

# OpenRTB

for

# Programmatic Digital Out of Home

## Technical Specifications

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## 1. The DMI Standards for Programmatic Digital Out of Home

The following standards have been adapted from technical standards for Programmatic Digital Out of Home (version 0.9.1) published by the Digital Place Based Advertising Association (DPAA) in April 2017 (<http://dmi-org.com/downloads/DPAA-Programmatic-Technical-Specs-v.9.11.pdf>).

The DMI standards take into account specific requirements by and available data about the German Digital Out of Home market. In the following document, **deviations** from the DPAA standards are marked **in red**.

The DMI will try to coordinate further development of these standards with other industry associations to arrive at an internationally accepted version.

## 2. Existing methodology

While the need for Digital Out of Home (DOOH) advertising is unique, these specs will build- upon existing protocols. As other standards are already in place covering the basic protocols, these specifications will address the unique needs for Digital Out of Home. The foundation for these specs in the [Open RTB 2.5 protocols](#).

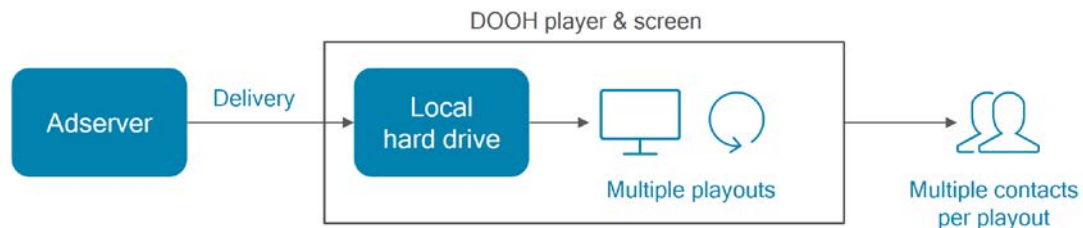
## 3. Digital Out of Home specific parameters

There are many unique elements tied to Digital Out of Home (DOOH) advertising that need to addressed within the programmatic protocols. These include:

- Impressions vs. deliveries vs. playouts vs. contacts:
  - **Impressions:** The term „impression“ **should be avoided** when defining reach of DOOH media. „Impression“ is defined as a term for one-to-one media, where delivery of the ad creative, display (or playout) of the ad creative, and contact with (exactly one) target group are treated as the same thing. For one-to-many media such as DOOH, delivery, playout, and contacts have to be treated separately:
  - **Delivery:** A delivery of an ad creative is NOT the saleable item. The delivery only covers the physical transmission of the creative to the DOOH playout system (where it is usually stored on the local hard drive and played out more than once - see below).
  - **Playout:** After delivery an ad creative is usually played out more than once (usually the smallest bookable unit is 1 hour with multiple playouts) on more than one DOOH screen (usually the smallest bookable unit is one location - such as one supermarket or one electronics store - with multiple screens). As such, the „contact“ counts will be adjusted to account for the expected audience (Ex. 10 playouts in 1 hour were viewed by 90

people; therefore, 90 contacts should be recorded). This is a very different consideration to the existing process.

- Measured contacts: In the German market, the reach of DOOH media is measured in „contacts“, not „impressions“. A „contact“ is recorded when a viewer remembers seeing a screen or a creative (utilizing a standardized methodology by DMI & GfK). Together with a „contact“, all demographics of the viewer are recorded. In the future, „contacts“ will be measured or verified using technology such as cameras and/or beacons/ smartphones. Note: Not every person passing a DOOH screen will generate a contact. (In the above example: During the 10 playouts in 1 hour 150 people may have passed the DOOH screen(s), only 90 of which remember having seen the screen or ad creative, resulting in 90 „contacts“).
- Saleable item: The saleable item is a playout or a bundle of playouts on one DOOH screen or a bundle of DOOH screens. Each playout or bundle of playouts yields multiple contacts.

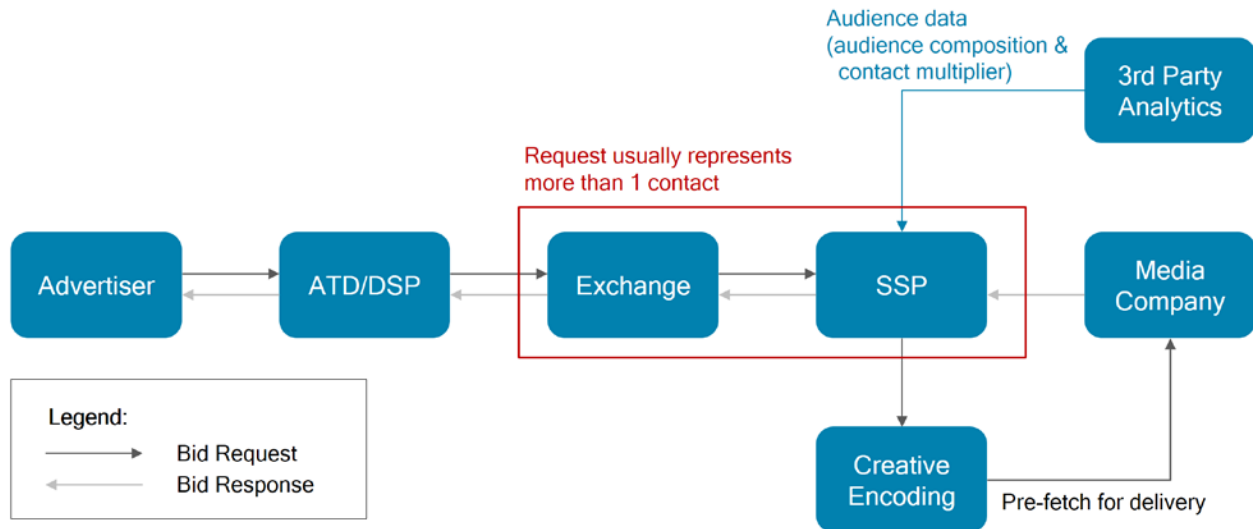


- One-to-many: The audience for Digital Out of Home advertising will generally deliver more than one **contact** (one-to-many) vs the one-to-one impression delivery of traditional programmatic. In some instances this value may be less than 1 (**per playout and screen**) when audience reporting identifies a small audience over a period of time (ex. 45 **contacts** per 60 **playouts** over an hour).
- Decimal value: The basis for the actual number of **contacts** is based on audited statistics provided by analytics providers (e.g. DMI, GfK) which are produced based on weekly, monthly, or yearly summaries. As such, for each **playout (on one or many screens)** a calculation is leveraged which could result in fractional (non-integer) **contact** numbers. The proposed approach is to use decimal values to ensure accuracy (in audience delivery and revenue).
- Creative management: There are many unique considerations tied to creatives:
  - Specs: Due to infrastructure and bandwidth access considerations there are unique formats and encoding standards that need to be managed against.

