

# Intro to Fractribution

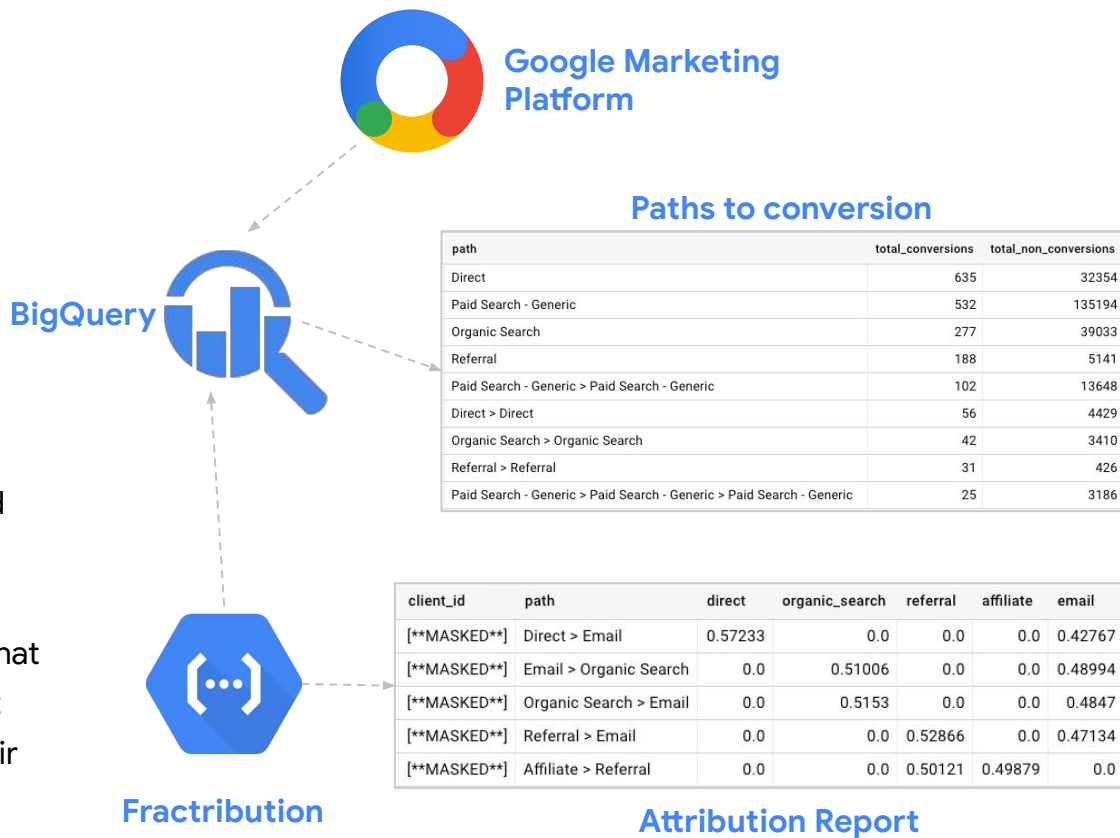
Custom Fractional Marketing Attribution



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# What is Fractribution?

- Fractribution drives an automated end-to-end **user-level fractional attribution** model.
- A **generalisable** process that can run on any **custom event log** (currently supporting GA360 sessions).
- The attribution algorithm uses a simplified **Shapley Value method**.
- It is an ideal solution for clients who find that the Data-Driven Attribution solutions built into GA360/DV360 are suboptimal for their specific use cases. E.g. regulation or data policy prevents ecommerce/revenue events being shared with GMP.



