

OpenRTB API Specification Version 2.2

April 2014

Introduction

The RTB Project, formerly known as the OpenRTB Consortium, assembled in November 2010 to develop a new API specification for companies interested in an open protocol for the automated trading of digital media across a broader range of platforms, devices, and advertising solutions. This document is the culmination of those efforts.

About the IAB's Networks & Exchanges Committee:

The IAB Networks & Exchanges Committee is comprised of senior leaders of ad networks and ad exchanges member companies. The committee is dedicated to furthering the interests of digital ecosystem in today's complex ad marketplace. Committee objectives are to foster the highest standards of professionalism and accountability in relationships with publishers, advertisers, intermediaries, and the agency community, to develop programs that enable revenue growth, and to create best practices that protect consumers and the industry.

The RTB Project is a working group within the IAB Advertising Technology Council.

This document can be found at www.iab.net

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Before You Get Started

This specification contains a very detailed explanation of a real-time bidding interface. Not all objects are required, and each object may contain a number of optional parameters. To assist a first time reader of the specification, we have indicated which fields are essential to support a minimum viable real time bidding interface for various scenarios (banner, video, mobile, etc.).

A minimal viable interface should include the **required** and **recommended** parameters, but the scope for these parameters may be limited to specific scenarios. In these cases, the scope will be qualified with the applicable scenarios (e.g., **required for video impressions** and **recommended for native apps**). Conversely, if the scope is not qualified, it applies to all scenarios.

Optional parameters may be included to ensure maximum value is derived by the parties.

| | Field | Scope | Type | Default | Description |
|---|----------------|------------------------------------|-------------------------|---------|--|
| Required parameters <u>must</u> be included. | <u>id</u> | required | <u>string</u> | - | Unique ID of the bid request, provided by the exchange. |
| | <u>version</u> | required | <u>string</u> | - | Open RTB version |
| | <u>imp</u> | required | <u>array of objects</u> | - | Array of impression objects. Multiple impression auctions may be specified in a single bid request. At least one impression is required for a valid bid request. |
| Recommended parameters <u>should</u> be included unless there is a compelling reason to omit them. | <u>site</u> | recommended for websites | <u>object</u> | - | See Site Object |
| | <u>app</u> | recommended for native apps | <u>object</u> | - | See App Object |
| | <u>device</u> | recommended | <u>object</u> | - | See Device Object |
| | <u>user</u> | recommended | <u>object</u> | - | See User Object |
| Optional parameters <u>may</u> be included at your discretion. | <u>at</u> | <u>optional</u> | <u>string</u> | 2 | Auction Type. If "1", then first price auction. If "2", then second price auction. Additional auction types can be defined as per the exchange's business rules. |
| | <u>tmax</u> | <u>optional</u> | <u>integer</u> | - | Maximum amount of time in milliseconds to submit a |

IMPORTANT: Since **recommended** parameters are not required, they may not be available from all supply sources. It is suggested that all parties to OpenRTB transaction complete the integration checklist on the next page to identify which parameters the supply side supports in the bid request, and which parameters the demand side requires for ad decisioning.

Integration Checklist

- ☐ **[Company Name]** is a **supply source**, and these are the objects/parameters **supported** in the bid request
- ☐ **[Company Name]** is a **demand source**, and these are the objects/parameters **required** for ad decisioning

Supported Scenarios:

| In-Browser: | In-App (typically mobile): | Other: |
|----------------------------------|----------------------------------|--|
| <input type="checkbox"/> Banners | <input type="checkbox"/> Banners | <input type="checkbox"/> Please Specify: |
| <input type="checkbox"/> Video | <input type="checkbox"/> Video | |

Supported Objects/Parameters:

| Object Name | Supported? | List Recommended Parameters NOT Supported | List Optional Parameters Supported |
|--------------------|-------------------------------------|--|------------------------------------|
| Bid Request Object | <input checked="" type="checkbox"/> | | |
| Impression Object | <input checked="" type="checkbox"/> | | |
| Banner Object | <input type="checkbox"/> | | |
| Video Object | <input type="checkbox"/> | | |
| Site Object | <input type="checkbox"/> | | |
| App Object | <input type="checkbox"/> | | |
| Content Object | <input type="checkbox"/> | | |
| Device Object | <input type="checkbox"/> | | |
| User Object | <input type="checkbox"/> | | |
| Publisher Object | <input type="checkbox"/> | | |
| Producer Object | <input type="checkbox"/> | | |
| Geo Object | <input type="checkbox"/> | | |
| Data Object | <input type="checkbox"/> | | |
| Segment Object | <input type="checkbox"/> | | |

1 Introduction

1.1 Mission / Overview

The mission of the OpenRTB project is to spur greater growth in the Real-Time Bidding (RTB) marketplace by providing open industry standards for communication between buyers of advertising and sellers of publisher inventory. There are several aspects to these standards including but not limited to the actual real-time bidding protocol, information taxonomies, offline configuration synchronization, and many more.

This document specifies a standard for the Real-Time Bidding Interface that has grown out of previous OpenRTB collaboration on the “blocklist project” and the “OpenRTB Mobile Project. These protocol standards aim to simplify the connection between suppliers of publisher inventory (i.e., exchanges, networks working with publishers, and sell-side platforms) and competitive buyers of that inventory (i.e., bidders, demand side platforms, or networks working with advertisers).

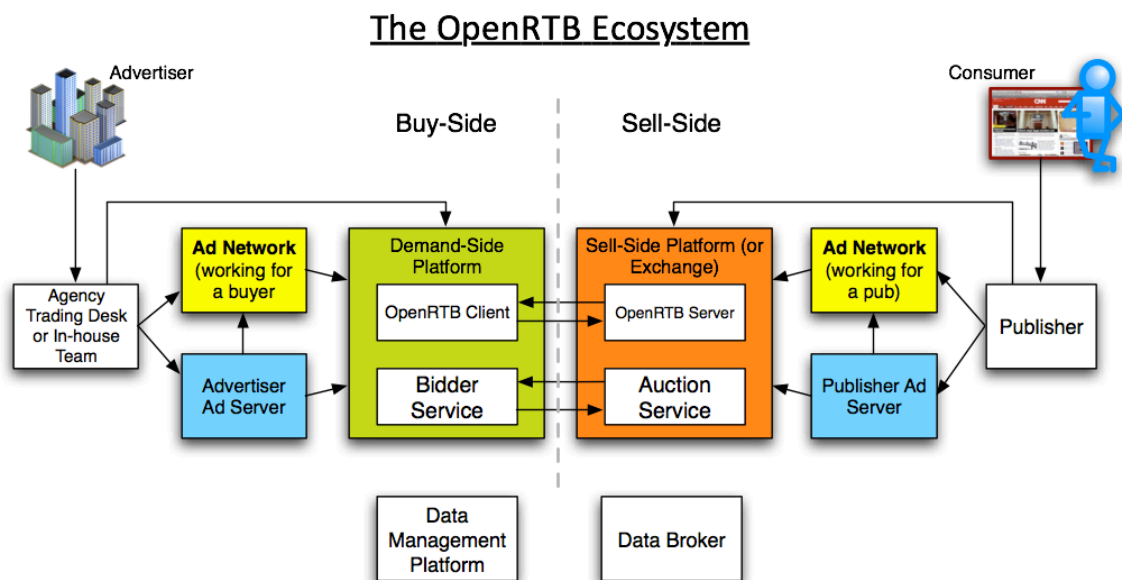


Figure 1: High-level communications diagram between parties in the Open RTB Ecosystem. OpenRTB supports both "offline" batch synchronization of information and "online" real-time synchronization.

The protocols outlined in this document should be considered guidelines, not absolute rules. The overall goal of OpenRTB is to create a *lingua franca* for communicating between buyers and sellers. The intent is **not** to regulate exactly how each business operates. As a project, we aim to make integration between parties easier, so that innovation can happen at a deeper-level at each of the businesses in the ecosystem.

1.2 Credits / Project History

OpenRTB was launched as a pilot project between three demand-side platforms (DataXu, MediaMath, Turn) and three sell-side platforms (Admeld, PubMatic, and the Rubicon Project) in November 2010. The first goal was to standardize communication between parties for exchanging blocklists. Version 1.0 of the OpenRTB blocklist specification was released in December 2010.

After a positive response from the industry, Nexage, Inc. approached the OpenRTB project with a proposal to create an API specification for OpenRTB for mobile advertising. The mobile subcommittee was formed between companies representing the buy-side (DataXu, Fiksu, and [X+1]) and companies representing the sell-side (Nexage, Pubmatic, and Smaato). This project resulted in the OpenRTB for mobile specification 1.0 that was released in February 2011.

Following the release of the mobile specification, a video subcommittee was formed with video ad exchanges (BrightRoll and Adap.tv) collaborating with DataXu and ContextWeb to incorporate support for video. The goal was to incorporate support for display, video and mobile in one document. This effort resulted in version 2.0 of OpenRTB, which was released for comment on June 30, 2011. As of June 30th, over 80 companies from the advertising technology community are participating in the project.

1.3 Resources

| Resource | Location |
|---|---|
| <i>OpenRTB Website</i> | http://openrtb.info |
| <i>OpenRTB Project Page</i> | http://github.com/openrtb/OpenRTB/ |
| <i>User Mailing List</i> | http://groups.google.com/group/openrtb-user |
| <i>Developer / Product Manager Mailing List</i> | http://groups.google.com/group/openrtb-dev |

1.4 Version History

OpenRTB Display BlockList Branch:

- 1.0 – Original Release of OpenRTB blocklist specifications
- 1.1 – Minor edits to include real-time exchange of creative attributes
- 1.2 – (proposed) Publisher Preferences API doc

OpenRTB Real-Time Bidding API

- 1.0 – Original Release of OpenRTB Mobile API
- 1.9 – Draft release, including display, mobile, and video in a single specification
- 2.0 – Combines display, mobile, and video standards into a single specification
- 2.1 – Fully backward compatible revisions for QAG Compliance and bugs
- 2.2 – New enhancements for Private Marketplaces via Deal ID, Video, Mobile, and regulatory signals.

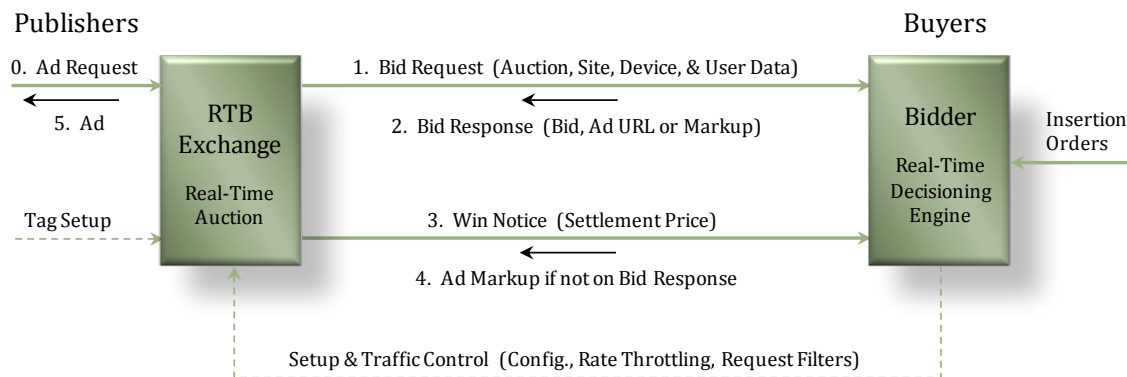
1.5 Terminology

The following terms are used throughout this document specifically in the context of the OpenRTB Interface and this specification.

| Term | Definition |
|------------------|---|
| <i>RTB</i> | Bidding for individual impressions in real-time (i.e., while a consumer is waiting). |
| <i>Exchange</i> | A service that conducts an auction among bidders per impression. |
| <i>Bidder</i> | An entity that competes in real-time auctions to acquire impressions. |
| <i>Seat</i> | An entity that wishes to obtain impressions and uses bidders to act on their behalf. |
| <i>Publisher</i> | An entity that operates one or more sites. |
| <i>Site</i> | Ad supported content including web and applications unless otherwise specified. |
| <i>DealID</i> | An identifier representing a pre-arranged agreement between a Publisher and a Seat to purchase impressions. |

2 RTB Basics

The following figure illustrates the OpenRTB interactions between an exchange and its bidders. Ad requests originate at publisher sites. For each inbound ad request, bid requests are broadcast to bidders, responses are evaluated under prevailing auction rules, the winner is notified, and ad markup is returned. This specification focuses on the real-time interactions of bid request and response and the win notice and response. Other interactions (e.g., block list synchronization, traffic control) are candidates for future initiatives or are already defined by OpenRTB.



2.1 Transport

The base protocol between an exchange and its bidder is HTTP. Specifically, HTTP POST is required for bid requests to accommodate greater payloads than HTTP GET and facilitate the use of binary representations. Win notices may be either HTTP POST or HTTP GET at the discretion of the exchange. All calls should return HTTP code 200 except for an empty bid response (i.e., the recommended method of specifying “no bid”), which should return HTTP code 204.

BEST PRACTICE: One of the simplest and most effective ways of improving connection performance is to enable HTTP Persistent Connections, also known as HTTP Keep-Alive. This has a profound impact on overall performance by reducing connection management overhead as well as CPU utilization on both sides of the interface.

2.2 Security

SSL (Secure Sockets Layer) is not required for compliance since these are server-to-server calls, which can be protected in other ways. Furthermore, SSL is not recommended due to the additional processing overhead.

2.3 Data Format

JSON (JavaScript Object Notation) is the suggested format for bid request and bid response data payloads. JSON was chosen for its combination of human readability and compactness. The data payloads are described in section 3 and section 4.

An exchange may offer additional representations to bidders who may prefer them. These might include a compressed form of JSON, XML, Apache Avro, ProtoBuf, Thrift, and many others.

The bid request specifies the representation as a mime type using the Content-Type HTTP header. The mime type for the standard JSON representation is “application/json” as shown. The format of the bid response must be the same as the bid request.

```
Content-Type: application/json
```

If alternative binary representations are used, the exchange or SSP should specify the Content-Type appropriately. For example: “Content-Type: avro/binary” or “Content-Type: application/x-protobuf”. If the content-type is missing, the bidder should assume the type is application/json, unless a different default has been selected by an exchange.

As a convention, the absence of an attribute has a formal meaning. In most cases, this indicates that the value is unknown, unless otherwise specified.

2.4 OpenRTB Version HTTP Header

The OpenRTB Version should be passed in the header of a bid request with a custom header parameter. This will allow bidders to recognize the version of the message contained before attempting to parse the request.