- Delivery timing: Often times creatives need to be delivered to the platform in advance of the actual **playout**. As such, this transaction may not always be real-time, but instead a “delayed” delivery. Typically, **delivery-to-payout** latency will be thirty mins to two hours, though it can additionally require an overnight process.
  - Creative encoding or adjustments: Creatives will be received by the SSP platform and converted to the necessary formats for delivery to all of the platform’s publisher customers. As such, real-time **playout** will not occur. This needs to be done once for every new creative. As such, the initial creative **playout** will be skipped (to enable conversion) and subsequent **playouts** will be „delivered“. Note: campaigns can still be trafficked with 1 or more creatives.
- Video pixels: Video is traditionally tracked with quartile pixels to verify start through completion. In Digital Out of Home advertising, these values are always 100%.
  - Demographics: The audience is a collection of users, not a pre-defined user. As such, additional data elements need to be shared for accuracy. **Furthermore, the audience composition changes over time. Therefore, audience data are not static (as is the case for one-to-one media), but dynamic real-time data. Where real-time audience data are not available, average values for the audience composition of a specific time of day and/or weekday are used.**
  - Real-time: As there are unique creative requirements the transaction will not be real-time, but instead introduce some latency (a few mins to a few hours) in the delivery from the original bid time.
  - Pricing: Pricing will be based on CPM (cost per thousand **contacts**). Each bid request will follow the “One-to-many **contacts**” value. The **contacts** value **will usually be greater than 1 (see Appendix H for exemplary values)**.
  - Booking Unit: Most of the time, the smallest saleable item will not be a single contact or a single playout (as opposed to a single impression in one-to-one advertising). Rather, the smallest saleable item (of time) is usually 1 hour per screen with several playouts during that hour (generating several contacts with the target group). Some publishers may specify 3 hours as the smallest saleable item (of time), others may specify one full day. The smallest saleable item (of screens) will not be a single screen but a collection of screens - usually one entire location such as one supermarket or one electronics store with multiple screens. A „**booking unit**“ is a collection of saleable screens for a defined number of playouts (usually defined by a unit of time). Each „booking unit“ is assigned a **unique identifier (the „booking unit ID“ or „BUID“)** by the DMI. Information on number and type of screens, playouts, contacts, demographics etc. per booking unit is stored in the [DMI’s DOOHRY database](#), where it can be looked up by SSPs and DSPs using the BUID. Therefore, it is sufficient to pass the BUID between SSPs and DSPs.

## 4. Process flow

Programmatic Process Flow for Digital Out of Home Inventory:



Note: as the creative is pre-fetched, the initial selection of an ad where the creative has not been processed will be skipped from display (pending encoding and delivery to the platform). Subsequent bid requests will be eligible for delivery (post encoding). A separate platform level creative caching integration between an SSP and DSP can significantly improve this process.

For an in-depth analysis of the process flow, refer to the DMI's [Standards for Programmatic DOOH](#).

## 5. DMI & DPAA Programmatic Specs

These programmatic specs for Digital Out of Home advertising are extensions build upon the [DPAA's specs \(version 0.9.1\)](#) which in turn are build upon the [IAB's OpenRTB API Specifications v2.5 \(Dec 2016\)](#). The IAB standards are the basis for existing connections that advertisers and publishers have with buying platforms. The IAB standards do not adequately support the unique requirements for Digital Out of Home advertising. The „OpenRTB for DOOH“ framework enables custom extensions to be created to account for variations. The unique Digital Out of Home criteria can be included within these newly developed DMI & DPAA extensions.

## 6. DMI & DPAA DOOH Extensions

### a. Object BidRequest (3.2.1)

The BidRequest contains all of the basics tied to the impression requests. The attributes will be used as follows:

Attribute	Status	Notes
id	Required	
imp	Required	
site	Will not be used	
app	Required	
device	Required	
user	Will not be used	
test	Optional	
at	Required	
tmax	Required	Maximum time in milliseconds. 1 second (tmax=1000) will be the default value, vs the typical 120.
wseat	Optional	
allimps	Optional	
cur	Optional	
bcat	Optional	
badv	Optional	
bapp	Optional	
regs	Optional	

Modifiers are needed to account for latency (delayed ad delivery).

Extension: DOOH

Attribute	Description	Type	Status
displaytime	Expected time in epoch seconds UTC the ad will be shown. This is an estimated display time used for day & time targeting.	Int64	Required
<del>advancebid</del>	<del>The number of minutes in advance that the bid will close before the creative is rendered</del>	<del>Int16</del>	<del>Required</del>



buid (planned)	"Booking unit identifier": unique identifier in the DMI's DOOHRY database describing the bookable unit in terms of number of DOOH screens, number of layouts and time.	Int64	Required
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The “displaytime” attribute is when a creative could not be pre-loaded onto the DOOH payout systems before the start of the campaign and streaming of the creative is not possible (see below). The “displaytime” attribute is used to send out a bid request well in advance of the actual payout with the payout time given in the “displaytime” parameter. This allows the DOOH payout systems to download the creative from the ad URL provided in the winning bid in the time period between the bid request and the actual payout.

The „advancebid“ attribute will not be used.

It is recommended to pre-load the creative before the start of a campaign (whenever possible), i.e. transmit the creative to all payout systems before the first bid request. This eliminates the transmission latency but leaves the payout latency (resulting from e.g. a fixed payout frequency of a creative in a DOOH program loop or simply from having to wait for the current payout to finish before being able to execute the bid request).