# How Fractribution works?

Preparing data for Attribution

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1464282128005036096	2018-03-21 08:08:16	Paid Search - Generic
1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:05	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:54	Referral
1464282128005036096	2018-03-30 03:56:45	Display - Prospecting
1464282128005036096	2018-03-30 11:51:41	Paid Search - Generic
1464282128005036096	2018-03-31 03:24:13	Paid Search - Generic
1464282128005036096	2018-03-31 03:55:59	Organic Search
1464282128005036096	2018-03-31 08:59:13	Unmatched Channel
1506295747200511732	2018-02-25 00:58:35	Paid Search - Generic
1506295747200511732	2018-03-02 11:57:42	Paid Search - Brand
1506295747200511732	2018-03-02 12:37:17	Paid Search - Brand
1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting
1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand



## Session event log

Proprietary + Confidential

1

## Session event log

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1464282128005036096	2018-03-21 08:08:16	Paid Search - Generic
1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
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1464282128005036096	2018-03-31 03:55:59	Organic Search
1464282128005036096	2018-03-31 08:59:13	Unmatched Channel
1506295747200511732	2018-02-25 00:58:35	Paid Search - Generic
1506295747200511732	2018-03-02 11:57:42	Paid Search - Brand
1506295747200511732	2018-03-02 12:37:17	Paid Search - Brand
1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting
1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand

We see each visitor's sequence of events during some defined reporting window (here it's 22 Feb to 31 Mar 2018)

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1464282128005036096	2018-03-21 08:08:16	Paid Search - Generic
1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
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1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting
1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand

1

## Session event log

Proprietary + Confidential

2

## Target endpoints

fullVisitorId	registration_time_aest
1464282128005036096	2018-03-31 04:05:27
1506295747200511732	2018-03-03 07:34:01
1632881112157734750	2018-03-04 13:33:46

1

## Session event log

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1464282128005036096	2018-03-21 08:08:16	Paid Search - Generic
1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
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1506295747200511732	2018-03-02 11:57:42	Paid Search - Brand
1506295747200511732	2018-03-02 12:37:17	Paid Search - Brand
1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting
1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand

3

Join to find  
each  
endpoint  
position

2

Target endpoints

fullVisitorId	registration_time_aest
1464282128005036096	2018-03-31 04:05:27
1506295747200511732	2018-03-03 07:34:01
1632881112157734750	2018-03-04 13:33:46



7 days

7 days

7 days

4

Collect events within a  
lookback window

1

Session event log

3

Join to find  
each  
endpoint  
position

2

Target endpoints

fullVisitorId	registration_time_aest
1464282128005036096	2018-03-31 04:05:27
1506295747200511732	2018-03-03 07:34:01
1632881112157734750	2018-03-04 13:33:46

fullVisitorId	session_id	event_name
13212345678901234567	1464282128005036096	- Generic
1464282128005036096	1464282128005036096	Paid Search - Generic
1464282128005036096	1464282128005036096	Paid Search - Generic
1464282128005036096	1464282128005036096	Paid Search - Generic
1464282128005036096	1464282128005036096	Referral
1464282128005036096	1464282128005036096	Display - Prospecting
1464282128005036096	1464282128005036096	Paid Search - Generic
1464282128005036096	1464282128005036096	Paid Search - Generic
1464282128005036096	1464282128005036096	Organic Search
1464282128005036096	1464282128005036096	Unmatched Channel
1506295747200511732	1506295747200511732	Paid Search - Generic
1506295747200511732	1506295747200511732	Paid Search - Brand
1506295747200511732	1506295747200511732	Paid Search - Brand
1506295747200511732	1506295747200511732	Display - Retargeting
1506295747200511732	1506295747200511732	Display - Retargeting
1506295747200511732	1506295747200511732	Display - Retargeting
1632881112157734750	1632881112157734750	Direct
1632881112157734750	1632881112157734750	Paid Search - Generic
1632881112157734750	1632881112157734750	Paid Search - Brand



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Collect events within a  
lookback window

These are now your **paths**  
to conversion

7 days

1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:05	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:54	Referral
1464282128005036096	2018-03-30 03:56:45	Display - Prospecting
1464282128005036096	2018-03-30 11:51:41	Paid Search - Generic
1464282128005036096	2018-03-31 03:24:13	Paid Search - Generic
1464282128005036096	2018-03-31 03:55:59	Organic Search
1464282128005036096	2018-03-31 08:59:13	Unmatched Channel

Paid Search - Generic > Paid Search - Generic > Referral > Display - Prospecting >  
Paid Search - Generic > Paid Search - Generic > Organic Search

7 days

1506295747200511732	2018-02-25 00:58:35	Paid Search - Generic
1506295747200511732	2018-03-02 11:57:42	Paid Search - Brand
1506295747200511732	2018-03-02 12:37:17	Paid Search - Brand
1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting

Paid Search - Generic > Paid Search - Brand > Paid Search - Brand > Display - Retargeting

7 days

1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand

Direct > Paid Search - Generic > Paid Search - Brand

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral

5

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1464282128005036096	2018-03-21 08:08:16	Paid Search - Generic
1464282128005036096	2018-03-21 08:42:47	Paid Search - Generic
1464282128005036096	2018-03-30 00:36:26	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:05	Paid Search - Generic
1464282128005036096	2018-03-30 03:51:54	Referral
1464282128005036096	2018-03-30 03:56:45	Display - Prospecting
1464282128005036096	2018-03-30 11:51:41	Paid Search - Generic
1464282128005036096	2018-03-31 03:24:13	Paid Search - Generic
1464282128005036096	2018-03-31 03:55:59	Organic Search
1464282128005036096	2018-03-31 08:59:13	Unmatched Channel
1506295747200511732	2018-02-25 00:58:35	Paid Search - Generic
1506295747200511732	2018-03-02 11:57:42	Paid Search - Brand
1506295747200511732	2018-03-02 12:37:17	Paid Search - Brand
1506295747200511732	2018-03-03 07:30:29	Display - Retargeting
1506295747200511732	2018-03-03 08:09:15	Display - Retargeting
1506295747200511732	2018-03-03 12:10:07	Display - Retargeting
1632881112157734750	2018-03-04 12:09:49	Direct
1632881112157734750	2018-03-04 12:54:49	Paid Search - Generic
1632881112157734750	2018-03-04 13:05:36	Paid Search - Brand

### Additional non-converting visitors

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## Construct your non-converting paths

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7 days  
7 days

7 days

7 days  
7 days

7 days

fullVisitorId	visitStartTime_aest	channel
1321955548994962358	2018-03-22 21:21:41	Referral
1000616322209632382	2018-02-27 10:48:58	Paid Search - Brand
1000616322209632382	2018-02-27 10:49:16	Organic Search
1000598485220432643	2018-02-27 03:44:33	Paid Search - Brand
1000598485220432643	2018-03-09 07:55:53	Paid Search - Brand
1000598485220432643	2018-03-11 02:01:28	Paid Search - Brand
1000598485220432643	2018-03-12 08:08:42	Paid Search - Brand
1000598485220432643	2018-03-30 04:12:18	Paid Search - Brand
1000408875265680585	2018-02-26 21:10:24	Paid Search - Brand
1000408875265680585	2018-02-27 11:37:29	Paid Search - Brand
1000408875265680585	2018-02-28 16:37:25	Paid Search - Brand
1000408875265680585	2018-03-22 04:09:48	Paid Search - Brand
1000408875265680585	2018-03-22 07:04:10	Paid Search - Brand
1000408875265680585	2018-03-27 04:06:06	Paid Search - Brand
1000408875265680585	2018-03-29 20:52:43	Paid Search - Brand
1000201269471321813	2018-03-29 00:55:34	Email
1000201269471321813	2018-03-30 23:07:55	Email
1000185760342848879	2018-03-10 21:37:34	Referral
1000152126453468655	2018-03-05 06:50:09	Paid Search - Generic
1000088225928354082	2018-03-07 10:26:43	Organic Search

Referral

Paid Search - Brand &gt; Organic Search

Paid Search - Brand

Paid Search - Brand &gt; Paid Search - Brand

Email &gt; Email

Referral

Paid Search - Generic

Organic Search

path	total_conversions	total_non_conversions
Direct	2236	89137
Organic Search	1296	137741
Referral	1051	16372
Paid Search - Generic	863	118292
Display - Prospecting	732	129677
Paid Search - Brand	691	8537
Direct > Direct	233	10353
Organic Search > Organic Search	223	12362
Paid Search - Generic > Paid Search - Generic	147	12670
Paid Search - Brand > Paid Search - Brand	132	1397
Affiliate	123	2017
Referral > Referral	116	1146
Display - Prospecting > Display - Prospecting	74	10764
Unmatched Channel	62	8853
Direct > Referral	53	486
Direct > Direct > Direct	51	3339
Direct > Organic Search	50	1052
Organic Search > Referral	45	253
Organic Search > Paid Search - Brand	42	254
Organic Search > Organic Search > Organic Search	38	2562