Additionally it is recommended (yet optional) that bidders place an identically formatted message in the HTTP header of the response with the protocol version the bidder has implemented. The message may contain a different version number than the request header.

```
x-openrtb-version: 2.2
```

This version should be specified as major.minor, for example: 2.0 or 2.1. First or second level increments on the version are changes to the protocol. In general, second-level changes should be backwards compatible, whereas first level changes need not be backwards compatible. Any third level revisions (such as 2.0.1) should not change the protocol itself, only descriptions and notes that don't affect the protocol content. Third level versions should not be included in this header.

2.5 Privacy by Design

The OpenRTB project fully supports privacy policies as specified by buyers and sellers of advertising. In particular OpenRTB supports do-not-track headers, and the ability to pass user preferences from sellers to buyers through the User Object (see Section 3.3.12).

2.6 Relationship to IAB Quality Assurance Guidelines

OpenRTB is fully compatible with the IAB Quality Assurance Guidelines (QAG) available here: http://www.iab.net/ne_guidelines. In particular the taxonomies used in this specification are derived from the QAG.

2.7 Customization and Extensions

The OpenRTB spec allows for exchange specific customization and extensions of the specification.. Any object may contain extensions. In order to keep extension fields consistent across platforms, they should consistently be named 'ext'.

3 Bid Request Details

RTB transactions are initiated when an exchange or other supply source sends a bid request to a bidder. The bid request consists of a bid request object, at least one impression object, and may optionally include additional objects providing impression context.

3.1 Object List

Following is the object list for the bid request. Click on the object name to jump to the object definition.

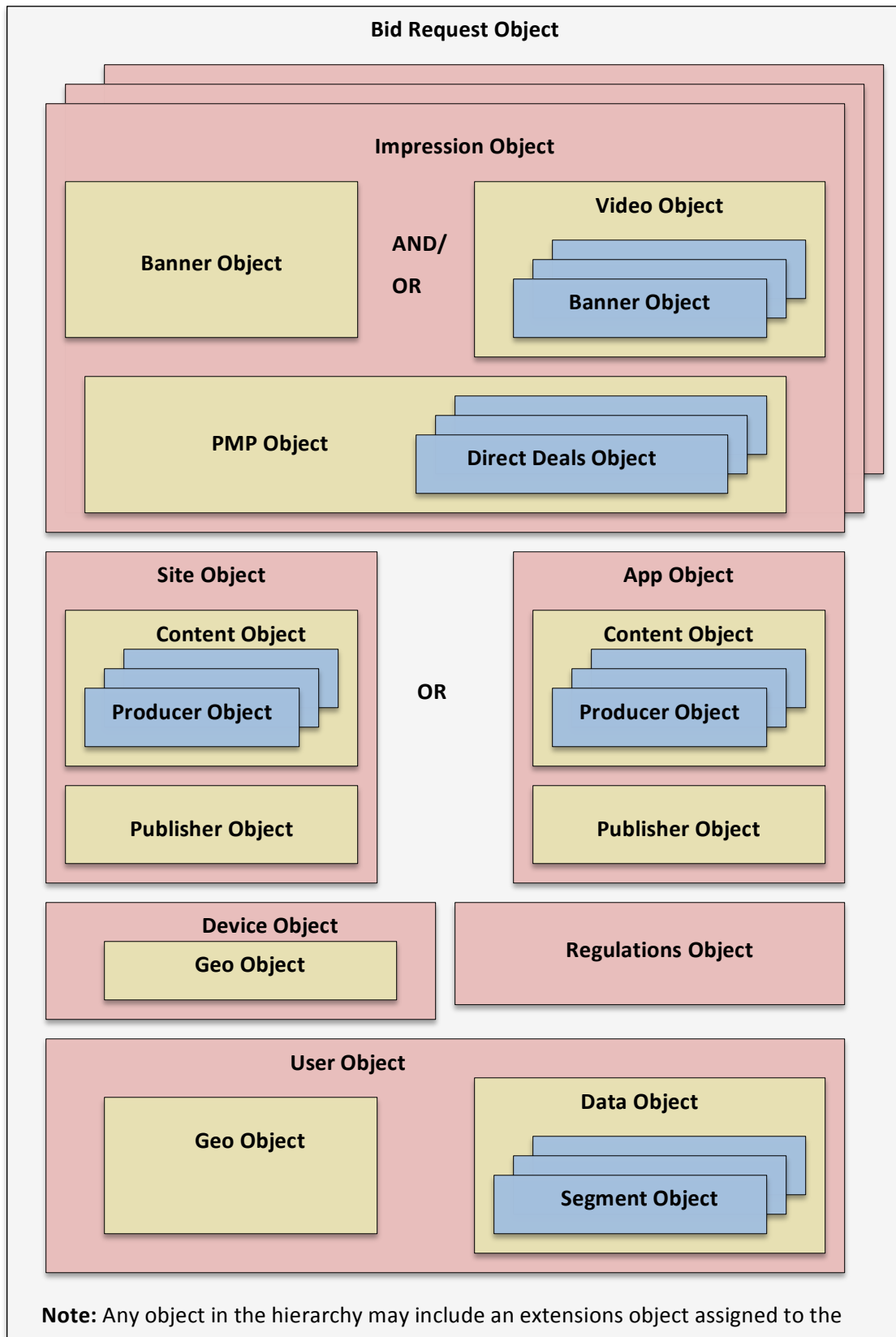
| Object Name | Scope | Notes |
|------------------------------------|--|--|
| Bid Request Object | required | Top-level object. |
| Impression Object | required | At least one impression object is required in a bid request object. |
| Banner Object | required for banner impressions | <p>A banner object typically describes an ad opportunity for banner, rich media or in-banner video inventory.</p> <p>IMPORTANT: An impression object must include a banner or a video object, but it may include both. In most cases, only one object type will be included (depending on whether the ad opportunity is for banner or in-stream video inventory). However, some publisher implementations may represent the same impression as both banner and video inventory. In this case, the inventory is represented by both a banner and a video object. It is expected that each bid within a response will only pertain to one object type (i.e., the bid response should either be for the inventory described by the banner object or the video object, not both).</p> |
| Video Object | required for video impressions | <p>A video object typically describes an ad opportunity for in-stream video inventory (including linear pre-roll, mid-roll and post-roll, and non-linear overlays). Please note, in-banner video is typically represented by the banner object.</p> <p>IMPORTANT: An impression object must include a banner or a video object, but it may include both. In most cases, only one object type will be included (depending on whether the ad</p> |

| | | |
|-------------------------|------------------------------------|--|
| | | <p>opportunity is for banner or in-stream video inventory). However, some publisher implementations may represent the same impression as both banner and video inventory. In this case, the inventory is represented by both a banner and a video object. It is expected that each bid within a response will only pertain to one object type (i.e., the bid response should either be for the inventory described by the banner object or the video object, not both).</p> |
| Site Object | recommended for websites | Either a site or app object may be included – not both. Neither is required. |
| App Object | recommended for native apps | Either a site or app object may be included – not both. Neither is required. |
| Content Object | recommended | This object describes the content of a site or app, depending on which object it is embedded in. |
| Device Object | recommended | This object describes the device the ad impression will be delivered to (e.g., mobile phone, computer, set top box, etc.) and its capabilities (e.g., flash support). |
| User Object | recommended | This object describes the user, and may include unique identifiers for the user. |
| Publisher Object | optional | This object describes the publisher of a site or app, depending on which object it is embedded in. |
| Producer Object | optional | This object describes the producer of content object, which might be different from the publisher of the content of the page. This object is useful in the case of syndicated content, such as embedded videos, for example. |
| Geo Object | optional | Depending on the parent object, this object describes the current geographic location of the device (e.g., based on IP address or GPS), or it may describe the home geo of the user (e.g., based on registration data). |
| Data Object | optional | The data object is a child of the user object and describes a data source. Once segment objects are embedded, data about the user may be passed to bidders. |

| | | |
|---------------------------|----------|---|
| Segment Object | optional | The segment object is a child of the data object, and describes data segments applicable to the user for the given data provider. |
| Regulations Object | optional | This object describes any legal, governmental or industry regulations governing the request. |
| PMP Object | optional | This object conveys a private marketplace of deals struck between buyers and sellers. |
| Direct Deal Object | optional | This object constitutes a deal struck <i>a priori</i> between a buyer and a seller and indicates that this impression is available under the terms of that deal. |
| Extensions | Optional | <p>This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification.</p> <p>Any object may contain extensions. In order to keep extension fields consistent across platforms, they should consistently be named 'ext'.</p> |

3.2 Object Hierarchy

Following is the object hierarchy for a bid request.



IMPORTANT: An impression object must include a banner or a video object, but it may include both. **In most cases, only one object type will be included** (depending on whether the ad opportunity is for banner or in-stream video inventory). However, some publisher implementations may represent the same impression as both banner and video inventory. In this case, the inventory is represented by both a banner and a video object. **It is expected that each bid within a response will only pertain to one object type** (i.e., the bid response should either be for the inventory described by the banner object or the video object, not both). See section 3.1 for more information about the objects.

3.3 Object Definitions

Following are definitions of the various objects involved in a bid request.

3.3.1 Bid Request Object

The top-level bid request object contains a globally unique bid request or auction ID. This “id” attribute is required as is at least one “imp” (i.e., impression) object. Other attributes are optional since an exchange may establish default values.

The **Default** column dictates how optional parameters should be interpreted if explicit values are not provided.

| Field | Scope | Type | Default | Description |
|---------------|------------------------------------|------------------|---------|--|
| <i>id</i> | required | string | - | Unique ID of the bid request, provided by the exchange. |
| <i>imp</i> | required | array of objects | - | Array of impression objects. Multiple impression auctions may be specified in a single bid request. At least one impression is required for a valid bid request. |
| <i>site</i> | recommended for websites | object | - | See Site Object |
| <i>app</i> | recommended for native apps | object | - | See App Object |
| <i>device</i> | recommended | object | - | See Device Object |
| <i>user</i> | recommended | object | - | See User Object |

| | | | | |
|----------------|----------|------------------|---|---|
| <i>at</i> | optional | int | 2 | Auction Type. If “1”, then first price auction. If “2”, then second price auction. Additional auction types can be defined as per the exchange’s business rules. Exchange specific rules should be numbered over 500. |
| <i>tmax</i> | optional | integer | - | Maximum amount of time in milliseconds to submit a bid (e.g., 120 means the bidder has 120ms to submit a bid before the auction is complete). If this value never changes across an exchange, then the exchange can supply this information offline. |
| <i>wseat</i> | optional | array of strings | - | Array of buyer seats allowed to bid on this auction. Seats are an optional feature of exchange. For example, [“4”, “34”, “82”, “A45”] indicates that only advertisers using these exchange seats are allowed to bid on the impressions in this auction. |
| <i>allimps</i> | optional | integer | 0 | Flag to indicate whether Exchange can verify that all impressions offered represent all of the impressions available in context (e.g., all impressions available on the web page; all impressions available for a video [pre, mid and postroll spots], etc.) to support road-blocking. A true value should only be passed if the exchange is aware of all impressions in context for the publisher. “0” means the exchange cannot verify, and “1” means that all impressions represent all impressions available. |
| <i>cur</i> | optional | array of strings | | Array of allowed currencies for bids on this bid request using ISO-4217 alphabetic codes. If |

| | | | | |
|-------------|----------|------------------|---|--|
| | | | | only one currency is used by the exchange, this parameter is not required. |
| <i>bcat</i> | optional | array of strings | - | Blocked Advertiser Categories. Note that there is no existing categorization / taxonomy of advertiser industries. However, as a substitute exchanges may decide to use IAB categories as an approximation (See Table 6.1 Content Categories) |
| <i>badv</i> | optional | array of strings | - | Array of strings of blocked top-level domains of advertisers. For example, {"company1.com", "company2.com"}. |
| <i>regs</i> | optional | object | - | This object is a container for any legal, governmental or industry regulations in force for the request. |
| <i>ext</i> | optional | object | - | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.2 Impression Object

The "imp" object describes the ad position or impression being auctioned. A single bid request can include multiple "imp" objects, a use case for which might be an exchange that supports selling all ad positions on a given page as a bundle. Each "imp" object has a required ID so that bids can reference them individually. An exchange can also conduct private auctions by restricting involvement to specific subsets of seats within bidders.

The **Default** column dictates how optional parameters should be interpreted if explicit values are not provided.

| Field | Scope | Type | Default | Description |
|-----------|-----------------|--------|---------|---|
| <i>id</i> | required | string | - | A unique identifier for this impression within the context of the bid request (typically, value starts with 1, and increments up to n for n |

| | | | | |
|--------------------------|--|---------|-----|---|
| | | | | impressions). |
| <i>banner</i> | required for banner impressions | object | - | A reference to a banner object. Either a banner or video object (or both if the impression could be either) must be included in an impression object. See Banner Object. |
| <i>video</i> | required for video impressions | object | - | A reference to a video object. Either a banner or video object (or both if the impression could be either) must be included in an impression object. See Video Object. |
| <i>displaymanager</i> | recommended for video and native apps | string | - | Name of ad mediation partner, SDK technology, or native player responsible for rendering ad (typically video or mobile). Used by some ad servers to customize ad code by partner. |
| <i>displaymanagerver</i> | recommended for video and native apps | string | - | Version of ad mediation partner, SDK technology, or native player responsible for rendering ad (typically video or mobile). Used by some ad servers to customize ad code by partner |
| <i>instl</i> | optional | integer | 0 | 1 if the ad is interstitial or full screen; else 0 (i.e., no). |
| <i>tagid</i> | optional | string | | Identifier for specific ad placement or ad tag that was used to initiate the auction. This can be useful for debugging of any issues, or for optimization by the buyer. |
| <i>bidfloor</i> | optional | float | 0 | Bid floor for this impression (in CPM of bidfloorcur). |
| <i>bidfloorcur</i> | optional | string | USD | If bid floor is specified and multiple currencies supported per bid request, then currency should be specified here using ISO-4217 alphabetic codes. Note, this may be different |

| | | | | |
|---------------------|----------|-----------------|------|---|
| | | | | from bid currency returned by bidder, if this is allowed on an exchange. |
| <i>secure</i> | optional | int | | Flag to indicate whether the impression requires secure HTTPS URL creative assets and markup. A value of "1" means that the impression requires secure assets. A value of "0" means non-secure assets. If this field is omitted the bidder should interpret the secure state is unknown and assume HTTP is supported. |
| <i>iframebuster</i> | optional | array of string | None | Array of names for supported iframe busters. Exchange specific. |
| <i>pmp</i> | optional | object | | A reference to the PMP object containing any Deals eligible for the impression object. See the PMP object definition. |
| <i>ext</i> | optional | object | - | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.3 Banner Object

The "banner" object must be included directly in the impression object if the impression offered for auction is display or rich media, or it may be optionally embedded in the video object to describe the companion banners available for the linear or non-linear video ad. The banner object may include a unique identifier; this can be useful if these IDs can be leveraged in the VAST response to dictate placement of the companion creatives when multiple companion ad opportunities of the same size are available on a page.