Where a pre-loading is not possible, the creative should be streamed from the ad server at the time of payout (in that case, the “maxbitrate” attribute in object “Video” should be supplied - see below).

Where neither pre-loading nor streaming is possible, the “displaytime” parameter should be used and the bid request sent well in advance of the payout.

**For an overview on pre-loading, streaming, and the “displaytime” attribute, refer to the [Standards for Programmatic DOOH](#).**

The (planned) „buid“ attribute is the unique „booking unit identifier“ assigned by the publisher in the DMI’s [DOOHRY database](#) to a booking unit. A booking unit represents a single or a bundle of payouts (several payouts in e.g. one hour or several screens in e.g. one location) and contains:

- The number of locations (e.g. supermarkets or trains stations) in the Bid Request
- The number of DOOH screens in the Bid Request
- Size, orientation, and resolution of DOOH screens in the Bid Request
- The payout frequency of the creative (e.g. every 2 minutes)
- The number of payouts per screen and day (EBL)
- Payout time (e.g. all day, 8:00-9:00, 9:00-12:00)
- Payout day (e.g. Mondays only, workdays only, weekends only)
- Payout period (e.g. 1 month, 1 week, 1 day)

- Contacts (i.e. measured contacts of target group, not ad impressions) per booking unit
- Demographics (sex, age, HHI, education, employment etc.) per booking unit
- Interests and media usage of target group per booking unit

Booking Units and all of the above information are available through the DMI's DOOHRY database. The „buid“ attribute is part of the bid request and can be passed on from the SSP to the DSP. The DSP can use the „buid“ to access the above information e.g. via [DOOHRY](#).

#### b. Object Imp (3.2.2)

The Object Imp will be utilized as follows:

Attribute	Status
id	Required
banner	Required
video	Optional
audio	Will not be used
native	Will not be used
pmp	Optional
displaymanager	Optional
displaymanagerver	Optional
instl	Required
tagid	Optional
bidfloor	Optional
bidfloorcur	Optional
clickbrowser	Optional
secure	Optional
iframebuster	Optional
exp	Optional

As the number of DOOH viewers is usually greater than 1 (multiple contacts per ad delivery), the Impression object will need to account for the actual number of contacts offered with the bid request. The number of contacts will depend on the time and day and the number of locations or screens in the booking unit (see Appendix H for exemplary values).

Multiple “slots” (= DOOH advertising spaces) in a given program loop can be offered as a group, by offering them as separate “Imp” Objects (with individual IDs) within the same bid request.

If a DSP wants to bid on the entire group instead of individual “slots”, the “group” attribute in the bid response should be set to “1”.

For an overview of multiple Imps and the “group” parameter (as well as the “sequence” parameter), refer to the [Standards for Programmatic DOOH](#).

Extension: DOOH

Attribute	Description	Type	Status
contactmultiply	Adjustment to represent the number of expected contacts (i.e. measured contacts of target group with creative) ContactMultiply is usually greater than 1 and will depend on time of day and on weekday.  Can also be passed from SSP to DSP via BUID or Deal ID (see sections 6a, 6p, and 6t)	Float (value >=0)	Required (see Appendix H for values)

Note:

- **contactmultiply** is proposed as a non-integer value to reflect the accuracy of the available data and the associated pricing associated with the delivery. The assumption is that the DSPs will aggregate the real numbers (non-integer) values to ultimately present the aggregated delivery totals as integer based values.
- When the „BUID“ attribute in Object BidRequest is used (see above), the ContactMultiply attribute is redundant, since the number of contacts is passed on (together with other information) in the „BUID“ attribute. Same applies, when a Deal ID is used.

### c. Object Banner (3.2.3)

This object will be used for image and for video executions.

Attribute	Status
w	Required
h	Required
format	Optional
id	Optional
btype	Optional
battr	Optional
pos	Required
mimes	Optional

topframe	Required
expdir	Will not be used
api	Optional

While the creative sizes will account for the unique specs, the text based resolution will need to be clarified.

Extension: DOOH

Attribute	Description	Type	Status
dpi	This identifies if there is a minimum DPI for any text-based elements of the creative to ensure it is clearly legible and clear on the display.	Integer	Required
exposetime	This identifies the exposure time per <b>layout</b> that the creative will be displayed before refreshing to the next creative. Value will be represented in seconds.	Integer	Required
width	This identifies the actual physical dimension width (inches) of the ad creative's display size measured in inches. As the defined pixel sizes identify the standards, dependencies and considerations may vary based on whether the display will be on a tablet sized screen vs posters vs billboards.	Integer	Required
height	This identifies the actual physical dimension length (inches) of the ad creative's display size measured in inches. As the defined pixel sizes identify the standards, dependencies and considerations may vary based on whether the display will be on a tablet sized screen vs posters vs billboards.	Integer	Required

d. [Object Video \(3.2.4\)](#)

This object will only be used for media consoles accepting the VAST protocol. Animated gifs (no audio “video”) will deliver as a banner (3.2.3). The object will be utilized as follows:

Attribute	Status	Notes
mimes	Required	
minduration	Required	
maxduration	Required	
protocols	Recommended	
protocol	Optional	
w	Optional	
h	Required	
startdelay	Optional	
linearity	Required	
skip	Will not be used	
skipmin	Will not be used	
skipafter	Will not be used	
sequence	Optional	Used to identify the position of a “slot” (i.e. DOOH advertising space) in a program loop.
battr	Optional	
maxextended	Value=0	
minibitrate	Optional	
maxbitrate	Optional	
boxingallowed	Optional	
playbackmethod	Required	
delivery	Optional	
pos	Recommended	
companionad	Will not be used	
api	Optional	
companiontype	Will not be used	

e. [Object Audio \(3.2.5\)](#)

This object will not be used as this is not a delivery format utilized.

f. [Object Native \(3.2.6\)](#)

This object will not be used utilized.

g. [Object Format \(3.2.7\)](#)

This object is not expected to be used.

h. [Object Site \(3.2.8\)](#)

This object will not be utilized. The content will be identified as Apps (3.2.9) as opposed to Sites.

i. [Object App \(3.2.9\)](#)

The App name will be used (vs Site (3.2.8)) as this is a non-website environment.