7

Create the path summary table

path	total_conversions	total_non_conversions
Direct	2236	89137
Organic Search	1296	137741
Referral	1051	16372
Paid Search - Generic	863	118292
Display - Prospecting	732	129677
Paid Search - Brand	691	8537
Direct > Direct	233	10353
Organic Search > Organic Search	223	12362
Paid Search - Generic > Paid Search - Generic	147	12670
Paid Search - Brand > Paid Search - Brand	132	1397
Affiliate	123	2017
Referral > Referral	116	1146
Display - Prospecting > Display - Prospecting	74	10764
Unmatched Channel	62	8853
Direct > Referral	53	486
Direct > Direct > Direct	51	3339
Direct > Organic Search	50	1052
Organic Search > Referral	45	253
Organic Search > Paid Search - Brand	42	254
Organic Search > Organic Search > Organic Search	38	2562

## 7 Create the path summary table



## 8 Run attribution algorithm to calculate fractions

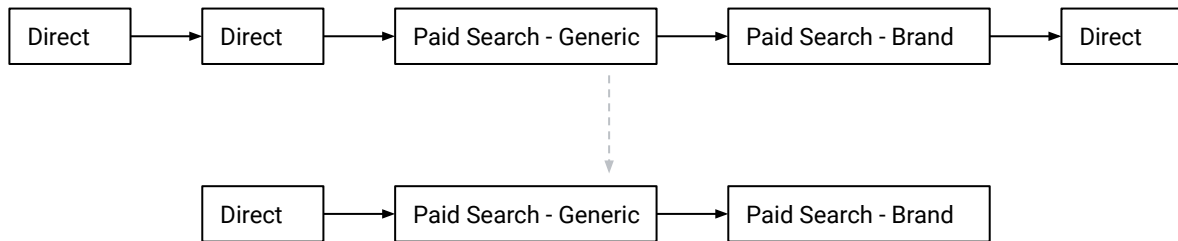
client_id	path	direct	organic_search	referral	affiliate	email
[**MASKED**]	Direct > Email	0.57233	0.0	0.0	0.0	0.42767
[**MASKED**]	Email > Organic Search	0.0	0.51006	0.0	0.0	0.48994
[**MASKED**]	Organic Search > Email	0.0	0.5153	0.0	0.0	0.4847
[**MASKED**]	Referral > Email	0.0	0.0	0.52866	0.0	0.47134
[**MASKED**]	Affiliate > Referral	0.0	0.0	0.50121	0.49879	0.0

Fractribution

# A quick note on path transforms

Paths to conversion are often very similar, but not exact. It is helpful to apply a **path transform** before running an attribution algorithm to reduce (unnecessary) complexity in these similar paths.

## An example path transform



Here we apply the 'first' path transform, which takes only the first occurrence of any given event. That is, the 2nd and 5th events here (both 'Direct') are removed from the transformed path.

There are FIVE path transforms available: unique, exposure, first, frequency and recency. These are explained on the next slide.

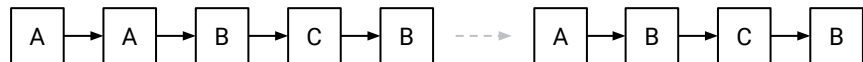
# What path transforms are available?

There are FIVE path transforms available:

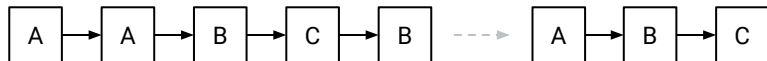
- **unique**: treat all events in a path as unique.



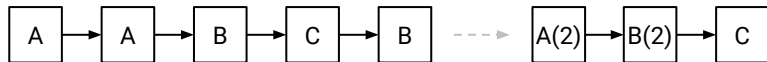
- **exposure**: collapse repeat events that are immediately in sequence.



- **first**: take only the first occurrence of any given event.