The **Default** column indicates how optional parameters should be interpreted if explicit values are not provided.

| Field | Scope | Type | Default | Description |
|-------------|--------------------|---------|---------|---|
| <i>w</i> | recommended | integer | - | Width of the impression in pixels. Since some ad types are not restricted by size this field is not required, but it's highly recommended that this information be included when possible. |
| <i>h</i> | recommended | integer | - | Height of the impression in pixels. Since some ad types are not restricted by size this field is not required, but it's highly recommended that this information be included when possible. |
| <i>wmax</i> | optional | integer | | Maximum width of the impression in pixels. If included, it indicates that a range of sizes is allowed with this maximum width and "w" is taken as recommended. If not included, then "w" should be considered an exact requirement |
| <i>hmax</i> | optional | integer | | Maximum height of the impression in pixels. If included, it indicates that a range of sizes is allowed with this maximum height and "h" is taken as recommended. If not included, then "h" should be considered an exact requirement. |
| <i>wmin</i> | optional | integer | - | Minimum width of the impression in pixels. If included, it indicates that a range of sizes is allowed with this minimum width and "w" is taken as recommended. If not included, then "w" should be considered an exact requirement. |
| <i>hmin</i> | optional | integer | | Minimum height of the impression in pixels. If included, it indicates that a range of sizes is allowed with this minimum height and "h" is taken as recommended. If not included, then "h" should be considered an exact requirement. |

| | | | | |
|-----------------|---|-------------------|-----------------------|---|
| <i>id</i> | recommended when subordinate to a video object | string | - | Unique identifier for this banner object. Useful for tracking multiple banner objects (e.g., in companion banner array). Usually starts with 1, increasing with each object. Combination of impression id banner object should be unique. |
| <i>pos</i> | optional | integer | - | Ad Position. Use Table 6.5 |
| <i>btype</i> | optional | array of integers | All types are allowed | Blocked creative types. See Table 6.2 Banner Ad Types. If blank, assume all types are allowed. |
| <i>battr</i> | optional | array of integers | All types are allowed | Blocked creative attributes. See Table 6.3 Creative Attributes. If blank assume all types are allowed. |
| <i>mimes</i> | optional | array of strings | All types are allowed | Whitelist of content MIME types supported. Popular MIME types include, but are not limited to “image/jpg”, “image/gif” and “application/x-shockwave-flash”. |
| <i>topframe</i> | optional | integer | 0 | Specify if the banner is delivered in the top frame or in an iframe. “0” means it is not in the top frame, and “1” means that it is. |
| <i>expdir</i> | optional | array of integers | Not expandable | Specify properties for an expandable ad. See Table 6.11 Expandable Direction for possible values. |
| <i>api</i> | optional | array of integers | None | List of supported API frameworks for this banner. (See Table 6.4 API Frameworks). If an API is not explicitly listed it is assumed not to be supported. |
| <i>ext</i> | optional | object | - | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.4 Video Object

The “video” object must be included directly in the impression object if the impression offered for auction is an in-stream video ad opportunity.

The **Default** column indicates how optional parameters should be interpreted if explicit values are not provided.

Note that for the video object, many of the fields are non-essential for a minimally viable exchange interfaces. These parameters do not necessarily need to be specified to the bidder, if they are always the same for all impression, or if the exchange chooses not to supply the additional information to the bidder.

| Field | Scope | Type | Default | Description |
|--------------------|--------------------|-------------------|---------|--|
| <i>mimes</i> | required | array of strings | - | Content MIME types supported. Popular MIME types include, but are not limited to “video/x-ms-wmv” for Windows Media, and “video/x-flv” for Flash Video. |
| <i>minduration</i> | required | integer | - | Minimum video ad duration in seconds |
| <i>maxduration</i> | required | integer | - | Maximum video ad duration in seconds |
| <i>protocol</i> | optional | integer | - | <p>Video bid response protocols. See Table 6.7 Video Bid Response Protocols for a list of possible values. <i>NOTE: Use “protocols” when multiple protocols are supported. Its use is also highly recommended even for one since this “protocol” attribute is likely to be deprecated in a future version.</i></p> <p>At least one supported protocol must be specified in either the “protocol” or “protocols” attribute.</p> |
| <i>protocols</i> | recommended | array of integers | | <p>Video bid response protocols. See Table 6.7 Video Bid Response Protocols for a list of possible values.</p> <p>At least one supported protocol must be specified in either the “protocol” or “protocols” attribute.</p> |
| <i>w</i> | recommended | integer | - | Width of the player in pixels. This field is not required, but it’s highly recommended that this information be included. |
| <i>h</i> | recommended | integer | - | Height of the player in pixels. This field is not required, but it’s highly recommended that this information be included. |
| <i>startdelay</i> | recommended | integer | - | Indicates the start delay in seconds for preroll, midroll, or |

| | | | | |
|----------------------|----------|-------------------|------------------------------|--|
| | | | | postroll ad placement. See Table 6.9 Video Start Delay for generic placement values. |
| <i>linearity</i> | optional | integer | - | Indicates whether the ad impression must be linear, non-linear or can be of any type (field not set). See Table 6.6 Video Linearity for a list of the possible values and recommended bidder interpretation. |
| <i>sequence</i> | optional | integer | 1 | If multiple ad impressions are offered in the same bid request, the sequence number will allow for the coordinated delivery of multiple creatives. |
| <i>battr</i> | optional | array of integers | Assume all types are allowed | Blocked creative attributes. See Table 6.3 Creative Attributes. If blank assume all types are allowed. |
| <i>maxextended</i> | optional | integer | Extension not allowed | Maximum extended video ad duration, if extension is allowed. If blank or 0, extension is not allowed. If -1, extension is allowed, and there is no time limit imposed. If greater than 0, then the value represents the number of seconds of extended play supported beyond the maxduration value. |
| <i>minbitrate</i> | optional | integer | Any bitrate accepted | Minimum bit rate in Kbps. Exchange may set this dynamically, or universally across their set of publishers. |
| <i>maxbitrate</i> | optional | integer | Any bitrate accepted | Maximum bit rate in Kbps. Exchange may set this dynamically, or universally across their set of publishers. |
| <i>boxingallowed</i> | optional | integer | 1 | If exchange publisher has rules preventing letter boxing of 4x3 content to play in a 16x9 window, then this should be set to false. Default setting is true, which assumes that boxing of |

| | | | | |
|-----------------------|----------|-------------------|---------------|--|
| | | | | content to fit into a window is allowed. "1" indicates boxing is allowed. "0" indicates it is not allowed. |
| <i>playbackmethod</i> | optional | array of integers | All | List of allowed playback methods. If blank, assume that all are allowed. See Table 6.8 Video Playback Methods for a list of possible values. |
| <i>delivery</i> | optional | array of integers | All | List of supported delivery methods (streaming, progressive). If blank, assume all are supported. See Table 6.12 Content Delivery Methods for a list of possible values. |
| <i>pos</i> | optional | integer | Unknown | Ad Position (see table 6.5) |
| <i>companionad</i> | optional | array of objects | Not available | If companion ads are available, they can be listed as an array of banner objects. See Banner Object. |
| <i>api</i> | optional | array of integers | Assume None | List of supported API frameworks for this impression. (See Table 6.4 API Frameworks). If an API is not explicitly listed it is assumed not to be supported. |
| <i>companiontype</i> | optional | array of integers | - | Recommended if companion objects are included. See Table 6.17 VAST Companion Types for a list of possible values. |
| <i>ext</i> | optional | object | - | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.5 Site Object

A site object should be included if the ad supported content is part of a website (as opposed to an application). **A bid request must not contain both a site object and an app object.**

The site object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown. At a minimum, it's useful to provide a page URL or a site ID, but this is not strictly required.

| Field | Scope | Type | Description |
|----------------------|-------------|------------------|---|
| <i>id</i> | recommended | string | Site ID on the exchange. |
| <i>name</i> | optional | string | Site name (may be masked at publisher's request). |
| <i>domain</i> | optional | string | Domain of the site, used for advertiser side blocking. For example, "foo.com". |
| <i>cat</i> | optional | array of strings | Array of IAB content categories for the overall site. See Table 6.1 Content Categories. |
| <i>sectioncat</i> | optional | array of strings | Array of IAB content categories for the current subsection of the site. See Table 6.1 Content Categories. |
| <i>pagecat</i> | optional | array of strings | Array of IAB content categories for the current page. See Table 6.1 Content Categories. |
| <i>page</i> | recommended | string | URL of the page where the impression will be shown. |
| <i>privacypolicy</i> | optional | integer | Specifies whether the site has a privacy policy. "1" means there is a policy. "0" means there is not. |
| <i>ref</i> | optional | string | Referrer URL that caused navigation to the current page. |
| <i>search</i> | optional | string | Search string that caused navigation to the current page. |
| <i>publisher</i> | optional | object | See Publisher Object |
| <i>content</i> | optional | object | See Content Object |
| <i>keywords</i> | optional | string | List of keywords describing this site in a comma separated string. ALTERNATE Representation: Array of strings. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined |

3.3.6 App Object

An “app” object should be included if the ad supported content is part of a mobile application (as opposed to a mobile website). **A bid request must not contain both an “app” object and a “site” object.**

The app object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown. At a minimum, it’s useful to provide an App ID or bundle, but this is not strictly required.

| Field | Scope | Type | Description |
|----------------------|-------------|------------------|--|
| <i>id</i> | recommended | string | Application ID on the exchange. |
| <i>name</i> | optional | string | Application name (may be masked at publisher’s request). |
| <i>domain</i> | optional | string | Domain of the application (e.g., “mygame.foo.com”). |
| <i>cat</i> | optional | array of strings | Array of IAB content categories for the overall application. See Table 6.1 Content Categories. |
| <i>sectioncat</i> | optional | array of strings | Array of IAB content categories for the current subsection of the app. See Table 6.1 Content Categories. |
| <i>pagecat</i> | optional | array of strings | Array of IAB content categories for the current page/view of the app. See Table 6.1 Content Categories. |
| <i>ver</i> | optional | string | Application version. |
| <i>bundle</i> | recommended | string | Application bundle or package name (e.g., com.foo.mygame). This is intended to be a unique ID across multiple exchanges. |
| <i>privacypolicy</i> | optional | integer | Specifies whether the app has a privacy policy. “1” means there is a policy and “0” means there is not. |
| <i>paid</i> | optional | integer | “1” if the application is a paid version; else “0” (i.e., free). |
| <i>publisher</i> | optional | object | See Publisher Object |
| <i>content</i> | optional | object | See Content Object |
| <i>keywords</i> | optional | string | List of keywords describing this app in a comma separated string. ALTERNATE |

| | | | Representation: Array of strings. |
|-----------------|----------|--------|---|
| <i>storeurl</i> | optional | string | For QAG 1.5 compliance, an app store URL for an installed app should be passed in the bid request. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in the specification. |

3.3.7 Content Object

The content object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown. This object describes the content in which the impression will appear (may be syndicated or non-syndicated content).

This object may be useful in the situation where syndicated content contains impressions and does not necessarily match the publisher's general content. The exchange might or might not have knowledge of the page where the content is running, as a result of the syndication method. (For example, video impressions embedded in an iframe on an unknown web property or device.)

| Field | Scope | Type | Description |
|----------------|----------|---------|--|
| <i>id</i> | optional | string | ID uniquely identifying the content |
| <i>episode</i> | optional | integer | Content episode number (typically applies to video content). |
| <i>title</i> | optional | string | Content title. Video examples: "Search Committee" (television) or "A New Hope" (movie) or "Endgame" (made for web) Non-video example: "Why an Antarctic Glacier Is Melting So Quickly" (Time magazine article) |
| <i>series</i> | optional | string | Content series. Video examples: "The Office" (television) or "Star Wars" (movie) or "Arby 'N' The Chief" (made for web) Non-video example: "Ecocentric" (Time magazine blog) |

| | | | |
|---------------------------|----------|------------------|--|
| <i>season</i> | optional | string | Content season. E.g., “Season 3” (typically applies to video content). |
| <i>url</i> | optional | string | Original URL of the content, for buy-side contextualization or review |
| <i>cat</i> | optional | array of strings | Array of IAB content categories for the content. See Table 6.1 Content Categories. |
| <i>videoquality</i> | optional | integer | Video quality per the IAB’s classification. See Table 6.14 Video Quality. |
| <i>keywords</i> | optional | string | Comma separated list of keywords describing the content. ALTERNATE Representation: Array of strings. |
| <i>contentrating</i> | optional | string | Content rating (e.g., MPAA) |
| <i>userrating</i> | optional | string | User rating of the content (e.g., number of stars, likes, etc.). |
| <i>context</i> | optional | string | Specifies the type of content (game, video, text, etc.). See Table 6.13 Content Context. |
| <i>livestream</i> | optional | integer | Is content live? E.g., live video stream, live blog. “1” means content is live. “0” means it is not live. |
| <i>sourcerelationship</i> | optional | integer | 1 for “direct”; 0 for “indirect” |
| <i>producer</i> | optional | object | See Producer Object |
| <i>len</i> | optional | integer | Length of content (appropriate for video or audio) in seconds. |
| <i>qagmediarating</i> | optional | integer | Media rating of the content, per QAG guidelines. See Table 0 QAG Media Ratings for list of possible values |
| <i>embeddable</i> | optional | integer | From QAG Video Addendum. If content can be embedded (such as an embeddable video player) this value should be set to “1”. If content cannot be embedded, then this should be set to “0”. |
| <i>language</i> | optional | string | Language of the content. Use alpha-2/ISO 639-1 codes. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.8 Publisher Object

The publisher object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

| Field | Scope | Type | Description |
|---------------|--------------------|------------------|--|
| <i>id</i> | recommended | string | Publisher ID on the exchange. |
| <i>name</i> | optional | string | Publisher name (may be masked at publisher's request). |
| <i>cat</i> | optional | array of strings | Array of IAB content categories for the publisher. See Table 6.1 Content Categories. |
| <i>domain</i> | optional | string | Publisher's highest level domain name, for example "foopub.com". |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.9 Producer Object

The producer is useful when content where the ad is shown is syndicated, and may appear on a completely different publisher. The producer object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown. This object is optional, but useful if the content producer is different from the site publisher.

| Field | Scope | Type | Description |
|---------------|----------|------------------|---|
| <i>id</i> | optional | string | Content producer or originator ID. Useful if content is syndicated, and may be posted on a site using embed tags. |
| <i>name</i> | optional | string | Content producer or originator name (e.g., "Warner Bros"). |
| <i>cat</i> | optional | array of strings | Array of IAB content categories for the content producer. See Table 6.1 Content Categories. |
| <i>domain</i> | optional | string | URL of the content producer. |

| | | | |
|------------|----------|--------|--|
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |
|------------|----------|--------|--|

3.3.10 Device Object

The “device” object provides information pertaining to the device including its hardware, platform, location, and carrier. This device can refer to a mobile handset, a desktop computer, set top box or other digital device.