Attribute	Status
id	Optional
name	Required
bundle	Will not be used
domain	Optional
storeurl	Will not be used
cat	Recommended
sectioncat	Will not be used
pagecat	Will not be used
ver	Will not be used
privacypolicy	Optional
paid	Will not be used
publisher	Required
content	Optional
keywords	Optional

j. [Object Publisher \(3.2.10\)](#)

This identifies the media company selling the opportunity and will be used to identify the provider (media company).

Attribute	Status
id	Required
name	Required
cat	Required
domain	Recommended

k. [Object Content \(3.2.11\)](#)

This section is not expected to be utilized.

l. [Object Producer \(3.2.12\)](#)

This section is not expected to be utilized.

m. [Object Device \(3.2.13\)](#)

The device attributes need to be appended with the device venue to accurately identify the opportunity.

Attribute	Status
ua	Recommended
geo	Required
dnt	Will not be used
lmt	Will not be used
ip	Recommended
ipv6	Recommended
devicetype	Recommended
make	Optional
model	Optional
os	Optional
osv	Optional
hvv	Optional
hvw	Optional

w	Optional
ppi	Optional
pxratio	Optional
js	Optional
geofetch	Optional
flashver	Optional
delivery	Optional
language	Optional
carrier	Optional
connectiontype	Optional
ifa	Optional
didshal1	Optional
didmd5	Optional
dpidshal	Optional
dpidmd5	Optional
macshal	Optional
macmd5	Optional

Extension: DOOH

Attribute	Description	Type	Status
devicevenue	This identifies the venue of the console.	Integer	Required. (See Appendix A for valid values)

Note:

- When the „buid“ attribute in Object BidRequest is used (see above), the „devicevenue“ attribute is redundant, since the respective information is passed on (together with other information) in the „buid“ attribute.
- The DMI has upgraded the DPAA’s original list of device venues to incorporate all venues with DOOH screens in the German market. At the same time, a hierarchical structure is recommended to be able to group similar venues and to add new venues without having to change the numbering. The proposed structure currently does not match the structure of venues in the DMI’s DOOHRY database (but will in the future). In the future, the DMI and the DPAA structures will be matched in the DOOHRY database as well. (For mapping of all three structures, see Appendix A.)



n. Object Geo (3.2.14)

This object will be used.

Attribute	Status	Notes
lat	Required	
lon	Required	
type	Required	Use "Mobile Location Services"
accuracy	Recommended	
lastfix	Optional	
lpSERVICE	Optional	
country	Recommended	Country code using ISO-3166-1-alpha-3.
region	Recommended	Region code using ISO-3166-2
regionfips104	Optional	
metro	Recommended	Germany: GKZ; USA: Google Metro Codes (see Appendix I for a link to the codes)
city	Recommended	U.N. Code for Trade and Transport Locations (see Appendix I for a link to the codes)
zip	Recommended	Germany: PLZ
utcoffset	Recommended	

Extension: DOOH

Attribute	Description	Type	Status
positiontype	Descriptor identifying whether the media console is in a fixed position (ex. billboard, elevator, mall) vs a console that might move (ex. taxi)	Integer	Required. (0=fixed, 1=move)

o. Object User (3.2.15)

While user attributes (**audience composition** in the **DOOH** context) is critical, it is not user ID specific. As such, the additional audience attributes will be added in 3.2.16 (Data).

p. Object Data (3.2.16)

The Data object is intended to capture additional information about the user. Within the DOOH environment, the fields will reveal attributes about the **audience composition**, not just an individual user.

Data records may come from one or more sources and each source will be provided uniquely.

Extension: DOOH

Attribute	Description	Type	Status
dataprovider	This identifies the source of the audience related data	Integer	Optional (0=DMI, 1=Nielsen, 2=Publisher research, 3=Other)
agerange	This identifies the pre-defined age ranges	Integer	Optional (See Appendix B for values)
agerangepersent	This identifies the percentage of the given age range band to the overall audience enabling buyers to determine percentage of composition of the audience.	Integer	Optional
hhirange	This identifies the pre-defined household income ranges	Integer	Optional (See Appendix C for values)
hhipersent	This identifies the percentage of the given household income range to the	Integer	Optional

Note:

- The passing of data records could also be solved via a Deal ID relationship as it sometimes done in traditional digital buying. This would entail setting up Deal IDs for a unique audience profile and establishing that accepted parameter between SSPs and DSPs. See section 3.2.20 (Deal).
- When the „BUID“ attribute in Object BidRequest is used (see above), the „agerange“, „agerangepersent“, „hhirange“, and „hhipersent“ attributes are redundant, since the respective information is passed on (together with more demographic information, see Appendices D to G) in the „BUID“ attribute.
- The Age Ranges for programmatic DOOH in the German market should reflect the standards already adopted in the German market which deviate slightly from the DPAA's standards (see Appendix B).

- The Household Income Ranges for programmatic DOOH in the German market should reflect the standards already adopted in the German market which are given as monthly income (in Euros) as opposed to yearly income (in dollars) (see Appendix C).

q. [Object Segment \(3.2.17\)](#)

This object is not expected to be utilized.

r. [Object Reqs \(3.2.18\)](#)

This object is not expected to be utilized.

s. [Object PMP \(3.2.19\)](#)

This section can be utilized as specified.

t. [Object Deal \(3.2.20\)](#)

This section can be utilized as specified.

Optionally, this section may also be utilized to accommodate data attributes (see Data 3.2.16). The application within Deal ID would not account for sending over all demographic data but instead aligning to a key audience segment desired and where that audience characteristic makes up the majority (negotiated w/the buyer) of the audience.

## 7. Bid Win & Execution Response

### a. General parameters

The win notification will include parameters to identify if the placement was won and delivery confirmation. The response notifications will be finalized upon live testing of platform integrations.

- Win Notification: A win notification will be sent under selection. This will be in advance of actual delivery.
- Impression served notification: The impression served notification will be sent highlighting the time of delivery and the **contact** multiplier for accurate DSP logging of the delivery.
- Video playback: Pixels will be fired for Viewability measurements at the quartile (25%, 50%, 75%, 100%) points.
- BURL (Billing URL): Impression served notification to be used as the billing & delivery notification.