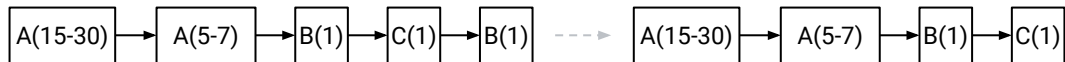


- **frequency**: count events from their first occurrence.



- **recency**: look at where the event occurred in the timeline before conversion and:

- treat the same events differently if they occur in different time buckets;
- collapse events if they are within the same bucket.





# Which path transform to use?

- **Unique** is best if you have a short lookback length and have low volume, specific marketing (and don't do lots of retargeting)
- **First** is best for cases where the attribution is on something new that is being marketed and/or brand awareness type marketing
- **Exposure** is a balance between first and unique and is the default if you don't know
- **Frequency** is useful when there is retargeting, many follow ups, no frequency capping
- **Recency** is useful if there are longer lookback periods (> 30 days) and a tiered marketing strategy.

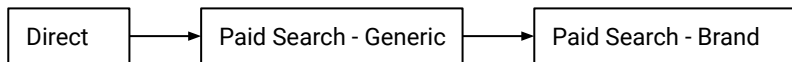
# How Fractribution works?

The attribution algorithm

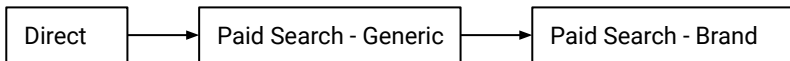
1

## Start with a baseline path

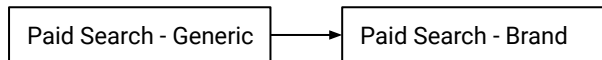
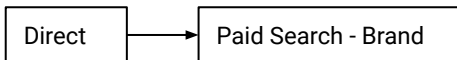
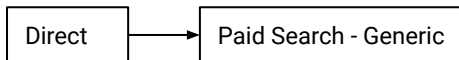
Proprietary + Confidential



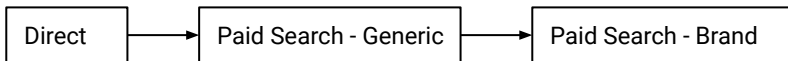
## 1 Start with a baseline path



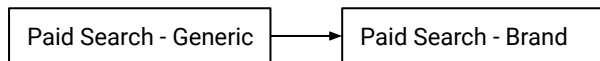
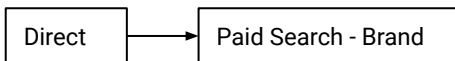
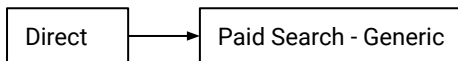
## 2 Define its leave-one-out counterfactuals



## 1 Start with a baseline path



## 2 Define its leave-one-out counterfactuals



## 3 Calculate the conversion probabilities for each of these paths

Path summary			
path	total_conversions	total_non_conversions	conversion_prob
Direct > Paid Search - Generic	19	549	0.0335
Direct > Paid Search - Brand	17	250	0.0637
Paid Search - Generic > Paid Search - Brand	7	357	0.0192
Direct > Paid Search - Generic > Paid Search - Brand	1	10	0.0909

 $19 / (19 + 549)$

4

The marginal contribution of each event is the conversion probability difference between the baseline (full) path and the counterfactual path without the event in it

Path summary			
path	total_conversions	total_non_conversions	conversion_prob
Direct > Paid Search - Generic	19	549	0.0335
Direct > Paid Search - Brand	17	250	0.0637
Paid Search - Generic > Paid Search - Brand	7	357	0.0192
Direct > Paid Search - Generic > Paid Search - Brand	1	10	0.0909

Marginal Contribution Direct = 0.0909 - 0.0192 = 0.0717

Marginal contribution		
direct	paid_search_generic	paid_search_brand
0.0717	0.0272	0.0574

4

The marginal contribution of each event is the conversion probability difference between the baseline (full) path and the counterfactual path without the event in it

Path summary			
path	total_conversions	total_non_conversions	conversion_prob
Direct > Paid Search - Generic	19	549	0.0335
Direct > Paid Search - Brand	17	250	0.0637
Paid Search - Generic > Paid Search - Brand	7	357	0.0192
Direct > Paid Search - Generic > Paid Search - Brand	1	10	0.0909

