); 8% via RTB**
- **Greater than \$3Billion worldwide**

RTB is going to be massive!

- **Buyers must answer three essential questions about every available impression:**
 - Do you want to show an ad here?
 - At what price?
 - With what message?