## 8. Appendix A: Device Venues

A comprehensive overview of the DOOH device venues for the German market including a mapping to the DMI's [DOOHRY database](#) can be found in the DMI [Standards for DOOH Venues](#).

Full Categorization DMI (English)		DPAA	
Name	ID	Name	ID
<b>Mobility</b>	<b>1</b>		
AIRBORNE	<b>1.1</b>	AIRBORNE	1
AIRPORTS	<b>1.2</b>	AIRPORTS	2
AIRPORTS_BAGGAGE_CLAIM	1.2.1	AIRPORTS_BAGGAGE_CLAIM	3
AIRPORTS_IN_TERMINAL	1.2.2	AIRPORTS_IN_TERMINAL	4
AIRPORTS_LOUNGES	1.2.3	AIRPORTS_LOUNGES	5
AIRPORTS_ARRIVALS	1.2.4		
AIRPORTS_DEPARTURES	1.2.5		
AIRPORTS_DUTY_FREE	1.2.6		
AIRPORTS_GATES	1.2.7		
AIRPORTS_PUBLIC_AREAS	1.2.8		
AIRPORTS_RESTRICTED_AREAS	1.2.9		
HIGHWAYS	<b>1.3</b>		
HIGHWAYS_REST_AREAS	1.3.1		
HIGHWAYS_ROADSIDE	1.3.2		
GAS_STATIONS	<b>1.4</b>	GAS_STATIONS	26
PUBLIC_TRANSPORT	<b>1.5</b>		
RAIL	1.5.1		
SUBWAY	1.5.2		
BUSSES	1.5.3	BUSES	12
BUSSES_INSIDE	1.5.3.1		
BUSSES_OUTSIDE	1.5.3.2		
TRAMS	1.5.4		
TRAMS_INSIDE	1.5.4.1		
TRAMS_OUTSIDE	1.5.4.2		
TAXIS	1.5.5		
TAXIS_INSIDE	1.5.5.1		
TAXIS_OUTSIDE	1.5.5.2	TAXIS_WRAPPED_VEHICLES	51
STATIONS	<b>1.6</b>		
STATIONS_RAILWAY	1.6.1	RAIL	43
STATIONS_RAILWAY_ENTRANCES	1.6.1.1		
STATIONS_RAILWAY_PLATFORMS	1.6.1.2		
STATIONS_SUBWAY	1.6.2	SUBWAY	50
STATIONS_SUBWAY_ENTRANCES	1.6.2.1		
STATIONS_SUBWAY_PLATFORMS	1.6.2.2		
STATIONS_BUS	1.6.3		
STATIONS_TRAM	1.6.4	SHELTERS	48
PARKING	<b>1.7</b>		
PARKING_GARAGES	1.7.1		
PARKING_CAR_PARKS	1.7.2		
TRUCKSIDE	<b>1.8</b>	TRUCKSIDE	52
MARINE	<b>1.9</b>	MARINE	35
FERRIES	<b>1.10</b>	FERRIES	24
CHARGING_STATION	<b>1.11</b>		
RENTAL_CAR_SERVICES	<b>1.12</b>		

**Full Categorization DMI (English)**

Name	ID
<b>RETAIL_POS</b>	<b>2</b>
CONVENIENCE_STORES	2.1
ELECTRONICS_STORES	2.2
ELECTRONICS_STORES_CHECKOUT	2.2.1
ELECTRONICS_STORES_INSTORE	2.2.2
KIOSKS	2.3
MALLS	2.4
MALLS_FOOD_COURTS	2.4.1
NEWSSTANDS	2.5
LOTTERY_RETAILER	2.6
POST_OFFICES	2.7
SUPERMARKETS	2.8
SUPERMARKETS_CHECKOUT	2.8.1
SUPERMARKETS_INSTORE	2.8.2
	2.9
HARDWARE_AND_FURNITURE_STORES	2.10
FASHION	2.11
SPORTS	2.12
BAKERIES	2.13
MEAT_FISH	2.14
OPTICIAN	2.15
TOURISM	2.16
TOURISM_TRAVEL_AGENCY	2.16.1
TOURISM_TOURIST_INFORMATION	2.16.2
CAR_DEALERSHIP_OR_WORKSHOP	2.17
FINANCIAL_SERVICES	2.18
FINANCIAL_SERVICES_BANKS	2.18.1
FINANCIAL_SERVICES_ATMS	2.18.2
PRESS_AND_BOOK_STORES	2.19
BOOK_STORES	2.20
DRUG_STORES	2.21
OTHER	2.22

**DPAA**

RETAIL	46
CONVENIENCE_STORES	18

KIOSKS	32
MALLS	33
MALLS_FOOD_COURTS	34
NEWSSTANDS	38

FINANCIAL_SERVICES	25
ATMS	6

**Full Categorization DMI (English)**

Name	ID
<b>OUTDOOR</b>	<b>3</b>
Street	<b>3.1</b>
Street_dCLP	3.1.1
Street_dCLB	3.1.2
Street_Videoboard	3.1.3
Pedestrian_Zone	<b>3.2</b>
Pedestrian_Zone_dCLP	3.2.1
Pedestrian_Zone_dCLB	3.2.2
Pedestrian_Zone_Videoboard	3.2.3

**DPAA**

POSTERS	41
JUNIOR_POSTERS	31
URBAN_PANELS	54
WALLS_SPECTACULARS	56
MOBILE_BILLBOARDS	36
PHONE_KIOSKS	40
CITY_INFORMATION_PANELS	17
DEDICATED_WILD_POSTING	19
RECEPTACLES	44
BACKLIGHTS	7
BENCHES	9
BIKE_RACKS	10
BULLETINS	11