Marginal Contribution Direct = 0.0909 - 0.0192 = 0.0717

Marginal contribution		
direct	paid_search_generic	paid_search_brand
0.0717	0.0272	0.0574

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Normalize these fractions so they add to 1

Fractional Attribution			
path	direct	paid_search_generic	paid_search_brand
Direct > Paid Search - Generic > Paid Search - Brand	0.459	0.174	0.367

0.0717 / (0.0717 + 0.0272 + 0.0574)

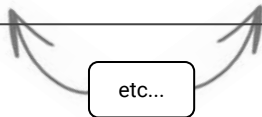


6

## Repeat for all paths

Proprietary + Confidential

Fractional Attribution							
path	direct	paid_search_generic	paid_search_brand	organic_search	email	referral	
Direct > Paid Search - Generic > Paid Search - Brand	0.459	0.174	0.367	0.0	0.0	0.0	...
Direct > Paid Search - Generic	0.784	0.216	0.0	0.0	0.0	0.0	
Direct > Paid Search - Brand	0.573	0.0	0.427	0.0	0.0	0.0	
Paid Search - Generic > Paid Search - Brand	0.0	0.198	0.802	0.0	0.0	0.0	
Direct > Email	0.572	0.0	0.0	0.0	0.428	0.0	
Email > Organic Search	0.0	0.0	0.0	0.510	0.490	0.0	
Organic Search > Email	0.0	0.0	0.0	0.515	0.485	0.0	
Referral > Email	0.0	0.0	0.0	0.0	0.471	0.529	
Display - Prospecting > Referral	0.0	0.0	0.0	0.0	0.0	0.501	
...							



6

## Repeat for all paths

Fractional Attribution							
path	direct	paid_search_generic	paid_search_brand	organic_search	email	referral	
Direct > Paid Search - Generic > Paid Search - Brand	0.459	0.174	0.367	0.0	0.0	0.0	...
Direct > Paid Search - Generic	0.784	0.216	0.0	0.0	0.0	0.0	
Direct > Paid Search - Brand	0.573	0.0	0.427	0.0	0.0	0.0	
Paid Search - Generic > Paid Search - Brand	0.0	0.198	0.802	0.0	0.0	0.0	
Direct > Email	0.572	0.0	0.0	0.0	0.428	0.0	
Email > Organic Search	0.0	0.0	0.0	0.510	0.490	0.0	
Organic Search > Email	0.0	0.0	0.0	0.515	0.485	0.0	
Referral > Email	0.0	0.0	0.0	0.0	0.471	0.529	
Display - Prospecting > Referral	0.0	0.0	0.0	0.0	0.0	0.501	
...							

7

## Push the final results up to BigQuery (if required)

Upload to  
BigQuery

BigQuery



etc...

# Getting to ROAS?

Joining Fractribution to your CRM and Revenue systems

1

## Path to fullVisitorId mapping

Path to fullVisitorId	
path	fullVisitorId
Direct > Paid Search - Generic > Paid Search - Brand	2248281639583218707
Direct > Paid Search - Generic > Paid Search - Brand	8647436381089107732
Direct > Paid Search - Generic	2055839700856389632
Direct > Paid Search - Brand	0750846065342433129
Direct > Paid Search - Brand	0573427169410921198
Paid Search - Generic > Paid Search - Brand	8313021323030224050
Direct > Email	9161549067325106850
Direct > Email	7712738124831804349
Direct > Email	6644155147493409979
...	

We establish this mapping through the path summary table creation process.

1

## Path to fullVisitorId mapping

Path to fullVisitorId	
path	fullVisitorId
Direct > Paid Search - Generic > Paid Search - Brand	2248281639583218707
Direct > Paid Search - Generic > Paid Search - Brand	8647436381089107732
Direct > Paid Search - Generic	2055839700856389632
Direct > Paid Search - Brand	0750846065342433129
Direct > Paid Search - Brand	0573427169410921198
Paid Search - Generic > Paid Search - Brand	8313021323030224050
Direct > Email	9161549067325106850
Direct > Email	7712738124831804349
Direct > Email	6644155147493409979
...	

