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# REAL-TIME BIDDING DIGITAL ECOSYSTEM

RTB (Real Time Bidding) is a media ad buying technology, which depends on online auction. RTB protocol defines how an application can estimate and make bids on every broadcast (showing ad to user), at the moment in real-time.

RTB is a marketplace interface, based on buying, which is done programmatically. An ad is shown to target audience, e.g. it is showed depending on every user characteristics. That is why, RTB-systems are mediators, and make possible to show ad to users by their characteristics. The sellers are able to get the customers and increase their profit.
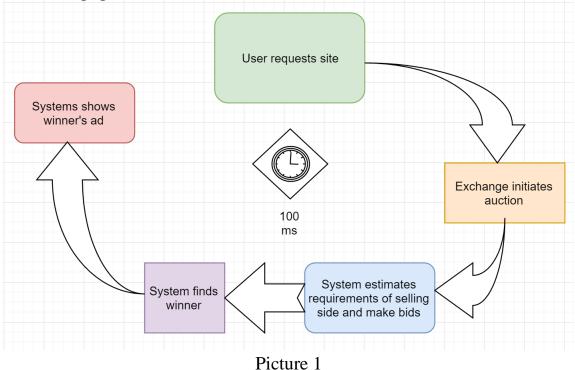
The algorithm has the following steps:
1.  A user visits the site, which is a part of RTB-system.
2.  The site initiates the request to show the banner before the page is loaded. A user data request can be also initiated.
3.  The user data is sent by ad network to SSP.
4.  SSP request classification is done by targeting parameters.
5.  The bargain is done by SSP and data about a bid is transferred from SSP to trading desk(exchange subsystem)
6.  The highest bid is selected.
7.  The bid is decreased to the second price.
8.  The winner is selected, the ad to is sent to a user's browser.
9.  The page is loaded with the banner.



Picture 1

Picture 1 is the general schem of RTB process.

Let us consider the main key concepts for Real Time Bidding.

Ad Exchanges is the ads exchange, programmatic auction with the high level of automation.

SSP (Supply / Sell Side platform) are the special technologies, which make possible to take part in selling ad place, and do it as much expensive as possible.

DSP (Demand Side Platform) are the systems, which operate in parallel with SSP, advertising networks (Ad Networks), advertising exchanges (Ad Exchanges) and perform data exchange for the benefit of an advertiser.

Trading desk is the service, which performs digital media trade.

Ad server is a software, which is used for the direct ad placing on sites ( ad zones), transfers banners to publisher's zones, counts the number of ad shows, uses algorithms, can work separately, or with Ad Exchange and act as SSP or DSP or both.

Every of the mentioned systems has data about a user, and can create user data datastore, DMP is Data Management platform, or, if it is needed, some other DMP services can be used.

This system is quite big data store, which should respond immediately to data request based on a user's id. Due to the amount of data is available to use the data mining methods can be applied.

DMP contains the following stages:
1.      Data collection which is a collection of all data about a user.
2.      Data classification is data separation into classes, taxonomies.
3.      Data analysis is getting unexpected dependencies and models.
4.      Data circulation is sending data to 3-d party DMP systems, and getting data from them (synchronization process – e.g. data sharing)
5.      Scaling makes system to be resistant to huge loads because of big amount of data about users and due to 3-d party DMP connection.

The topicality of the given project is in prognostication, analysis and matching or in ad process processing algorithms creation, and the analysis of the entire system data to foresee behavior and on load work dependencies.

One of the most important characteristics is a user interests analysis in order to increase the matching algorithms efficiency for each view. The network data analysis allows to find factors which make system worse and to give possibility for system users to see these reports graphically in real time, or as close to real time as it is possible.

The given system should be based on modern data analysis methods, operate with big amount of data; give its users possibility to see system metrics for its work analysis, and to increase the efficiency of ad network.