**Full Categorization DMI (English)**

Name	ID
<b>Healthcare</b>	<b>4</b>
DOCTORS_OFFICES	4.1
GENERAL MEDICINE	4.1.1
ANGIOLOGY	4.1.2
OCCUPATIONAL MEDICINE	4.1.3
OPHTHALMOLOGY	4.1.4
SURGERY	4.1.5
DIABETOLOGY	4.1.6
ENDOCRINOLOGY	4.1.7
GYNECOLOGY AND OBSTETRICS	4.1.8
GASTROENTEROLOGY	4.1.9
VASCULAR SURGERY	4.1.10
OTOLARYNGOLOGY	4.1.11
DERMATOLOGY	4.1.12
CARDIOSURGERY	4.1.13
HYGIENE AND ENVIROMENTAL MEDICINE	4.1.14
INTERNAL MEDICINE	4.1.15
CARDIOLOGY	4.1.16
ORTHODENTICS	4.1.17
PAEDIATRICS & ADOLESCENT MEDICINE	4.1.18
PAEDIATRIC & ADOLOSCENT PSYACHIATRY	4.1.19
ORAL AND MAXILLOFACIAL SURGERY	4.1.20
NEUROLOGY	4.1.21
ORTHOPAEDICS AND TRAUMATOLOGY	4.1.22
PLASTIC AND AESTHETIC SURGERY	4.1.23
PNEUMOLOGY	4.1.24
PSYCHOTHERAPEUTIC MEDICINE	4.1.25
PSYCHIATRY AND PSYCHOTHERAPY	4.1.26
RADIOLOGY / NUCLEAR MEDICINE	4.1.27
RHEUMATOLOGY	4.1.28
PHARMACIES	4.2
HOSPITALS	4.3
VETERINARIAN_OFFICES	4.4
PHYSIOTHERAPIST	4.5

**DPAA**

DOCTORS_OFFICES	20
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DOCTORS_OFFICES_OBSTETRICS	21
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DOCTORS_OFFICES_PEDIATRICS	22
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HOSPITALS	29
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VETERINARIAN_OFFICES	55
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**Full Categorization DMI (English)**

Name	ID
<b>EDUCATION_WORKPLACE_SERVICES</b>	<b>5</b>
SCHOOLS	<b>5.1</b>
UNIVERSITY	<b>5.2</b>
UNIVERSITY_LIBRARIES	5.2.1
UNIVERSITY_BIOCENTERS	5.2.2
UNIVERSITY_LOBBY	5.2.3
UNIVERSITY_AUDITORIUM	5.2.4
UNIVERSITY_CANTEEN	5.2.5
UNIVERSITY_GYM	5.2.6
UNIVERSITY_DEPT_Science & Mathematics	5.2.7
UNIVERSITY_DEPT_Engineering	5.2.8
UNIVERSITY_DEPT_Social_Sciences	5.2.9
UNIVERSITY_DEPT_Law & Economics	5.2.10
UNIVERSITY_DEPT_Medicine & Healthcare	5.2.11
UNIVERSITY_DEPT_Teaching_Professions	5.2.12
UNIVERSITY_DEPT_Linguistics & Cultural Studies	5.2.13
UNIVERSITY_DEPT_Agriculture and Forestry	5.2.14
UNIVERSITY_DEPT_Officials courses	5.2.15
UNIVERSITY_DEPT_Art, Design & Music	5.2.16
<b>TECHNICAL_COLLEGES</b>	<b>5.3</b>
CHILD_CARE	<b>5.4</b>
OFFICE_BUILDINGS	<b>5.5</b>
TRADE_FAIR	<b>5.6</b>
GOVERNMENT OFFICES	<b>5.7</b>
GOVERNMENT OFFICES_NATIONAL	5.7.1
GOVERNMENT OFFICES_REGIONAL	5.7.2
GOVERNMENT OFFICES_LOCAL	5.7.3
MILITARY	5.8

**DPAA**

UNIVERSITIES	53
CHILD_CARE	15
OFFICE_BUILDINGS	39

**Full Categorization DMI (English)**

Name	ID
<b>ENTERTAINMENT_LEISURE</b>	<b>6</b>
HOSPITALITY	6.1
HOSPITALITY_BARS	6.1.1
HOSPITALITY_CLUBS_DISCOS	6.1.2
HOSPITALITY_CAFES_AND_COFFEESHOPS	6.1.3
HOSPITALITY_RESTAURANTS	6.1.7
HOSPITALITY_HIGH_END_RESTAURANTS	6.1.8
HOSPITALITY_QSR	6.1.9
HOTELS	6.2
MOVIE_THEATER	6.3
MOVIE_THEATER_LOBBIES	6.3.1
THEATER_OPERA_MUSICAL	6.4
SPORTS	6.5
SPORTS_GOLF_COURSES	6.5.1
SPORTS_GYMS	6.5.2
SPORTS_SWIMMING	6.5.3
SPORTS_ARENAS	6.5.4
RESORTS_LEISURE	6.6
SALONS	6.7
TANNING_STUDIOS	6.8
FAMILY_ENTERTAINMENT	6.9
NIGHTLIFE	6.10

**DPAA**

BARS	8
CAFES	13
QSR	42
HOTELS	30
MOVIE_THEATER_LOBBIES	37
GOLF_COURSES	27
GYMS	28
SPORTS_ARENAS	49
RESORTS_LEISURE	45
SALONS	47
FAMILY_ENTERTAINMENT	23
CASUAL_DINING_RESTAURANTS	14

## 9. Appendix B: Age Ranges

DPAA		
ID#	Gender	Age Range
1	Female	All
2	Female	15-17
3	Female	18-24
4	Female	25-34
5	Female	35-44
6	Female	45-49
7	Female	50-54
8	Female	55-64
9	Female	65+
10	Male	All
11	Male	15-17
12	Male	18-24
13	Male	25-34
14	Male	35-44
15	Male	45-49
16	Male	50-54
17	Male	55-64
18	Male	65+
19	Persons	15-17
20	Persons	18-24
21	Persons	25-34
22	Persons	35-44
23	Persons	45-49
24	Persons	50-54
25	Persons	55-64
26	Persons	65+