2

## fullVisitorId to crm\_id mapping

Proprietary + Confidential

fullVisitorId to crm_id	
fullVisitorId	crm_id
2248281639583218707	ca978112ca1bbdcafac231b3
8647436381089107732	2e7d2c03a9507ae265ecf5b5
2055839700856389632	3f79b27b435b05321651daef
0750846065342433129	cd0aa9856147b6c5b4ff2b7d
0573427169410921198	de7d1b721a1e0632b7cf04ed
8313021323030224050	3e23e8160039594a33894f65
9161549067325106850	18ac3e7343f016890c510e93
7712738124831804349	252f10c83610ebca1a059c0b
6644155147493409979	aaa9402664f1a41f40ebbc52
...	

Note: If your session event log is keyed on the crm\_id anyway, no need for this step.

## 1 Path to fullVisitorId mapping

Path to fullVisitorId	
path	fullVisitorId
Direct > Paid Search - Generic > Paid Search - Brand	2248281639583218707
Direct > Paid Search - Generic > Paid Search - Brand	8647436381089107732
Direct > Paid Search - Generic	2055839700856389632
Direct > Paid Search - Brand	0750846065342433129
Direct > Paid Search - Brand	0573427169410921198
Paid Search - Generic > Paid Search - Brand	8313021323030224050
Direct > Email	9161549067325106850
Direct > Email	7712738124831804349
Direct > Email	6644155147493409979
...	

## 2 fullVisitorId to crm\_id mapping

Proprietary + Confidential

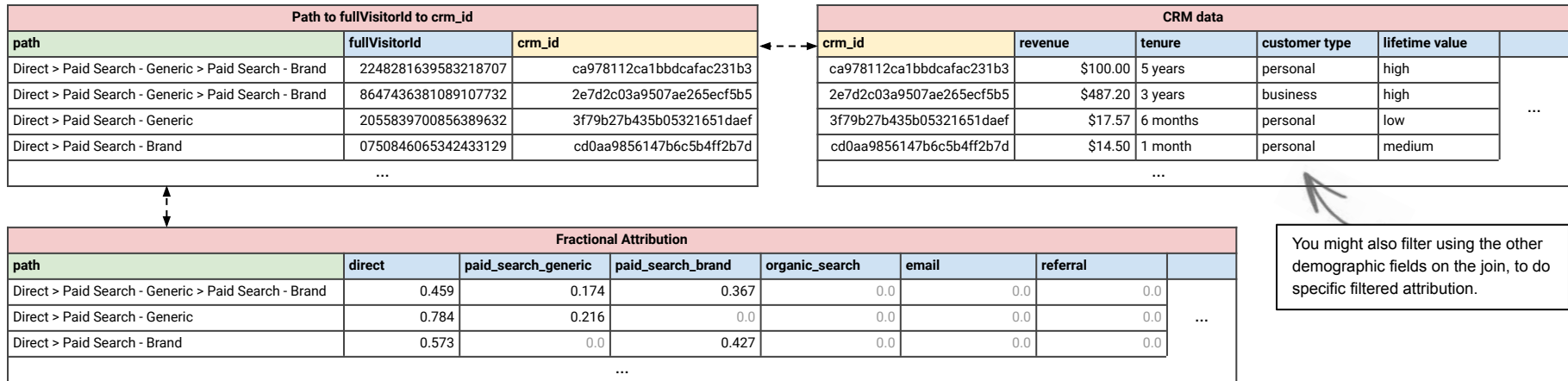
fullVisitorId to crm_id	
fullVisitorId	crm_id
2248281639583218707	ca978112ca1bbdcafac231b3
8647436381089107732	2e7d2c03a9507ae265ecf5b5
2055839700856389632	3f79b27b435b05321651daef
0750846065342433129	cd0aa9856147b6c5b4ff2b7d
0573427169410921198	de7d1b721a1e0632b7cf04ed
8313021323030224050	3e23e8160039594a33894f65
9161549067325106850	18ac3e7343f016890c510e93
7712738124831804349	252f10c83610ebca1a059c0b
6644155147493409979	aaa9402664f1a41f40ebbc52
...	