The device object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

In general, the most essential fields are either the IP address (to enable geo-lookup for the bidder), or providing geo information directly in the geo object.

| Field | Scope | Type | Description |
|-----------------|--|---------|--|
| <i>dnt</i> | recommended | Integer | If “0”, then do not track is set to false, if “1”, then do no track is set to true in browser. |
| <i>ua</i> | recommended | string | Browser user agent string. |
| <i>ip</i> | recommended if geo object is not supplied | string | IPv4 address closest to device. |
| <i>geo</i> | recommended if IP is not supplied | object | Geography as derived from the device’s location services (e.g., cell tower triangulation, GPS) or IP address. See Error! Reference source not found.. |
| <i>didsha1</i> | optional | string | SHA1 hashed device ID; IMEI when available, else MEID or ESN. OpenRTB’s preferred method for device ID hashing is SHA1. |
| <i>didmd5</i> | optional | string | MD5 hashed device ID; IMEI when available, else MEID or ESN. Should be interpreted as case insensitive. |
| <i>dpidsha1</i> | optional | string | SHA1 hashed platform-specific ID (e.g., Android ID or UDID for iOS). OpenRTB’s preferred method for device ID hash is SHA1. |
| <i>dpidmd5</i> | optional | string | MD5 hashed platform-specific ID (e.g., Android ID or UDID for iOS). Should be interpreted as case insensitive. |
| <i>macsha1</i> | optional | string | SHA1 hashed MAC address of the device. |
| <i>macmd5</i> | optional | string | MD5 hashed MAC address of the device. |
| <i>ipv6</i> | optional | string | IP address in IPv6. |
| <i>carrier</i> | optional | string | Carrier or ISP derived from the IP address. Should be specified using Mobile Network Code (MNC) http://en.wikipedia.org/wiki/Mobile_Network_Code |
| <i>language</i> | optional | string | Browser language; use alpha-2/ISO 639-1 codes. |
| <i>make</i> | optional | string | Device make (e.g., “Apple”). |
| <i>model</i> | optional | string | Device model (e.g., “iPhone”). |
| <i>os</i> | optional | string | Device operating system (e.g., “iOS”). |
| <i>osv</i> | optional | string | Device operating system version (e.g., “3.1.2”). |
| <i>js</i> | optional | integer | “1” if the device supports JavaScript; else “0”. |

| | | | |
|-----------------------|----------|---------|--|
| <i>connectiontype</i> | optional | integer | Return the detected data connection type for the device. See Table 6.10 Connection Type. |
| <i>devicetype</i> | optional | integer | Return the device type being used. See Table 6.16 Device Type. |
| <i>flashver</i> | optional | string | Return the Flash version detected. |
| <i>ifa</i> | optional | string | Native identifier for advertisers; an opaque ID assigned by the device or browser for use as an advertising identifier. (e.g. Apple's IFA, Android's Advertising ID, etc) |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

BEST PRACTICE: There are currently no prominent open source lists for device makes, models, operating systems, or carriers. Exchanges typically use commercial products or other proprietary lists for these attributes. Until suitable open standards are available, exchanges are highly encouraged to publish lists of their device make, model, operating system, and carrier values to bidders.

BEST PRACTICE: Proper device IP detection in mobile is not straightforward. Typically it involves starting at the left of the x-forwarded-for header, skipping private carrier networks (e.g., 10.x.x.x or 192.x.x.x), and possibly scanning for known carrier IP ranges. Exchanges are urged to research and implement this feature carefully when presenting device IP values to bidders.

3.3.11 Geo Object

The geo object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

Note that the Geo Object may appear in one or both the Device Object and the User Object. This is intentional, since the information may be derived from either a device-oriented source (such as IP geo lookup), or by user registration information (for example provided to a publisher through a user registration). If the information is in conflict, it's up to the bidder to determine which information to use.

| Field | Scope | Type | Description |
|------------|----------|-------|--|
| <i>lat</i> | optional | float | Latitude from -90 to 90. South is negative. This should only be passed if known to be accurate (For example, not the centroid of |

| | | | |
|----------------------|-------------|---------|--|
| | | | a postal code). |
| <i>lon</i> | optional | float | Longitude from -180 to 180. West is negative. This should only be passed if known to be accurate. |
| <i>country</i> | optional | string | Country using ISO-3166-1 Alpha-3. |
| <i>region</i> | optional | string | Region using ISO 3166-2. |
| <i>regionfips104</i> | optional | string | Region of a country using FIPS 10-4 notation (alternative to ISO 3166-2). |
| <i>metro</i> | optional | string | Pass the metro code (see http://code.google.com/apis/adwords/docs/appendix/metrocodes.html). Metro codes are similar to but not exactly the same as Nielsen DMAs. |
| <i>city</i> | optional | string | City using United Nations Code for Trade and Transport Locations (http://www.unece.org/cefact/locode/service/location.htm). |
| <i>zip</i> | optional | string | Zip/postal code. |
| <i>type</i> | recommended | integer | Indicate the source of the geo data (GPS, IP address, user provided). See Table 6.15 Location Type for a list of potential values. Type should be provided when lat/lon is provided. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.12 User Object

The “user” object contains information known or derived about the human user of the device. Note that the user ID is an exchange artifact (refer to the “device” object for hardware or platform derived IDs) and may be subject to rotation policies. However, this user ID must be stable long enough to serve reasonably as the basis for frequency capping.

The user object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

If device ID is used as a proxy for unique user ID, use the device object.

| Field | Scope | Type | Description |
|-------------------|-------------------------------------|------------------|---|
| <i>id</i> | recommended (or buyerid) | string | Unique consumer ID of this user on the exchange. |
| <i>buyerid</i> | recommended (or id) | string | Buyer's user ID for this user as mapped by exchange for the buyer. |
| <i>yob</i> | optional | integer | Year of birth as a 4-digit integer. |
| <i>gender</i> | optional | string | Gender as "M" male, "F" female, "O" Other. (Null indicates unknown). |
| <i>keywords</i> | optional | string | Comma separated list of keywords of consumer interests or intent. ALTERNATE Representation: Array of strings. |
| <i>customdata</i> | optional | string | If supported by the exchange, this is custom data that the bidder had stored in the exchange's cookie. The string may be in base85 cookie safe characters, and be in any format. This may useful for storing user features. Note: Proper JSON encoding must be used to include "escaped" quotation marks. |
| <i>geo</i> | optional | object | Home geo for the user (e.g., based off of registration data); this is different from the current location of the access device (that is defined by the geo object embedded in the Device Object); see Error! Reference source not found. |
| <i>data</i> | optional | array of objects | See Data Object. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.13 Data Object

The data and segment objects together allow data about the user to be passed to bidders in the bid request. This data may be from multiple sources (e.g., the exchange itself, third party providers) as specified by the data object ID field. A bid request can mix data objects from multiple providers.

The data object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

| Field | Scope | Type | Description |
|----------------|----------|------------------|--|
| <i>id</i> | optional | string | Exchange specific ID for the data provider. |
| <i>name</i> | optional | string | Data provider name. |
| <i>segment</i> | optional | array of objects | Array of segment objects. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.14 Segment Object

The data and segment objects together allow data about the user to be passed to bidders in the bid request. Segment objects convey specific units of information from the provider identified in the parent data object.

The segment object itself and all of its parameters are optional, so default values are not provided; if an optional parameter is not specified, it should be considered unknown.

| Field | Scope | Type | Description |
|--------------|----------|--------|---|
| <i>id</i> | optional | string | ID of a data provider's segment applicable to the user |
| <i>name</i> | optional | string | Name of a data provider's segment applicable to the user |
| <i>value</i> | optional | string | String representing the value of the segment. The method for transmitting this data should be negotiated offline with the data provider. For example for gender, "male", or "female", for age, "30-40") |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.15 Regulations Object

The "regs" object contains any legal, governmental, or industry regulations that apply to the request.

The first regulation added signal whether or not the request falls under the United States Federal Trade Commission’s regulations for the United States Children’s Online Privacy Protection Act (“COPPA”). See the COPPA appendix for details.

The *regs* object itself and all of its parameters are optional, so default values are not provided. If an optional parameter is not specified, it should be considered unknown.

| Field | Scope | Type | Description |
|--------------|----------|---------|--|
| <i>coppa</i> | optional | integer | Flag indicating whether or not this request falls under the COPPA regulations established by the USA FTC, where 0 = no, 1 = yes. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

3.3.16 PMP Object

The “pmp” object contains a parent object for usage within the context of private marketplaces and the use of the RTB protocol to execute Direct Deals.

| Field | Scope | Type | Description |
|------------------------|----------|------------------|---|
| <i>private_auction</i> | optional | integer | An integer flag indicating that this impression is a private auction eligible only to seats named in the Direct Deals object. (e.g., 1 = bids for this impression are restricted to the deals specified and the terms thereof; 0 = all bids are accepted) |
| <i>deals</i> | optional | array of objects | A collection of “deal” objects encapsulating a list of direct deals eligible for this impression. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

BEST PRACTICE: See Section 7.2 PMP and Direct Deals for implementation guidelines.

3.3.17 Direct Deals Object

A “deal” object constitutes a deal struck *a priori* between a buyer and a seller and indicates that this impression is available under the terms of that deal.

| Field | Scope | Type | Default | Description |
|--------------------|-----------------|------------------|---------|---|
| <i>id</i> | required | String | | A unique identifier for the direct deal. |
| <i>bidfloor</i> | optional | Float | 0 | Bid floor for this impression (in CPM of bidfloorcur). |
| <i>bidfloorcur</i> | optional | String | USD | If bid floor is specified and multiple currencies supported per bid request, then currency should be specified here using ISO-4217 alphabetic codes. Note, this may be different from bid currency returned by bidder, if this is allowed on an exchange. |
| <i>wseat</i> | optional | array of strings | - | Array of buyer seats allowed to bid on this Direct Deal. Seats are an optional feature of an exchange. For example, ["4","34","82","45"] indicates that only advertisers using these exchange seats are allowed to bid on this direct deal. |
| <i>wadomain</i> | optional | array of strings | - | Array of advertiser domains allowed to bid on this Direct Deal. For example, ["advertiser1.com","advertiser2.com"] indicates that only the listed advertisers are allowed to bid on this direct deal. |
| <i>at</i> | Optional | Integer | | Auction type. If "1", then first price auction. If "2", then second price auction. If "3", the passed bidfloor indicates the apriori agreed upon deal price. Additional auction types can be defined as per the exchange's business rules. |
| <i>ext</i> | optional | Object | - | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

BEST PRACTICE: See Section 7.2 PMP and Direct Deals for implementation guidelines.

4 Bid Response Details

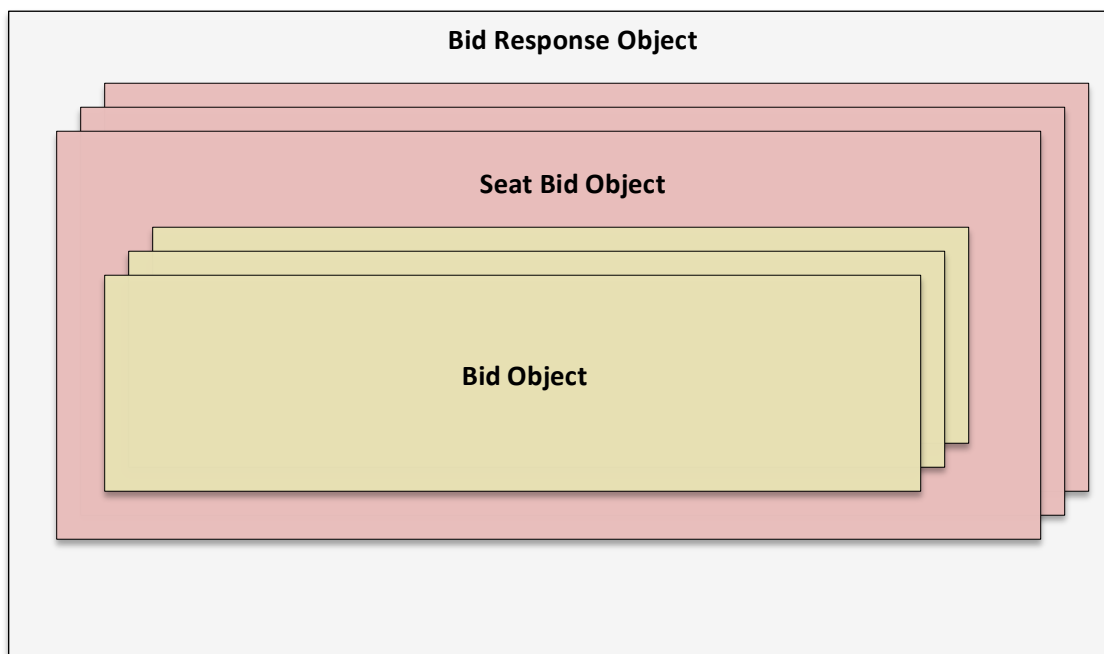
4.1 Object List

Following is the object list for the bid response:

| Object Name | Scope | Notes |
|---------------------|-----------------|---|
| <i>Bid Response</i> | required | Top-level object |
| <i>seatbid</i> | required | At least one seatbid object is required in a bid response object. |
| <i>bid</i> | required | At least one bid object is required in a bid set object. |
| <i>ext</i> | optional | <p>This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification.</p> <p>Any object may contain extensions. In order to keep extension fields consistent across platforms, they should consistently be named 'ext'.</p> |

4.2 Object Hierarchy

Following is the object hierarchy for a bid response:



Note: Any object in the hierarchy may include an extensions object assigned to the parameter **ext**

4.3 Object Definitions

Following are definitions for the bid response objects.

4.3.1 Bid Response Object

The top-level bid response object is defined below. The “id” attribute is a reflection of the bid request ID for logging purposes. Similarly, “bidid” is an optional response tracking ID for bidders. If specified, it can be included in the subsequent win notice call if the bidder wins. At least one “seatbid” object is required, which contains a bid on at least one impression. Other attributes are optional since an exchange may establish default values.