DMI		
ID#	Gender	Age Range
1	Female	All
2	Female	14-19
3	Female	20-24
4	Female	25-29
5	Female	30-34
6	Female	35-39
7	Female	40-44
8	Female	45-49
9	Female	50-54
10	Female	55-59
11	Female	60-64
12	Female	65+
13	Male	All
14	Male	14-19
15	Male	20-24
16	Male	25-29
17	Male	30-34
18	Male	35-39
19	Male	40-44
20	Male	45-49
21	Male	50-54
22	Male	55-59
23	Male	60-64
24	Male	65+
25	Persons	14-19
26	Persons	20-24
27	Persons	25-29
28	Persons	30-34
29	Persons	35-39
30	Persons	40-44
31	Persons	45-49
32	Persons	50-54
33	Persons	55-59
34	Persons	60-64
35	Persons	65+
36	Persons	All
37	Female	18-19
38	Male	18-19
39	Persons	18-19

## 10. Appendix C: HHI Ranges

DPAA	
ID#	HHI Range (yearly)
1	0 - \$24,999
2	\$25,000 - \$39,999
3	\$40,000 - \$59,999
4	\$60,000 - \$74,999
5	\$75,000 - \$99,999
6	\$100,000+

DMI	
ID#	HHI Range (monthly)
1	0 - €999
2	€1,000 - €1,499
3	€1,500 - €1,999
4	€2,000 - €2,499
5	€2,500 - €2,999
6	€3,000 - €3,499
7	€3,500 - €3,999
8	€4,000 - €4,499
9	€4,500 - €4,999
10	€5,000+

## 11. Appendix D: Education

ID#	Education
1	Volksschule/Hauptschule ohne abgeschlossene Lehre
2	Volksschule/Hauptschule mit abgeschlossener Lehre
3	Weiterführende Schule ohne Abitur
4	Abitur
5	Studium
6	kein Abschluss

## 12. Appendix E: Employment

ID#	Employment
1	berufstätig
2	voll berufstätig
3	teil-berufstätig (halbtags/stundenweise)
4	In Ausbildung (Schüler, Student, Azubi)
5	in Berufs-Ausbildung, Azubi
6	Hausfrau ohne Berufstätigkeit
7	Schüler(in)
8	Student(in)
9	Rentner(in)
10	nicht berufstätig, arbeitslos

## 13. Appendix F: Job Description

ID#	Job description
1	Selbständig
2	freiberuflich tätig
3	Angestellter
4	Beamter
5	selbständiger Landwirt
6	Facharbeiter
7	Arbeiter
8	noch nie berufstätig gewesen
9	Hausfrau/-mann ohne Berufstätigkeit
10	In Ausbildung (Schüler, Student, Azubi)
11	nicht berufstätig/keine Angabe

## 14. Appendix G: Other

ID#	Head of Household
1	ja
2	nein

ID#	Persons in Household
1	1 Person
2	2 Personen
3	3 Personen
4	4 Personen
5	5 Personen oder mehr

ID#	Children
1	Kein Kind
2	1 Kind
3	2 Kinder
4	3 Kinder oder mehr

ID#	Age of Children
1	bis 2 Jahre
2	2 bis 6 Jahre
3	6 bis 10 Jahre
4	10 bis 13 Jahre
5	Keine Kinder im Haushalt

ID#	Decision Maker
1	ja
2	nein

ID#	Management Level
1	Gesamtleitung
2	Teilbereichsleitung
3	Keine leitende Funktion

ID#	Decision Making Authority
1	Treffe Entscheidung über Etat & Finanzierungsmöglichkeiten
2	Treffe Kaufentscheidung zu einem konkreten Angebot oder Produkt
3	Treffe Entscheidungen in Personalfragen
4	Treffe P+O-Entscheidungen
5	Keine leitende Funktion

ID#	Number of Employees in Company
1	Unter 10 Mitarbeiter
2	10 bis unter 50 Mitarbeiter
3	50 bis unter 250 Mitarbeiter
4	250 bis unter 500 Mitarbeiter
5	500 bis unter 1.000 Mitarbeiter
6	1.000 Mitarbeiter oder mehr