## 3 CRM data, with revenue and demographics

CRM data								
crm_id	revenue	tenure	customer type	lifetime value	age band	gender	custom segment	
ca978112ca1bbdcafac231b3	\$100.00	5 years	personal	high	55+	female	Mobile first	...
2e7d2c03a9507ae265ecf5b5	\$487.20	3 years	business	high	N/A	N/A	Loyalists	
3f79b27b435b05321651daef	\$17.57	6 months	personal	low	20 to 30	unspecified	Disengaged	
cd0aa9856147b6c5b4ff2b7d	\$14.50	1 month	personal	medium	16 to 18	male	Aspiring minnows	
...								

## 4 Join all to establish a link between revenue and attribution fractions

Proprietary + Confidential





## 4 Join all to establish a link between revenue and attribution fractions

Path to fullVisitorId to crm_id			CRM data					
path	fullVisitorId	crm_id	crm_id	revenue	tenure	customer type	lifetime value	
Direct > Paid Search - Generic > Paid Search - Brand	2248281639583218707	ca978112ca1bbdcfac231b3	ca978112ca1bbdcfac231b3	\$100.00	5 years	personal	high	...
Direct > Paid Search - Generic > Paid Search - Brand	8647436381089107732	2e7d2c03a9507ae265ecf5b5	2e7d2c03a9507ae265ecf5b5	\$487.20	3 years	business	high	
Direct > Paid Search - Generic	2055839700856389632	3f79b27b435b05321651daef	3f79b27b435b05321651daef	\$17.57	6 months	personal	low	
Direct > Paid Search - Brand	0750846065342433129	cd0aa9856147b6c5b4ff2b7d	cd0aa9856147b6c5b4ff2b7d	\$14.50	1 month	personal	medium	
...			...					

Fractional Attribution							
path	direct	paid_search_generic	paid_search_brand	organic_search	email	referral	
Direct > Paid Search - Generic > Paid Search - Brand	0.459	0.174	0.367	0.0	0.0	0.0	...
Direct > Paid Search - Generic	0.784	0.216	0.0	0.0	0.0	0.0	
Direct > Paid Search - Brand	0.573	0.0	0.427	0.0	0.0	0.0	
...							

## 5 Distribute revenue by customer over the fractional attribution values

Fractional Revenue							
path	crm_id	direct revenue	paid_search_generic revenue	paid_search_brand revenue	organic_search revenue	email revenue	
Direct > Paid Search - Generic > Paid Search - Brand	ca978112ca1bbdcfac231b3	\$45.90	\$17.40	\$36.70	\$0.0	\$0.0	...
Direct > Paid Search - Generic > Paid Search - Brand	2e7d2c03a9507ae265ecf5b5	\$223.62	\$84.77	\$178.80	\$0.0	\$0.0	
Direct > Paid Search - Generic	3f79b27b435b05321651daef	\$13.77	\$3.80	\$0.0	\$0.0	\$0.0	
Direct > Paid Search - Brand	cd0aa9856147b6c5b4ff2b7d	\$8.31	\$0.0	\$6.19	\$0.0	\$0.0	
...							

$$0.427 \times \$14.50 = \$6.19$$

## 6 Aggregate channels to get attributed conversions, and attributed revenue

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Attribution Report				
channel	Attributed Conversions	Attributed Revenue	Actual Spend (Ads, etc)	ROAS
Direct	40,451	\$2,948,878	N/A	N/A
Paid Search - Generic	28,852	\$2,103,311	\$1,237,242	1.70
Paid Search - Brand	10,785	\$597,732	\$711,585	0.84
Organic Search	25,033	\$1,291,828	N/A	N/A
Email	807	\$41,645	\$44,303	0.94
Referral	19,803	\$1,021,934	\$811,059	1.26
...				

\$2,103,311  
\$1,237,242

$$= \text{sum}(\text{direct}) = 0.459 + 0.784 + 0.573 + \dots$$

$$= \text{sum}(\text{direct revenue}) = \$45.90 + \$223.62 + \$13.77 + \$8.31 + \dots$$

path	direct
Direct > Paid Search - Generic > Paid Search - Brand	0.459
Direct > Paid Search - Generic	0.784
Direct > Paid Search - Brand	0.573
...	

direct revenue
\$45.90
\$223.62
\$13.77
\$8.31
...