No-Bids on all impressions should be indicated as a HTTP 204 response. For no-bids on specific impressions, the bidder should omit these from the bid response.

| Field | Scope | Type | Description |
|-------------------|-----------------|------------------|--|
| <i>id</i> | required | string | ID of the bid request. |
| <i>seatbid</i> | required | array of objects | Array of seatbid objects. |
| <i>bidid</i> | optional | string | Bid response ID to assist tracking for bidders. This value is chosen by the bidder for cross-reference. |
| <i>cur</i> | optional | string | Bid currency using ISO-4217 alphabetic codes; default is “USD”. |
| <i>customdata</i> | optional | string | This is an optional feature, which allows a bidder to set data in the exchange’s cookie. The string may be in base85 cookie safe characters, and be in any format. This may be useful for storing user features. Note: Proper JSON encoding must be used to include “escaped” quotation marks. |
| <i>nbr</i> | optional | integer | Reason for not bidding. See Table 6.19 No-Bid Reason Codes. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

4.3.2 Seat Bid Object

A bid response can contain multiple “seatbid” objects, each on behalf of a different bidder seat. Since a bid request can include multiple impressions, each “seatbid” object can contain multiple bids each pertaining to a different impression on behalf of a seat. Thus, each “bid” object must include the impression ID to which it pertains as well as the bid price. The “group” attribute can be used to specify if a seat is willing to accept any impressions that it can win (default) or if it is only interested in winning any if it can win them all (i.e., all or nothing).

| Field | Scope | Type | Description |
|--------------|-----------------|------------------|--|
| <i>bid</i> | required | array of objects | Array of bid objects; each bid object relates to an imp object in the bid request. Note that, if supported by an exchange, one imp object can have many bid objects. |
| <i>seat</i> | optional | string | ID of the bidder seat on whose behalf this bid is made. |
| <i>group</i> | optional | integer | “1” means impressions must be won-lost as a group; default is “0”. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

4.3.3 Bid Object

For each bid, the “nurl” attribute contains the win notice URL. If the bidder wins the impression, the exchange calls this notice URL a) to inform the bidder of the win and b) to convey certain information using substitution macros (see Section 4.6 Substitution Macros).

The “adomain” attribute can be used to check advertiser block list compliance. The “iurl” attribute can provide a link to an image that is representative of the campaign’s content (irrespective of whether the campaign may have multiple creatives). This enables human review for spotting inappropriate content. The “cid” attribute can be used to block ads that were previously identified as inappropriate; essentially a safety net beyond the block lists. The “crid” attribute can be helpful in reporting creative issues back to bidders. Finally, the “attr” array indicates the creative attributes that describe the ad to be served.

BEST PRACTICE: Substitution macros may allow a bidder to use a static notice URL for all of its bids. Thus, exchanges should offer the option of a default notice URL that can be pre-configured per bidder to reduce redundant data transfer.

| Field | Scope | Type | Description |
|----------------|-----------------|-------------------|--|
| <i>id</i> | required | string | ID for the bid object chosen by the bidder for tracking and debugging purposes. Useful when multiple bids are submitted for a single impression for a given seat. |
| <i>impid</i> | required | string | ID of the impression object to which this bid applies. |
| <i>price</i> | required | float | Bid price in CPM. WARNING/Best Practice Note: Although this value is a float, OpenRTB strongly suggests using integer math for accounting to avoid rounding errors. |
| <i>adid</i> | optional | string | ID that references the ad to be served if the bid wins. |
| <i>nurl</i> | optional | string | Win notice URL. Note that ad markup is also typically, but not necessarily, returned via this URL. |
| <i>adm</i> | optional | string | Actual ad markup. XHTML if a response to a banner object, or VAST XML if a response to a video object. |
| <i>adomain</i> | optional | array of strings | Advertiser's primary or top-level domain for advertiser checking. This can be a list of domains if there is a rotating creative. However, exchanges may mandate that only one landing domain is allowed. |
| <i>lurl</i> | optional | string | Sample image URL (without cache busting) for content checking |
| <i>cid</i> | optional | string | Campaign ID or similar that appears within the ad markup |
| <i>crid</i> | optional | string | Creative ID for reporting content issues or defects. This could also be used as a reference to a creative ID that is posted with an exchange. |
| <i>attr</i> | optional | array of integers | Array of creative attributes. See Table 6.3 Creative Attributes. |
| <i>dealid</i> | optional | string | A unique identifier for the direct deal associated with the bid. If the bid is associated and in response to a dealid |

| | | | |
|------------|----------|---------|---|
| | | | in the request object it is required in the response object. |
| <i>h</i> | optional | integer | Width of the ad in pixels. If the bid request contained the wmax/hmax and wmin/hmin optional fields it is recommended that the response bid contains this field to signal the size of ad chosen. |
| <i>w</i> | optional | integer | Height of the ad in pixels. If the bid request contained the wmax/hmax and wmin/hmin optional fields it is recommended that the response bid contains this field to signal the size of ad chosen. |
| <i>ext</i> | optional | object | This object is a placeholder that may contain custom JSON agreed to by the parties in an OpenRTB transaction to support flexibility beyond the standard defined in this specification. |

4.4 Loss Notification

Exchanges are encouraged to supply lost bid data via an offline or separate process outside of the bid request / response protocol.

4.5 Ad Serving Options

There are two methods by which the winning bidder can return ad markup to the exchange. In either case, the ad markup is either XHTML if the bidder is responding with a banner or VAST XML if responding with a VAST video.

4.5.1 Ad Served on the Win Notice

In this method, ad markup is returned to the exchange is via the win notice. In this case, the response body of the win notice call (e.g., invoking the “nurl” attribute) contains the ad markup and only the ad markup; there must be no other structured data in the response body. Using this method, the “adm” attribute in the “bid” object must be omitted.

4.5.2 Ad Served in the Bid

In this method, ad markup is returned directly in the bid itself. This is accomplished via the “adm” attribute in the “bid” object. If both the “adm” attribute and win notice return data, the “adm” contents will take precedence.

4.5.3 Comparison of Ad Serving Approaches

Each of the ad serving methods has its own advantages that may be of varying importance to either the exchange or the bidder.

- **Ad Served in the Bid**
 - Potential Concurrency: *The exchange can choose to return that ad markup and call the win notice concurrently, thereby improving user experience.*
 - Reduced Risk of Forfeiture: *A forfeit is the scenario in which a bidder wins, but forfeits due to technical failure serving the ad. This can occur when serving on the win notice (e.g., win notice call failure), but is mitigated by including the ad in the bid.*
- **Ad Served on the Win Notice**
 - Reduced Bandwidth Costs: *Serving ad markup only upon winning can save large amounts of bandwidth usage, the costs for which can mount up over high volumes.*
 - Additional Bidder Flexibility: *Bidders may typically know the ad they will serve at the time of bid, but this provides an additional optional decision point after the settlement price has been established.*

4.6 Substitution Macros

The win notice URL and its format are defined by the bidder. In order for the exchange to convey certain information to the winning bidder (e.g., the settlement price), a number of substitution macros can be inserted into the win notice URL definition. Prior to calling a win notice URL, the exchange will search the specified URL for any of the defined macros and replace them with the appropriate data. Note that the substitution is simple in the sense that wherever a legal macro is found, it will be replaced without regard for syntax correctness. Furthermore, if the source value is an optional parameter that was not specified, the macro will simply be removed (i.e., replaced with a zero-length string).

These same substitution macros can also be placed in the ad markup. The exchange will perform the same data substitutions as in the win notice URL. This occurs irrespective of whether the markup is returned on the win notice or passed in the “adm” attribute of the bid response. A use case for macros in the ad markup might be when a bidder prefers to receive its win notice from the device itself. To accomplish this, the bidder would include a tracking pixel in the ad markup the URL for which would include any of the available macros.

| Macro | Description |
|----------------------------------|--|
| <code>\${AUCTION_ID}</code> | ID of the bid request; from “id” attribute. |
| <code>\${AUCTION_BID_ID}</code> | ID of the bid; from “bidid” attribute. |
| <code>\${AUCTION_IMP_ID}</code> | ID of the impression just won; from “impid” attribute. |
| <code>\${AUCTION_SEAT_ID}</code> | ID of the bidder’s seat for whom the bid was made. |

| | |
|-----------------------------------|--|
| <code>\${AUCTION_AD_ID}</code> | ID of the ad markup the bidder wishes to serve; from “adid” attribute. |
| <code>\${AUCTION_PRICE}</code> | Settlement price using the same currency and units as the bid. |
| <code>\${AUCTION_CURRENCY}</code> | The currency used in the bid (explicit or implied); for confirmation only. |

Prior to substitution, macro data values can be encoded for security purposes using various obfuscation or encryption algorithms. This may be of particular interest for use cases such as the foregoing where price information is carried beyond the exchange, through the publisher, and into the device browser via a tracking pixel in the markup.

To specify that a particular macro is to be encoded, the suffix “:X” should be appended to the macro name, where X is a string that indicates the algorithm to be used. Algorithms choices are not defined by this specification, but must be mutually agreed upon between exchange and bidder. As an example, suppose that the price macro is to be encoded using Base64 and that its code is “B64”. The macro would then be written as follows:

`${AUCTION_PRICE:B64}`

BEST PRACTICE: Encoding of macro data should be used sparingly due to the additional processing overhead. For communications strictly between exchange and bidder (e.g., a win notice called from the exchange), encoding is generally unnecessary.

5 Bid Request/Response Samples

5.1 GitHub Repository

The official OpenRTB GitHub repository now contains a set of validated example requests. This repo should be considered the canonical examples for implementers.

<https://github.com/openrtb/examples>

5.2 Validator

A public validator of request and response objects is available at the link below. The validator is a developer utility for ensuring the validity of bid request and response payloads expressed in JSON. The validator can be used with all final versions of OpenRTB specification. To use the validator, select the version of OpenRTB that is relevant to your data sample, select whether that data sample is a Bid Request or a Bid Response, then paste the JSON data sample into the field indicated, and press the Validate button.

<http://www.nexage.com/resources/technical-resources/openrtb-validator>

The underlying code for the actual validator is also available. It is distributed freely under a BSD-3 open source license at the below URL.

<http://github.com/openrtb/openrtb2x/tree/2.0/openrtb-validator>

5.3 Bid Requests

5.3.1 Example 1 – Simple Banner

Following is a basic example of a bid request for a banner ad. Some optional parameters are included in this example.

```
{
  "id": "80ce30c53c16e6ede735f123ef6e32361bfc7b22",
  "imp": [
```

```
{
  "id": "1",
  "banner": {
    "h": 250,
    "w": 300,
    "pos": 0
  },
  "bidfloor": 0.03
},
"site": {
  "id": "102855",
  "domain": "http://www.foobar.com",
  "cat": "IAB3-1",
  "page": "http://www.foobar.com/1234.html ",
  "publisher": {
    "id": "8953",
    "name": "foobar.com",
    "cat": "IAB3-1",
    "domain": "foobar.com"
  }
},
"device": {
  "ua": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8) AppleWebKit/537.13 (KHTML, like Gecko) Version/5.1.7 Safari/534.57.2",
  "ip": "123.145.167.*"
},
"user": {
  "id": "55816b39711f9b5acf3b90e313ed29e51665623f"
},
"at": 1,
"cur": [
```

```
"USD"  
  ],  
}
```

5.3.2 Example 2 – Expandable Creative

This example builds the first and adds parameters to describe support for an expandable creative, and passes data about the user from “Data Provider 1”.

```
{  
  "id": "123456789316e6ede735f123ef6e32361bfc7b22",  
  "imp": [  
    {  
      "id": "1",  
      "banner": {  
        "h": 250,  
        "w": 300,  
        "pos": 0,  
        "battr": [  
          13  
        ],  
        "expandable": [  
          2,  
          4  
        ],  
        "iframebuster": [  
          "vendor1.com",  
          "vendor2.com"  
        ]  
      },  
      "bidfloor": 0.03
```

```
}
],
"site": {
  "id": "102855",
  "domain": "http://www.foobar.com",
  "cat": "IAB3-1",
  "page": "http://www.foobar.com/1234.html ",
  "publisher": {
    "id": "8953",
    "name": "foobar.com",
    "cat": "IAB3-1",
    "domain": "foobar.com"
  }
},
"device": {
  "ua": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8) AppleWebKit/537.13 (KHTML, like
  Gecko) Version/5.1.7 Safari/534.57.2",
  "ip": "123.145.167.*"
},
"user": {
  "id": "55816b39711f9b5acf3b90e313ed29e51665623f"
  "buyeruid": "545678765467876567898765678987654",
  "data": [
    {
      "id": "6",
      "name": "Data Provider 1",
      "segment": [
        {
          "id": "12341318394918",
          "name": "auto intenders"
        }
      ],
    }
  ]
}
```

```
{
  "id": "1234131839491234",
  "name": "auto enthusiasts",
},
{
  "id": "23423424",
  "name": "data-provider1-age",
  "value": "30-40"
}
]
}
},
"at": 1,
"cur": [
  "USD"
],
}
```

5.3.3 Example 3 – Mobile

Example 3 uses a device object to reflect a mobile device, and an app object to reflect a request from a mobile application.

```
{
  "id": "IxexyLDIlk",
  "imp": [
    {
      "id": "1",
      "banner": {
        "w": 728,
        "h": 90,
        "pos": 1,

```

```
    "btype": [
      4
    ],
    "battr": [
      14
    ],
    "api": [
      3
    ]
  },
  "instl": 0,
  "tagid": "agltb3B1Yi1pbmNyDQsSBFNpdGUY7fD0FAw",
  "bidfloor": 0.5
}
],
"app": {
  "id": "agltb3B1Yi1pbmNyDAsSA0FwcBiJkfiUDA",
  "name": "Yahoo Weather",
  "cat": [
    "weather",
    "IAB15",
    "IAB15-10"
  ],
  "ver": "1.0.2",
  "bundle": "628677149",
  "publisher": {
    "id": "agltb3B1Yi1pbmNyDAsSA0FwcBiJkftUCV",
    "name": "yahoo",
    "domain": "www.yahoo.com"
  },
  "storeurl": "https://itunes.apple.com/id628677149"
},
```

```
"device": {  
  "dnt": 0,  
  "ua": "Mozilla/5.0 (iPhone; CPU iPhone OS 6_1 like Mac OS X) AppleWebKit/534.46 (KHTML,  
like Gecko) Version/5.1 Mobile/9A334 Safari/7534.48.3",  
  "ip": "123.145.167.189",  
  "geo": {  
    "country": "USA",  
    "lat": 35.012345,  
    "lon": -115.12345,  
    "city": "Los Angeles",  
    "metro": "803",  
    "region": "CA",  
    "zip": "90049"  
  },  
  "dpidsha1": "AA000DFE74168477C70D291f574D344790E0BB11",  
  "dpidmd5": "AA003EABFB29E6F759F3BDAB34E50BB11",  
  "carrier": "310-410",  
  "language": "en",  
  "make": "Apple",  
  "model": "iPhone",  
  "os": "iOS",  
  "osv": "6.1",  
  "js": 1,  
  "connectiontype": 3,  
  "devicetype": 1  
},  
"user": {  
  "id": "ffffffd5135596709273b3a1a07e466ea2bf4fff",  
  "yob": "1984",  
  "gender": "M"  
},  
"at": 2,
```



```

"bcat": [
  "IAB25",
  "IAB7-39",
  "IAB8-18",
  "IAB8-5",
  "IAB9-9"
],
"badv": [
  "apple.com",
  "go-text.me",
  "heywire.com"
]
}