## 15. Appendix H: Exemplary „contactmultiply“ values

Venue	Booking Unit (time)	Days per Booking Unit	Playouts per day	Playouts per Booking Unit	Locations	Screens	Booking Unit (geography)		
							Measured contacts (ContactMultiply) entire Network (all Screens)	Measured contacts (ContactMultiply) per Location	Measured contacts (ContactMultiply) per Screen
Airport	Mo-Su all day	7	360	2.520	7	948	20.137.000	2.876.714	21.242
	Mo-Fr all day	5	360	1.800	7	948	15.701.000	2.243.000	16.562
	Sa all day	1	360	360	7	948	3.102.000	443.143	3.272
	Su all day	1	360	360	7	948	1.334.000	190.571	1.407
	Mo-Su 06 - 09 h	7	60	420	7	948	4.921.000	703.000	5.191
	Mo-Su 09 - 12 h	7	60	420	7	948	3.866.000	552.286	4.078
	Mo-Su 12 - 15 h	7	60	420	7	948	2.321.000	331.571	2.448
	Mo-Su 15 - 18 h	7	60	420	7	948	2.796.000	399.429	2.949
	Mo-Su 18 - 21 h	7	60	420	7	948	2.991.000	427.286	3.155
	Mo-Su 21 - 24 h	7	60	420	7	948	3.241.000	463.000	3.419
	Mo-Su 00 - 06 h	7	0	0	7	948	0	0	0
	Mo-Fr 06 - 09 h	5	60	300	7	948	3.795.000	542.143	4.003
	Mo-Fr 09 - 12 h	5	60	300	7	948	3.019.000	431.286	3.185
	Mo-Fr 12 - 15 h	5	60	300	7	948	1.596.000	228.000	1.684
	Mo-Fr 15 - 18 h	5	60	300	7	948	2.144.000	306.286	2.262
	Mo-Fr 18 - 21 h	5	60	300	7	948	2.427.000	346.714	2.560
	Mo-Fr 21 - 24 h	5	60	300	7	948	2.720.000	388.571	2.869
	Mo-Fr 00 - 06 h	5	0	0	7	948	0	0	0
	Sa 06 - 09 h	1	60	60	7	948	896.000	128.000	945
	Sa 09 - 12 h	1	60	60	7	948	651.000	93.000	687
	Sa 12 - 15 h	1	60	60	7	948	533.000	76.143	562
	Sa 15 - 18 h	1	60	60	7	948	346.000	49.429	365
	Sa 18 - 21 h	1	60	60	7	948	364.000	52.000	384
	Sa 21 - 24 h	1	60	60	7	948	312.000	44.571	329
	Sa 00 - 06 h	1	0	0	7	948	0	0	0
	Su 06 - 09 h	1	60	60	7	948	231.000	33.000	244
	Su 09 - 12 h	1	60	60	7	948	196.000	28.000	207
	Su 12 - 15 h	1	60	60	7	948	193.000	27.571	204
	Su 15 - 18 h	1	60	60	7	948	306.000	43.714	323
	Su 18 - 21 h	1	60	60	7	948	200.000	28.571	211
	Su 21 - 24 h	1	60	60	7	948	209.000	29.857	220
	Su 00 - 06 h	1	0	0	7	948	0	0	0
Highway	Mo-Su all day	7	720	5.040	360	3.259	13.246.000	36.794	4.064
	Mo-Fr all day	5	720	3.600	360	3.259	9.795.000	27.208	3.006
	Sa all day	1	720	720	360	3.259	2.358.000	6.550	724
	Su all day	1	720	720	360	3.259	1.093.000	3.036	335
	Mo-Su 06 - 09 h	7	90	630	360	3.259	2.046.000	5.683	628
	Mo-Su 09 - 12 h	7	90	630	360	3.259	2.153.000	5.981	661
	Mo-Su 12 - 15 h	7	90	630	360	3.259	2.130.000	5.917	654
	Mo-Su 15 - 18 h	7	90	630	360	3.259	3.084.000	8.567	946
	Mo-Su 18 - 21 h	7	90	630	360	3.259	2.232.000	6.200	685
	Mo-Su 21 - 24 h	7	90	630	360	3.259	885.000	2.458	272
	Mo-Su 00 - 06 h	7	180	1.260	360	3.259	717.000	1.992	220
	Mo-Fr 06 - 09 h	5	90	450	360	3.259	1.687.000	4.686	518
	Mo-Fr 09 - 12 h	5	90	450	360	3.259	1.590.000	4.417	488
	Mo-Fr 12 - 15 h	5	90	450	360	3.259	1.443.000	4.008	443
	Mo-Fr 15 - 18 h	5	90	450	360	3.259	2.373.000	6.592	728
	Mo-Fr 18 - 21 h	5	90	450	360	3.259	1.626.000	4.517	499
	Mo-Fr 21 - 24 h	5	90	450	360	3.259	542.000	1.506	166
	Mo-Fr 00 - 06 h	5	180	900	360	3.259	535.000	1.486	164
	Sa 06 - 09 h	1	90	90	360	3.259	255.000	708	78
	Sa 09 - 12 h	1	90	90	360	3.259	398.000	1.106	122
	Sa 12 - 15 h	1	90	90	360	3.259	514.000	1.428	158
	Sa 15 - 18 h	1	90	90	360	3.259	520.000	1.444	160
	Sa 18 - 21 h	1	90	90	360	3.259	364.000	1.011	112
	Sa 21 - 24 h	1	90	90	360	3.259	217.000	603	67
	Sa 00 - 06 h	1	180	180	360	3.259	90.000	250	28
	Su 06 - 09 h	1	90	90	360	3.259	105.000	292	32
	Su 09 - 12 h	1	90	90	360	3.259	165.000	458	51
	Su 12 - 15 h	1	90	90	360	3.259	173.000	481	53
	Su 15 - 18 h	1	90	90	360	3.259	190.000	528	58
	Su 18 - 21 h	1	90	90	360	3.259	242.000	672	74
	Su 21 - 24 h	1	90	90	360	3.259	125.000	347	38
	Su 00 - 06 h	1	180	180	360	3.259	92.000	256	28
Supermarket	Mo-Su all day	6	300	1.800	430	2.254	2.442.000	5.679	1.083
	Mo-Fr all day	5	300	1.500	430	2.254	1.942.000	4.516	862
	Sa all day	1	300	300	430	2.254	501.000	1.165	222
	Su all day	1	300	300	430	2.254	0	0	0
	Mo-Su 06 - 09 h	6	60	360	430	2.254	181.000	421	80
	Mo-Su 09 - 12 h	6	60	360	430	2.254	909.000	2.114	403
	Mo-Su 12 - 15 h	6	60	360	430	2.254	462.000	1.074	205
	Mo-Su 15 - 18 h	6	60	360	430	2.254	625.000	1.453	277
	Mo-Su 18 - 21 h	6	60	360	430	2.254	265.000	616	118
	Mo-Su 21 - 24 h	6	60	360	430	2.254	0	0	0
	Mo-Su 00 - 06 h	6	0	0	430	2.254	0	0	0
	Mo-Fr 06 - 09 h	5	60	300	430	2.254	142.000	330	63
	Mo-Fr 09 - 12 h	5	60	300	430	2.254	665.000	1.547	295
	Mo-Fr 12 - 15 h	5	60	300	430	2.254	385.000	895	171
	Mo-Fr 15 - 18 h	5	60	300	430	2.254	517.000	1.202	229
	Mo-Fr 18 - 21 h	5	60	300	430	2.254	232.000	540	103
	Mo-Fr 21 - 24 h	5	60	300	430	2.254	0	0	0
	Mo-Fr 00 - 06 h	5	0	0	430	2.254	0	0	0
	Sa 06 - 09 h	1	60	60	430	2.254	39.000	91	17
	Sa 09 - 12 h	1	60	60	430	2.254	243.000	565	108
	Sa 12 - 15 h	1	60	60	430	2.254	77.000	179	34
	Sa 15 - 18 h	1	60	60	430	2.254	108.000	251	48
	Sa 18 - 21 h	1	60	60	430	2.254	33.000	77	15
	Sa 21 - 24 h	1	60	60	430	2.254	0	0	0
Sa 00 - 06 h	1	0	0	430	2.254	0	0	0	



## 16. Appendix I: Additional Information

- Google Metro Codes

<https://developers.google.com/adwords/api/docs/appendix/geotargeting?csw=1>

- U.N. Code for Trade and Transport Locations:

<http://www.unece.org/cefact/locode/service/location.htm>