```

5.3.4 Example 4 – Video

The following example illustrates a bid request for a video impression with two companion ad slots (1 expandable). Additionally, the video content itself is described in the "content" object. A few notes about specific fields in the example:

- protocol: Only VAST 2.0 and 3.0 are allowed. Note that a wrapper response is not allowed in this example.
- sequence: it is not explicitly included so the default of '1' should be assumed.
- batrr: User interactive and alert stype ads (value '13' and '14', respectively) are explicitly being blocked for both the video and its companions.
- pos: Indicates this opportunity is "above the fold".
- api: Indicates that VPAID 1.0 containers are explicitly supported. As such, the mime types supported for VPAID are only "application/x-shockwave-flash" and "application/javascript". Note that there is an implicit restriction as to which protocol is allowed in which mimetype. JavaScript support was not specified until VPAID 2.0, while Flash supports both VPAID 1.0 and 2.0.
- companiontype: Indicates only static or HTML resources are allowed.
- ext: an exchange-specific deals extension is passed to inform the bidder of the priority assigned deals.

```
{
```

```
"id": "1234567893",
"at": 2,
"tmax": 120,
"imp": [
  {
    "id": "1",
    "bidfloor": 0.03,
    "video":
    {
      "mimes": [
        "video/x-flv",
        "video/mp4",
        "application/x-shockwave-flash",
        "application/javascript"
      ],
      "linearity": 1,
      "minduration": 5,
      "maxduration": 30,
      "protocol": [2,3],
      "w": 640,
      "h": 480,
      "startdelay": 0,
      "battr": [13,14],
      "maxextended": 30,
      "minbitrate": 300,
      "maxbitrate": 1500,
      "boxingallowed": true,
      "playbackmethod": [1,3],
      "delivery": [2],
      "pos": 1,
      "companionad": [
        {
```

```
        "id": "1234567893-1",
        "w": 300,
        "h": 250,
        "pos": 1,
        "battr": [13,14],
        "expandable": [2,4]
      },
      {
        "id": "1234567893-2",
        "w": 728,
        "h": 90,
        "pos": 1,
        "battr": [13,14]
      }
    ],
    "companiontype": [1,2],
    "api": [1,2]
  }
}

],
"site":
{
  "id": "1345135123",
  "name": "Site ABCD",
  "domain": "siteabcd.com",
  "sitecat": [
    "IAB2-1",
    "IAB2-2"
  ],
  "page": "http://siteabcd.com/page.htm",
  "ref": "http://referringsite.com/referringpage.htm",
  "privacypolicy": true,
```

```
"publisher":
{
  "id": "pub12345",
  "name": "Publisher A"
},
"content":
{
  "id": "1234567",
  "episode": 23,
  "title": "Car Show",
  "series": "All About Cars",
  "season": 2,
  "cat": ["IAB2-2"],
  "keyword": ["keyword a", "keyword b", "keyword c"]
},
"device":
{
  "ip": "64.124.253.1",
  "ua": "Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10.6; en-US; rv:1.9.2.16) Gecko/20110319
Firefox/3.6.16",
  "os": "OS X",
  "flashversion": "10.1",
  "js": 1
},
"user":
{
  "uid": "456789876567897654678987656789",
  "buyeruid": "545678765467876567898765678987654",
  "data": [
    {
      "id": "6",
```

```
{
  "name": "Data Provider 1",
  "segment": [
    {
      "id": "12341318394918",
      "name": "auto intenders"
    },
    {
      "id": "1234131839491234",
      "name": "auto enthusiasts"
    }
  ]
}
```

5.3.5 Example 5 – PMP w/ Direct Deal

Following is a basic example of a bid request for a banner ad with a direct deal. Some optional parameters are included in this example.

```
{
  "id": "80ce30c53c16e6ede735f123ef6e32361bfc7b22",
  "imp": [
    {
      "id": "1",
      "banner": {
        "h": 250,
        "w": 300,
        "pos": 0
      },
      "bidfloor": 0.03,
    }
  ]
}
```

```
"pmp":{
  "private_auction":1,
  "deals":[
    {
      "id":"AB-Agency1-0001",
      "bidfloor":2.5,
      "wseat":[
        "Agency1"
      ],
      "at":1,
      "ext":{

      }
    },
    {
      "id":"XY-Agency2-0001",
      "bidfloor":2,
      "wseat":[
        "Agency2"
      ],
      "at":2
    }
  ]
},
"site": {
  "id": "102855",
  "domain": "http://www.foobar.com",
  "cat": "IAB3-1",
  "page": "http://www.foobar.com/1234.html ",
  "publisher": {
    "id": "8953",
    "name": "foobar.com",
    "cat": "IAB3-1",
    "domain": "foobar.com"
  }
},
"device": {
```

```
"ua": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_6_8) AppleWebKit/537.13 (KHTML, like Gecko) Version/5.1.7 Safari/534.57.2",
  "ip": "123.145.167.*"
},
"user": {
  "id": "55816b39711f9b5acf3b90e313ed29e51665623f"
},
"at": 1,
"cur": [
  "USD"
],
}
```

5.4 Bid Responses

5.4.1 Example 1 – Ad Served on Win Notice

Following is an example of a bid response with the ad served on win notice. The bid for this impression is a \$9.43 CPM.

```
{
  "id": "1234567890",
  "seatbid": [
    {
      "bid": [
        {
          "id": "1",
          "impid": "102",
          "price": 9.43,
```

```
"adid":"314",
  "nurl":"http://adserver.com/winnotice?impid=102",
  "adm":"%3C!DOCTYPE%20html%20PUBLIC%20%5C%22-%2F%2FW3C%2F%2FDTD%20XHTML%201.0%20Transitional%2F%2FEN%5C%22%20%5C%22http%3A%2F%2Fwww.w3.org%2FTR%2F%2Fhtml1%2F%2FDTD%2F%2Fhtml1-transitional.dtd%5C%22%3E%3Chtml%20xmlns%3D%5C%22http%3A%2F%2Fwww.w3.org%2F1999%2F%2Fhtml%5C%22%20xml%3A%2F%2F%3D%5C%22en%5C%22%20lang%3D%5C%22en%5C%22%3E...%3C%2Fhtml%3E",
  "adomain":[
    "advertiserdomain.com"
  ],
  "iurl":"http://adserver.com/pathtosampleimage",
  "cid":"campaign111",
  "crid":"creative112",
  "attr":[
    1,
    2,
    3,
    4,
    5,
    6,
    7,
    12
  ]
}
],
  "seat":"512"
}
],
  "bidid":"abc1123",
  "cur":"USD"
}
```


5.4.2 Example 2 – VAST URL Returned

Following is an example of a bid response that returns a VAST URL to be served. The bid for this impression is a \$9.43 CPM.

```
{
  "id":"1234567890",
  "seatbid":[
    {
      "bid":[
        {
          "id":"kljaf9",
          "impid":"1",
          "price":9.43,
          "nurl":"http://adserver.com/WinNoticeUrlThatReturnsVAST"
        }
      ]
    }
  ]
}
```

5.4.3 Example 3 – VAST XML Document Returned Inline

Following is an example of a bid response that returns the VAST document inline to be served. A few notes about specific fields in the example:

- The bid for this impression is a \$3.00 CPM.
- Note that since there both a win notice URL and an inline VAST document, the adm attribute is used for the VAST ad markup.

[illegible]

[illegible]

5.4.4 Example 4 – Direct Deal Ad Served on Win Notice

Following is an example of a bid response with the ad served on win notice. The bid for this impression is a \$5.00 CPM against a direct deal.

```
{
  "id": "1234567890",
  "seatbid": [
    {
      "bid": [
        {
          "id": "1",
          "impid": "102",
          "price": 5.00,
          "dealid": "ABC-1234-6789",
          "adid": "314",
          "nurl": "http://adserver.com/winnotice?impid=102",
          "adm": "%3C!DOCTYPE%20html%20PUBLIC%20%5C%22-%2F%2FW3C%2F%2FDTD%20XHTML%201.0%20Transitional%2F%2FEN%5C%22%20%5C%22http%3A%2F%2Fwww.w3.org%2FTR%2Fxhtml1%2FDTD%2Fxhtml1-transitional.dtd%5C%22%3E%3Chtml%20xmlns%3D%5C%22http%3A%2F%2Fwww.w3.org%2F1999%2Fxhtml%5C%22%20xml%3Alang%3D%5C%22en%5C%22%20lang%3D%5C%22en%5C%22%3E...%3C%2Fhtml%3E",
          "adomain": [
            "advertiserdomain.com"
          ],
          "iurl": "http://adserver.com/pathtosampleimage",
          "cid": "campaign111",
          "crid": "creative112",

```

```
    "attr":[
      1,
      2,
      3,
      4
    ]
  },
  "seat":"512"
}
],
"bidid":"abc1123",
"cur":"USD"
}
```

6 Reference Lists/Enumerations

BEST PRACTICE: All reference lists are actively maintained by the IAB on the OpenRTB web site. As such, implementers should ensure they are working from the latest lists and enumerations

6.1 Content Categories

The following list represents the IAB's contextual taxonomy for categorization. Standard IDs have been adopted to easily support the communication of primary and secondary categories for various objects. *Note to the reader: This OpenRTB table has values derived from the IAB Quality Assurance Guidelines (QAG). Users of OpenRTB should keep in synch with updates to the QAG values as published on IAB.net.*

| Value | Description |
|-------------|---------------------------------|
| IAB1 | Arts & Entertainment |
| IAB1-1 | Books & Literature |
| IAB1-2 | Celebrity Fan/Gossip |
| IAB1-3 | Fine Art |
| IAB1-4 | Humor |
| IAB1-5 | Movies |
| IAB1-6 | Music |
| IAB1-7 | Television |
| IAB2 | Automotive |
| IAB2-1 | Auto Parts |
| IAB2-2 | Auto Repair |
| IAB2-3 | Buying/Selling Cars |
| IAB2-4 | Car Culture |
| IAB2-5 | Certified Pre-Owned |
| IAB2-6 | Convertible |
| IAB2-7 | Coupe |
| IAB2-8 | Crossover |
| IAB2-9 | Diesel |

| | |
|-------------|----------------------|
| IAB2-10 | Electric Vehicle |
| IAB2-11 | Hatchback |
| IAB2-12 | Hybrid |
| IAB2-13 | Luxury |
| IAB2-14 | MiniVan |
| IAB2-15 | Mororcycles |
| IAB2-16 | Off-Road Vehicles |
| IAB2-17 | Performance Vehicles |
| IAB2-18 | Pickup |
| IAB2-19 | Road-Side Assistance |
| IAB2-20 | Sedan |
| IAB2-21 | Trucks & Accessories |
| IAB2-22 | Vintage Cars |
| IAB2-23 | Wagon |
| IAB3 | Business |
| IAB3-1 | Advertising |
| IAB3-2 | Agriculture |
| IAB3-3 | Biotech/Biomedical |
| IAB3-4 | Business Software |
| IAB3-5 | Construction |
| IAB3-6 | Forestry |
| IAB3-7 | Government |
| IAB3-8 | Green Solutions |
| IAB3-9 | Human Resources |
| IAB3-10 | Logistics |
| IAB3-11 | Marketing |
| IAB3-12 | Metals |
| IAB4 | Careers |
| IAB4-1 | Career Planning |
| IAB4-2 | College |
| IAB4-3 | Financial Aid |
| IAB4-4 | Job Fairs |

| | |
|-------------|-------------------------------|
| IAB4-5 | Job Search |
| IAB4-6 | Resume Writing/Advice |
| IAB4-7 | Nursing |
| IAB4-8 | Scholarships |
| IAB4-9 | Telecommuting |
| IAB4-10 | U.S. Military |
| IAB4-11 | Career Advice |
| IAB5 | Education |
| IAB5-1 | 7-12 Education |
| IAB5-2 | Adult Education |
| IAB5-3 | Art History |
| IAB5-4 | Colledge Administration |
| IAB5-5 | College Life |
| IAB5-6 | Distance Learning |
| IAB5-7 | English as a 2nd Language |
| IAB5-8 | Language Learning |
| IAB5-9 | Graduate School |
| IAB5-10 | Homeschooling |
| IAB5-11 | Homework/Study Tips |
| IAB5-12 | K-6 Educators |
| IAB5-13 | Private School |
| IAB5-14 | Special Education |
| IAB5-15 | Studying Business |
| IAB6 | Family & Parenting |
| IAB6-1 | Adoption |
| IAB6-2 | Babies & Toddlers |
| IAB6-3 | Daycare/Pre School |
| IAB6-4 | Family Internet |
| IAB6-5 | Parenting - K-6 Kids |
| IAB6-6 | Parenting teens |
| IAB6-7 | Pregnancy |
| IAB6-8 | Special Needs Kids |

| | |
|-------------|-----------------------------|
| IAB6-9 | Eldercare |
| IAB7 | Health & Fitness |
| IAB7-1 | Exercise |
| IAB7-2 | A.D.D. |
| IAB7-3 | AIDS/HIV |
| IAB7-4 | Allergies |
| IAB7-5 | Alternative Medicine |
| IAB7-6 | Arthritis |
| IAB7-7 | Asthma |
| IAB7-8 | Autism/PDD |
| IAB7-9 | Bipolar Disorder |
| IAB7-10 | Brain Tumor |
| IAB7-11 | Cancer |
| IAB7-12 | Cholesterol |
| IAB7-13 | Chronic Fatigue Syndrome |
| IAB7-14 | Chronic Pain |
| IAB7-15 | Cold & Flu |
| IAB7-16 | Deafness |
| IAB7-17 | Dental Care |
| IAB7-18 | Depression |
| IAB7-19 | Dermatology |
| IAB7-20 | Diabetes |
| IAB7-21 | Epilepsy |
| IAB7-22 | GERD/Acid Reflux |
| IAB7-23 | Headaches/Migraines |
| IAB7-24 | Heart Disease |
| IAB7-25 | Herbs for Health |
| IAB7-26 | Holistic Healing |
| IAB7-27 | IBS/Crohn's Disease |
| IAB7-28 | Incest/Abuse Support |
| IAB7-29 | Incontinence |
| IAB7-30 | Infertility |

| | |
|-------------|-------------------------|
| IAB7-31 | Men's Health |
| IAB7-32 | Nutrition |
| IAB7-33 | Orthopedics |
| IAB7-34 | Panic/Anxiety Disorders |
| IAB7-35 | Pediatrics |
| IAB7-36 | Physical Therapy |
| IAB7-37 | Psychology/Psychiatry |
| IAB7-38 | Senior Health |
| IAB7-39 | Sexuality |
| IAB7-40 | Sleep Disorders |
| IAB7-41 | Smoking Cessation |
| IAB7-42 | Substance Abuse |
| IAB7-43 | Thyroid Disease |
| IAB7-44 | Weight Loss |
| IAB7-45 | Women's Health |
| IAB8 | Food & Drink |
| IAB8-1 | American Cuisine |
| IAB8-2 | Barbecues & Grilling |
| IAB8-3 | Cajun/Creole |
| IAB8-4 | Chinese Cuisine |
| IAB8-5 | Cocktails/Beer |
| IAB8-6 | Coffee/Tea |
| IAB8-7 | Cuisine-Specific |
| IAB8-8 | Desserts & Baking |
| IAB8-9 | Dining Out |
| IAB8-10 | Food Allergies |
| IAB8-11 | French Cuisine |
| IAB8-12 | Health/Lowfat Cooking |
| IAB8-13 | Italian Cuisine |
| IAB8-14 | Japanese Cuisine |
| IAB8-15 | Mexican Cuisine |
| IAB8-16 | Vegan |

| | |
|-------------|--------------------------------|
| IAB8-17 | Vegetarian |
| IAB8-18 | Wine |
| IAB9 | Hobbies & Interests |
| IAB9-1 | Art/Technology |
| IAB9-2 | Arts & Crafts |
| IAB9-3 | Beadwork |
| IAB9-4 | Birdwatching |
| IAB9-5 | Board Games/Puzzles |
| IAB9-6 | Candle & Soap Making |
| IAB9-7 | Card Games |
| IAB9-8 | Chess |
| IAB9-9 | Cigars |
| IAB9-10 | Collecting |
| IAB9-11 | Comic Books |
| IAB9-12 | Drawing/Sketching |
| IAB9-13 | Freelance Writing |
| IAB9-14 | Genealogy |
| IAB9-15 | Getting Published |
| IAB9-16 | Guitar |
| IAB9-17 | Home Recording |
| IAB9-18 | Investors & Patents |
| IAB9-19 | Jewelry Making |
| IAB9-20 | Magic & Illusion |
| IAB9-21 | Needlework |
| IAB9-22 | Painting |
| IAB9-23 | Photography |
| IAB9-24 | Radio |
| IAB9-25 | Roleplaying Games |
| IAB9-26 | Sci-Fi & Fantasy |
| IAB9-27 | Scrapbooking |
| IAB9-28 | Screenwriting |
| IAB9-29 | Stamps & Coins |

| | |
|--------------|----------------------------------|
| IAB9-30 | Video & Computer Games |
| IAB9-31 | Woodworking |
| IAB10 | Home & Garden |
| IAB10-1 | Appliances |
| IAB10-2 | Entertaining |
| IAB10-3 | Environmental Safety |
| IAB10-4 | Gardening |
| IAB10-5 | Home Repair |
| IAB10-6 | Home Theater |
| IAB10-7 | Interior Decorating |
| IAB10-8 | Landscaping |
| IAB10-9 | Remodeling & Construction |
| IAB11 | Law, Gov't & Politics |
| IAB11-1 | Immigration |
| IAB11-2 | Legal Issues |
| IAB11-3 | U.S. Government Resources |
| IAB11-4 | Politics |
| IAB11-5 | Commentary |
| IAB12 | News |
| IAB12-1 | International News |
| IAB12-2 | National News |
| IAB12-3 | Local News |
| IAB13 | Personal Finance |
| IAB13-1 | Beginning Investing |
| IAB13-2 | Credit/Debt & Loans |
| IAB13-3 | Financial News |
| IAB13-4 | Financial Planning |
| IAB13-5 | Hedge Fund |
| IAB13-6 | Insurance |
| IAB13-7 | Investing |
| IAB13-8 | Mutual Funds |
| IAB13-9 | Options |

| | |
|--------------|----------------------|
| IAB13-10 | Retirement Planning |
| IAB13-11 | Stocks |
| IAB13-12 | Tax Planning |
| IAB14 | Society |
| IAB14-1 | Dating |
| IAB14-2 | Divorce Support |
| IAB14-3 | Gay Life |
| IAB14-4 | Marriage |
| IAB14-5 | Senior Living |
| IAB14-6 | Teens |
| IAB14-7 | Weddings |
| IAB14-8 | Ethnic Specific |
| IAB15 | Science |
| IAB15-1 | Astrology |
| IAB15-2 | Biology |
| IAB15-3 | Chemistry |
| IAB15-4 | Geology |
| IAB15-5 | Paranormal Phenomena |
| IAB15-6 | Physics |
| IAB15-7 | Space/Astronomy |
| IAB15-8 | Geography |
| IAB15-9 | Botany |
| IAB15-10 | Weather |
| IAB16 | Pets |
| IAB16-1 | Aquariums |
| IAB16-2 | Birds |
| IAB16-3 | Cats |
| IAB16-4 | Dogs |
| IAB16-5 | Large Animals |
| IAB16-6 | Reptiles |
| IAB16-7 | Veterinary Medicine |
| IAB17 | Sports |

| | |
|----------|---------------------|
| IAB17-1 | Auto Racing |
| IAB17-2 | Baseball |
| IAB17-3 | Bicycling |
| IAB17-4 | Bodybuilding |
| IAB17-5 | Boxing |
| IAB17-6 | Canoeing/Kayaking |
| IAB17-7 | Cheerleading |
| IAB17-8 | Climbing |
| IAB17-9 | Cricket |
| IAB17-10 | Figure Skating |
| IAB17-11 | Fly Fishing |
| IAB17-12 | Football |
| IAB17-13 | Freshwater Fishing |
| IAB17-14 | Game & Fish |
| IAB17-15 | Golf |
| IAB17-16 | Horse Racing |
| IAB17-17 | Horses |
| IAB17-18 | Hunting/Shooting |
| IAB17-19 | Inline Skating |
| IAB17-20 | Martial Arts |
| IAB17-21 | Mountain Biking |
| IAB17-22 | NASCAR Racing |
| IAB17-23 | Olympics |
| IAB17-24 | Paintball |
| IAB17-25 | Power & Motorcycles |
| IAB17-26 | Pro Basketball |
| IAB17-27 | Pro Ice Hockey |
| IAB17-28 | Rodeo |
| IAB17-29 | Rugby |
| IAB17-30 | Running/Jogging |
| IAB17-31 | Sailing |
| IAB17-32 | Saltwater Fishing |

| | |
|--------------|-----------------------------------|
| IAB17-33 | Scuba Diving |
| IAB17-34 | Skateboarding |
| IAB17-35 | Skiing |
| IAB17-36 | Snowboarding |
| IAB17-37 | Surfing/Bodyboarding |
| IAB17-38 | Swimming |
| IAB17-39 | Table Tennis/Ping-Pong |
| IAB17-40 | Tennis |
| IAB17-41 | Volleyball |
| IAB17-42 | Walking |
| IAB17-43 | Waterski/Wakeboard |
| IAB17-44 | World Soccer |
| IAB18 | Style & Fashion |
| IAB18-1 | Beauty |
| IAB18-2 | Body Art |
| IAB18-3 | Fashion |
| IAB18-4 | Jewelry |
| IAB18-5 | Clothing |
| IAB18-6 | Accessories |
| IAB19 | Technology & Computing |
| IAB19-1 | 3-D Graphics |
| IAB19-2 | Animation |
| IAB19-3 | Antivirus Software |
| IAB19-4 | C/C++ |
| IAB19-5 | Cameras & Camcorders |
| IAB19-6 | Cell Phones |
| IAB19-7 | Computer Certification |
| IAB19-8 | Computer Networking |
| IAB19-9 | Computer Peripherals |
| IAB19-10 | Computer Reviews |
| IAB19-11 | Data Centers |
| IAB19-12 | Databases |

| | |
|--------------|-------------------------|
| IAB19-13 | Desktop Publishing |
| IAB19-14 | Desktop Video |
| IAB19-15 | Email |
| IAB19-16 | Graphics Software |
| IAB19-17 | Home Video/DVD |
| IAB19-18 | Internet Technology |
| IAB19-19 | Java |
| IAB19-20 | JavaScript |
| IAB19-21 | Mac Support |
| IAB19-22 | MP3/MIDI |
| IAB19-23 | Net Conferencing |
| IAB19-24 | Net for Beginners |
| IAB19-25 | Network Security |
| IAB19-26 | Palmtops/PDAs |
| IAB19-27 | PC Support |
| IAB19-28 | Portable |
| IAB19-29 | Entertainment |
| IAB19-30 | Shareware/Freeware |
| IAB19-31 | Unix |
| IAB19-32 | Visual Basic |
| IAB19-33 | Web Clip Art |
| IAB19-34 | Web Design/HTML |
| IAB19-35 | Web Search |
| IAB19-36 | Windows |
| IAB20 | Travel |
| IAB20-1 | Adventure Travel |
| IAB20-2 | Africa |
| IAB20-3 | Air Travel |
| IAB20-4 | Australia & New Zealand |
| IAB20-5 | Bed & Breakfasts |
| IAB20-6 | Budget Travel |
| IAB20-7 | Business Travel |

| | |
|--------------|------------------------------------|
| IAB20-8 | By US Locale |
| IAB20-9 | Camping |
| IAB20-10 | Canada |
| IAB20-11 | Caribbean |
| IAB20-12 | Cruises |
| IAB20-13 | Eastern Europe |
| IAB20-14 | Europe |
| IAB20-15 | France |
| IAB20-16 | Greece |
| IAB20-17 | Honeymoons/Getaways |
| IAB20-18 | Hotels |
| IAB20-19 | Italy |
| IAB20-20 | Japan |
| IAB20-21 | Mexico & Central America |
| IAB20-22 | National Parks |
| IAB20-23 | South America |
| IAB20-24 | Spas |
| IAB20-25 | Theme Parks |
| IAB20-26 | Traveling with Kids |
| IAB20-27 | United Kingdom |
| IAB21 | Real Estate |
| IAB21-1 | Apartments |
| IAB21-2 | Architects |
| IAB21-3 | Buying/Selling Homes |
| IAB22 | Shopping |
| IAB22-1 | Contests & Freebies |
| IAB22-2 | Couponing |
| IAB22-3 | Comparison |
| IAB22-4 | Engines |
| IAB23 | Religion & Spirituality |
| IAB23-1 | Alternative Religions |
| IAB23-2 | Atheism/Agnosticism |

| | |
|--------------|-----------------------------------|
| IAB23-3 | Buddhism |
| IAB23-4 | Catholicism |
| IAB23-5 | Christianity |
| IAB23-6 | Hinduism |
| IAB23-7 | Islam |
| IAB23-8 | Judaism |
| IAB23-9 | Latter-Day Saints |
| IAB23-10 | Pagan/Wiccan |
| IAB24 | Uncategorized |
| IAB25 | Non-Standard Content |
| IAB25-1 | Unmoderated UGC |
| IAB25-2 | Extreme Graphic/Explicit Violence |
| IAB25-3 | Pornography |
| IAB25-4 | Profane Content |
| IAB25-5 | Hate Content |
| IAB25-6 | Under Construction |
| IAB25-7 | Incentivized |
| IAB26 | Illegal Content |
| IAB26-1 | Illegal Content |
| IAB26-2 | Warez |
| IAB26-3 | Spyware/Malware |
| IAB26-4 | Copyright Infringement |

6.2 Banner Ad Types

The following table indicates the types of ads that can be accepted by the exchange unless restricted by publisher site settings.

| Value | Description |
|-------|--|
| 1 | XHTML text ad. (usually mobile) |
| 2 | XHTML banner ad. (usually mobile) |
| 3 | JavaScript ad; must be valid XHTML (i.e., script tags included). |
| 4 | Iframe |

6.3 Creative Attributes

The following table specifies a standard list of creative attributes that can describe an ad being served or serve as restrictions of thereof.

| Value | Description |
|-------|---|
| 1 | Audio Ad (Auto Play) |
| 2 | Audio Ad (User Initiated) |
| 3 | Expandable (Automatic) |
| 4 | Expandable (User Initiated - Click) |
| 5 | Expandable (User Initiated - Rollover) |
| 6 | In-Banner Video Ad (Auto Play) |
| 7 | In-Banner Video Ad (User Initiated) |
| 8 | Pop (e.g., Over, Under, or upon Exit) |
| 9 | Provocative or Suggestive Imagery |
| 10 | Shaky, Flashing, Flickering, Extreme Animation, Smileys |
| 11 | Surveys |
| 12 | Text Only |
| 13 | User Interactive (e.g., Embedded Games) |
| 14 | Windows Dialog or Alert Style |
| 15 | Has audio on/off button |
| 16 | Ad can be skipped (e.g., skip button on preroll video) |

6.4 API Frameworks

This is a list of API frameworks.

| Value | Description |
|-------|-------------|
| 1 | VPAID 1.0 |
| 2 | VPAID 2.0 |
| 3 | MRAID-1 |
| 4 | ORMMA |
| 5 | MRAID-2 |

BEST PRACTICE: Note that MRAID-1 is a subset of MRAID-2. In OpenRTB 2.1 and prior, value #3 was “MRAID”. However, not all MRAID capable APIs understand MRAID-2 features and as such the only safe interpretation of value #3 is MRAID-1. In OpenRTB 2.2, this has been made explicit and MRAID-2 has been added as value #5.

6.5 Ad Position

The following table specifies the position of the ad as a relative measure of visibility or prominence. *Note to the reader: This OpenRTB table has values derived from the IAB Quality Assurance Guidelines (QAG). Users of OpenRTB should keep in sync with updates to the QAG values as published on IAB.net. Values 3-6 apply to native apps per the mobile addendum to the version 1.5 of the QAG.*

| Value | Description |
|-------|---|
| 0 | Unknown |
| 1 | Above the fold |
| 2 | DEPRECATED - May or may not be immediately visible depending on screen size and resolution. |
| 3 | Below the fold |
| 4 | Header |
| 5 | Footer |
| 6 | Sidebar |
| 7 | Fullscreen |

6.6 Video Linearity

The following table indicates the options for video linearity. "In-stream" or "linear" video refers to pre-roll, post-roll, or mid-roll video ads where the user is forced to watch ad in order to see the video content. "Overlay" or "non-linear" refer to ads that are shown on top of the video content. *Note to the reader: This OpenRTB table has values derived from the IAB Quality Assurance Guidelines (QAG). Users of OpenRTB should keep in synch with updates to the QAG values as published on IAB.net.*

This field is optional. The following is the interpretation of the bidder based upon the presence or absence of the field in the bid request:

- If no value is set, any ad (linear or not) can be present in the response.
- If a value is set, only ads of the corresponding type can be present in the response.

| Value | Description |
|-------|--------------------|
| 1 | Linear/In-stream |
| 2 | Non-Linear/Overlay |

6.7 Video Bid Response Protocols

The following table lists the options for video bid response protocols that could be supported by an exchange.

| Value | Description |
|-------|------------------|
| 1 | VAST 1.0 |
| 2 | VAST 2.0 |
| 3 | VAST 3.0 |
| 4 | VAST 1.0 Wrapper |
| 5 | VAST 2.0 Wrapper |
| 6 | VAST 3.0 Wrapper |

6.8 Video Playback Methods

The following table lists the various video playback methods.

| Value | Description |
|-------|-------------|
|-------|-------------|

| | |
|----------|---------------------|
| 1 | Auto-play sound on |
| 2 | Auto-play sound off |
| 3 | Click-to-play |
| 4 | Mouse-over |

6.9 Video Start Delay

The following table lists the various options for the video start delay. If the start delay value is greater than 0 then the position is mid-roll, and the value represents the number of seconds into the content that the ad will be displayed. If the start delay time is not available, the exchange can report the position of the ad in general terms using this table of negative numbers.

| Value | Description |
|-----------|-------------------|
| 0 | Pre-roll |
| -1 | Generic mid-roll |
| -2 | Generic Post-roll |

6.10 Connection Type

The following table lists the various options for the connection type.

| Value | Description |
|----------|------------------------------------|
| 0 | Unknown |
| 1 | Ethernet |
| 2 | Wifi |
| 3 | Cellular data – Unknown Generation |
| 4 | Cellular data – 2G |
| 5 | Cellular data – 3G |
| 6 | Cellular data – 4G |

6.11 Expandable Direction

The following table lists the directions in which an expandable ad may expand, given the positioning of the ad unit on the page and constraints imposed by the content.

| Value | Description |
|-------|-------------|
| 1 | Left |
| 2 | Right |
| 3 | Up |
| 4 | Down |
| 5 | Fullscreen |

6.12 Content Delivery Methods

The following table lists the various options for the delivery of video content.

| Value | Description |
|-------|-------------|
| 1 | Streaming |
| 2 | Progressive |

6.13 Content Context

The following table lists the various options for the content context; what type of content is it.

Note to the reader: This OpenRTB table has values derived from the IAB Quality Assurance Guidelines (QAG). Users of OpenRTB should keep in synch with updates to the QAG values as published on IAB.net.

| Value | Description |
|-------|--|
| 1 | Video (a video file or stream that is being watched by the user, including (Internet) television broadcasts) |
| 2 | Game (an interactive software game that is being played by the user) |
| 3 | Music (an audio file or stream that is being listened to by the user, including (Internet) radio broadcasts) |
| 4 | Application (an interactive software application that is being used by the user) |
| 5 | Text (a document that is primarily textual in nature that is being read or viewed by the user, including web page, ebook, or news article) |
| 6 | Other (content type unknown or the user is consuming content which does not fit into one of the categories above) |
| 7 | Unknown |

6.14 Video Quality

The following table lists the options for the video quality (as defined by the IAB – <http://www.iab.net/media/file/long-form-video-final.pdf>).

| Value | Description |
|-------|-------------------------|
| 0 | Unknown |
| 1 | Professionally Produced |
| 2 | Prosumer |
| 3 | User Generated (UGC) |

6.15 Location Type

The following table lists the options to indicate how the geographic information was determined.

| Value | Description |
|-------|---|
| 1 | GPS/Location Services |
| 2 | IP Address |
| 3 | User provided (e.g., registration data) |

6.16 Device Type

The following table lists the options to indicate how the geographic information was determined. *Notes to the reader:*

- *This OpenRTB table has values derived from the IAB Quality Assurance Guidelines (QAG). Users of OpenRTB should keep in synch with updates to the QAG values as published on IAB.net.*
- *Version 2.2 of the spec added distinct values for Mobile and Tablet. Any implementing exchange and bidder should co-ordinate dependencies on transmitting or receiving the new values. It is recommended that any bidder adding support for 2.2 treat a value of 1 as an acceptable alias of 4 & 5.*

| Value | Description | Note |
|-------|-------------------|--------------|
| 1 | Mobile/Tablet | Version 2.0. |
| 2 | Personal Computer | Version 2.0 |

| | | |
|---|------------------|----------------------|
| 3 | Connected TV | Version 2.0 |
| 4 | Phone | New for Version 2.2. |
| 5 | Tablet | New for Version 2.2 |
| 6 | Connected Device | New for Version 2.2 |
| 7 | Set Top Box | New for Version 2.2 |

6.17 VAST Companion Types

The following table lists the options to indicate markup types allowed for video companion ads. This table is derived from IAB VAST 2.0+. See www.iab.net/vast/ for more information.

| Value | Description |
|-------|-----------------|
| 1 | Static Resource |
| 2 | HTML Resource |
| 3 | iframe Resource |

6.18 QAG Media Ratings

The following table lists the media ratings using the QAG categorization. See http://www.iab.net/ne_guidelines for more information

| Value | Description |
|-------|------------------|
| 1 | All Audiences |
| 2 | Everyone over 12 |
| 3 | Mature Audiences |

6.19 No-Bid Reason Codes

The following table lists the options to signal the exchange why the impression was not bid on.

| Value | Description |
|-------|------------------|
| 0 | Unknown Error |
| 1 | Technical Error |
| 2 | Invalid Request |
| 3 | Known Web spider |

| | |
|----------|---------------------------------|
| 4 | Suspected Non-Human Traffic |
| 5 | Cloud, Data center, or Proxy IP |
| 6 | Unsupported Device |
| 7 | Blocked Publisher or Site |
| 8 | Unmatched user |

7 Implementation Notes

The following section will provide brief notes on how certain objects and fields are to be interpreted and implemented.

7.1 COPPA Regulation Flag

The United States Federal Trade Commission has changed the compliance rules for the Children's Online Privacy Protection Act ("COPPA"), effective July 1, 2013. The proposal effects websites, and associated services, that have been identified as: (1) directed to users under 13 years of age; or (2) collecting information from users actually known to be under 13 (collectively "Children's Sites").

The FTC has written a comprehensive FAQ on the change here:

<http://business.ftc.gov/documents/Complying-with-COPPA-Frequently-Asked-Questions>

Steve Bellovin, CTO of the FTC, argued for a standardized signaling protocol in a blog posted dated January 2013:

<http://techatftc.wordpress.com/2013/01/02/coppa-and-signaling/>

Impacts

The FAQ specifically calls out these areas relevant for OpenRTB as 'Personal Information' that is not to be collected.

- Geolocation information sufficient to identify street name and name of a city or town;
- Persistent identifiers when they can be used to recognize a user over time and across different Web sites or online services.

Recommendations to Implementers

OpenRTB Exchanges and Bidders should

1. Provide a facility for sites to be declared as 'child directed'
2. Implement the regulations object extension
3. Provide facilities within campaigns to target for and against this signal
4. Degrade the Geographic information to be less exact prior to logging or transmission
5. Suppress the assignment and synchronization of identifiers (depending on usage)

It is recommended that when `regs.coppa = 1`, the exchange should additionally manipulate the OpenRTB bid request object as follows:

Device Object

- Suppress `didmd5` and `didsha1` device ID fields.
- Truncate `ip` field - remove lowest 8 bits.

- Truncate ipv6 field - remove lowest 32 bits.

Geo Object

- Suppress lat/long fields.
- Suppress metro, city and zip fields.

User Object

- Suppress id, buyerid, yob, gender fields.

7.2 PMP and Direct Deals

Best Practice Bidding Logic

```

1  Receive request and parse
2  Create empty bid list for response
3  If request contains the impression[].pmp object
4    match bids against each pmp.deals[]
5    enforce targeting for dealID and seatID
6    append best M matching bids to response
7  If pmp.private_auction = False
8    match open auction bids against the request
9    append top N bids by price to response
10 Return response list to exchange

```

Recommendations

- $M \geq 1$, preferably one per matching DealID
- $N \geq 2$ to assist with blocking rate issues
- Minimum viable is “1+1” bidding
- Ideal is “M+N” bidding

Warning

Returning only one bid when both DealID and open auction bids are valid creates problems. The exchange side may be configured by a publisher to prioritize all DealID bids above open auction bids, or to force a price auction between them with different floors by class of bid. There are multiple common practices that depend on how the publisher prefers to sell inventory with DealID.

Policy Recommendations

- A DealID should be utilized for any situation where the auction may be awarded to a bid not on the basis of price alone. Any prioritization of bids other than by price should have a DealID.
- A DealID is recommended for all situations where a preferential floor may be assigned to a seat entity.

Anti Patterns

The below is a set of anti-patterns that OpenRTB supporting platforms have observed in various attempts to implement DealID bidding logic.

Subjecting DealID Bids to an internal auction on price

The ideal bidding logic describes a process of being liberal about sending bids. *DealID bids may not be subject to a classic price auction.* There may be an expectation that the buyer and seller want prioritization to achieve a larger objective: complete delivery of the Deal represented by the DealID. Thus any bidding logic that sorts DealID bids by price and (with or without open marketplace bids) and truncates the list too aggressively can endanger the fulfillment of the Deal.

Associating DealID to the wrong Object

A DealID should be treated as a 'targeting token' associated to orders, line-items or campaigns. If the DealID is associated to a Seat/Buyer it may create an undesired application of the DealID to many active campaigns. Alternatively if it is associated to the Advertiser it may limit that entity to only a single DealID.

Improper Handling of the Private vs Open Market Flag

The `pmp.private_auction` boolean flag indicates that the seller is willing or not willing to accept open market bids, ie "all bidders are welcome". If this flag is not read and interpreted correctly bid responses may be invalid. Open market bids sent to a private impression auction may be rejected and should not have been exposed to all bidders.

Improper handling of SeatIDs

If SeatIDs are treated as a filter of eligible demand partners on an open market impression, this defeats the 'all bidders are welcome' intention.

Silently Applying Margin Discounts to DealID Bids

With DealID buyers and sellers are communicating directly. The Exchange and Bidder become third-party automation platforms. If there are any automatic or silent discounts of bid prices (based upon margins or fees) set by either the exchange or the bidder, then the Deal may fail to function correctly.

Use cases**#1 Open Trading Agreement with Buyer**

- Between publisher and buying entity
- Publisher sets an access rule defining the price floor for a specific buyer.
- Locked to the buyer
- Broadcast price floor
- public/open inventory
- No DealID needed (dealID is optional)
- no named advertiser(s)
- no prioritization of bids
- daily, total or freq caps optional on publisher/exchange side
- all placements, or limited to specific placements

- targeting is up to the buyer/bidder

#2 Open Trading Agreement with Buyer with Named Advertisers

- as #1 with a list of named advertisers

#3 Open Bidding with DealID as Value-added Markers

- Between publisher and buying entity
- Publisher sets a price floor for URL masked inventory.
- public/open inventory (all buyers welcome)
- DealID represents 'Package Tokens'
- Each DealID signals that the impression falls into various content and placement categories
- Floor is associated to each DealID to signal cost for usage of that Token
- Winner is decided by bid price
- execution of targeting is up to the buyer/bidder

#4 First Look Trading Agreement

- Between publisher and buying entity
- Publisher sets an access rule defining the price floor for the buyer
- locked to the buyer
- known price floor
- DealID needed
- Optional named advertiser list
- Prioritization of bids expected
- daily, total or freq caps optional on publisher/exchange side
- all placements, or limited to specific placements
- targeting is up to the buyer/bidder

#5 Direct Option Deal with Advertiser via RTB

- Between Publisher and Advertiser or their representative.
- Publisher sets a rule defining a price floor and prioritization for specific advertiser(s)
- Fill rate is expected to be greater than or equal to X%
- locked to the buyer
- private/exclusive inventory
- limited to a set list of advertiser names (generally variants of one name)
- known price floor
- DealID needed
- Prioritization of bids expected
- daily, total or freq caps freq caps will apply on bidder side. Optional on Exchange side
- limited to specific placements
- targeting is mostly enforced by buyer/bidder

#6 Direct Option Deal with Advertiser via RTB with private data

- Same as #4
- DealID represents some combination of private first-party data from the Publisher

#7 Full Fill Direct Deal with Advertiser via RTB

- Same as #4
- Fill rate is expected to be 100% or nearly so.

#8 Full Fill Direct Deal with Advertiser via RTB with private data

- Same as #6
- DealID represents some combination of private first-party data from the Publisher

7.3 No-Bid Signaling

This section covers best practices for using the optional no-bid signaling. See the table 6.19 No-Bid Reason Codes for the enumerated list.

Many exchanges support multiple response types as a no-bid:

- HTTP 204 No Content from the bidder
- An empty JSON object: `"{}"`
- A well formed no bid response:
`{"id":"1234567890", "seatbid":[]}`
- A well formed no bid response with a reason code:
`{"id":"1234567890", "seatbid":[], "nbr ":2}`

An important issue in RTB is when impressions are triggered by software robots mimicking web browsers. Such robots maybe implicitly or explicitly driving these false transactions. The following represents a set of symmetric best practices for exchanges and bidders to help recognize and reject these events.

Responsibility of the exchange

Make best effort to classify and reject "non-human traffic" requests for ads to the exchange via the following best practices:

- (Recommended) filter impressions from known spiders via user-agent classification
- (Recommended) filter impressions from suspected NHT via a 'detector'

Responsibility of the bidder

- (Recommended) no-bid impressions from known spiders via user-agent classification
- (Recommended) no-bid impressions from suspected NHT via a 'detector'
- Specify a no-bid reason code in either case.

Where

- (Exchange) Filtering the impression means that the exchange should respond to the 'ad call' with either a blank HTTP 204 response or an unpaid ad (PSA) and not offered to any bidders.
- (Bidder) Filtering the impression means that the bidder should respond with a no-bid code.

- (Both) The impression transaction records should be clearly marked in any logging systems and be removed from contributing to any event counts associated with planning, forecasting, and reporting systems.

Appendix: Additional Information

- Creative Commons / Attribution License
<http://creativecommons.org/licenses/by/3.0>
 - IAB (Interactive Advertising Bureau)
<http://www.iab.net>
 - IAB / Networks & Exchanges QA Guidelines / Content Categories
<http://www.iab.net/media/file/NE-QA-Guidelines-Final-Release-0610.pdf>
 - JavaScript Object Notation (JSON)
<http://www.json.org>
 - MMA (Mobile Marketing Association)
<http://mmaglobal.com>
 - OpenRTB Project
<http://github.com/openrtb/OpenRTB/>
 - Apache Avro
<http://avro.apache.org>
 - Protocol Buffers (Protobuf)
<http://code.google.com/p/protobuf>
-