



Getting in 'touch' with CoolTShirts: Attribution Analysis

Learn SQL from Scratch

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**1. Campaigns, Sources &
Pages: What's driving users
and where are they going?**

1.1 Campaign and Sources

CoolTshirts (CTS) currently engages users **across 8 campaigns** and **6 sources**.

- **utm_campaign** represents the the specific ad or e-mail blast and is labeled '**campaign**'
- **utm_source** represents the specific site that sent the user and is labeled '**source**'

Campaigns and Sources are paired as follows:

campaign	source
getting-to-know-cool-tshirts	nytimes
weekly-newsletter	email
ten-crazy-cool-tshirts-facts	buzzfeed
retargetting-campaign	email
retargetting-ad	facebook
interview-with-cool-tshirts-founder	medium
paid-search	google
cool-tshirts-search	google

```
/*Here is the query used to return the total unique campaign count:*/
```

```
SELECT COUNT (DISTINCT utm_campaign) AS  
'distinct_campaigns'  
FROM page_visits;
```

```
/*Here is the query used to return the total unique source count:*/
```

```
SELECT COUNT (DISTINCT utm_source) AS  
'distinct_sources'  
FROM page_visits;
```

```
/*The following query returns both the distinct campaign and its associated source:*/
```

```
SELECT DISTINCT utm_campaign AS 'campaign', utm_source  
AS 'source'  
FROM page_visits;
```

1.2 Pages: Where are users going?

CTS directs users to the following pages:

Pages
1 - landing_page
2 - shopping_cart
3 - checkout
4 - purchase

All users begin their journey at '1 - landing page.' Those who visit the '4 - purchase' page are users who have converted to becoming **buyers**.

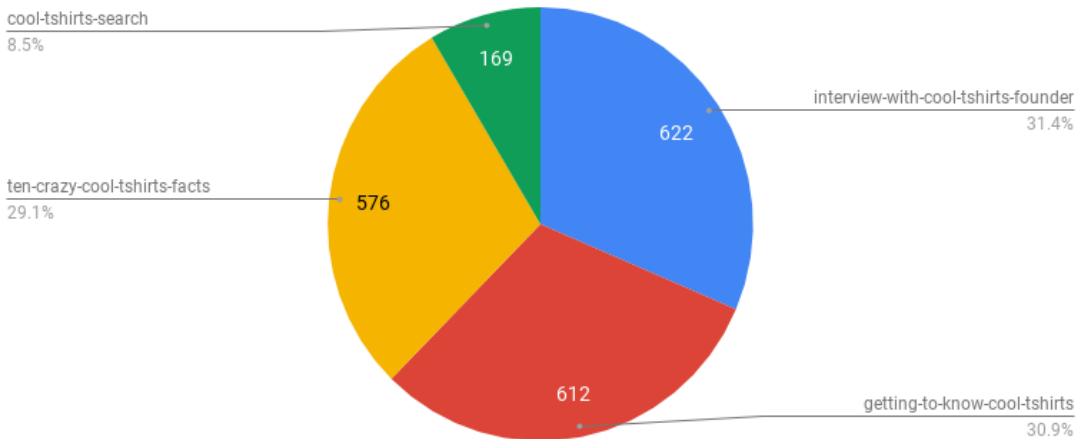
```
/*Here is the query used to return the list of CTS  
pages:*/  
SELECT DISTINCT page_name AS 'pages'  
FROM page_visits;
```

2. The User Journey

2.1 Where do users begin? First touch attribution

- CTS's campaigns initiated first touches with 1,979 users.
- Over 90% of these users began their journey with CTS via one of three campaigns:
 - interview-with-cool-tshirts-founder
 - getting-to-know-cool-tshirts
 - ten-crazy-cool-tshirts-facts.
- The proportion of users was divided roughly evenly among these three campaigns

Total First Touches by Campaign



2.2 First touch attribution, cont'd

Data was queried from 'page_visits' table, using a SQL function 'MIN' to take the minimum value of the 'timestamp' variable for each page visit, listed by user ('user_id') campaign ('utm_campaign') and source ('utm_source').

The query then counted the total page visits by each source and campaign, summarizing the output in the following table:

source	campaign	total_first_touches
medium	interview-with-cool-tshirts-founder	622
nytimes	getting-to-know-cool-tshirts	612
buzzfeed	ten-crazy-cool-tshirts-facts	576
google	cool-tshirts-search	169
	Total	1979

```
/*Here is the query used to return a summary of first
touches by source & campaign:*/
WITH first_touch AS (
    SELECT user_id,
           MIN(timestamp) as first_touch_at
    FROM page_visits
    GROUP BY user_id),

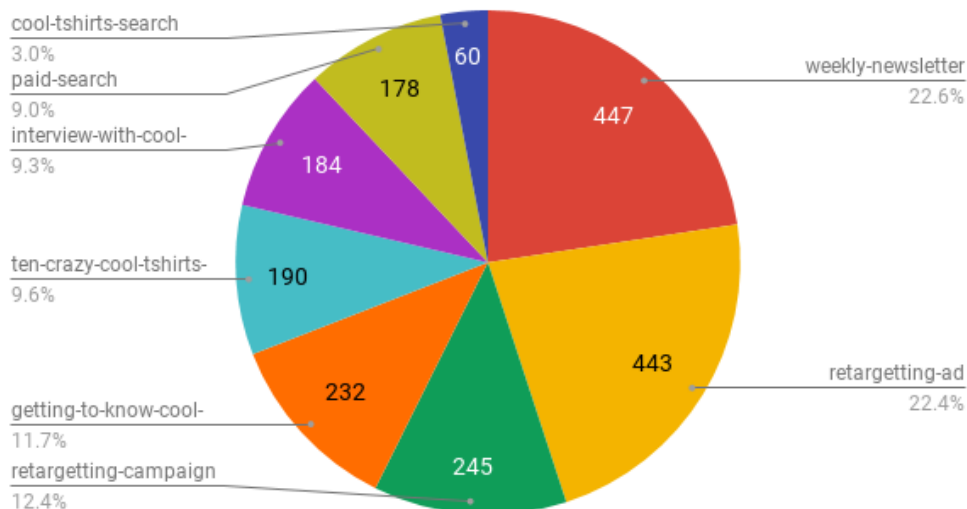
ft_attr AS (
    SELECT ft.user_id,
           ft.first_touch_at,
           pv.utm_source,
           pv.utm_campaign
    FROM first_touch ft
    JOIN page_visits pv
        ON ft.user_id = pv.user_id
        AND ft.first_touch_at = pv.timestamp
    )
SELECT ft_attr.utm_source AS 'source',
       ft_attr.utm_campaign AS 'campaign', COUNT(*) AS
'total_first_touches'
FROM ft_attr
GROUP BY 1, 2
ORDER BY 3 DESC;
```


2.3 Where do users end their journey?

Last touch attribution

- Almost 70% of users ended their journey with CTS via the weekly-newsletter email, retargeting-ad on Facebook, or the getting-to-know-cool-tshirts NYT ad.
- Together, the weekly newsletter and Facebook retargeting ad accounted for 45% of last touches.
- Only 3% of users ended their journey using google Google search.

Total Last Touches by Campaign



2.4 Last touch attribution, cont'd

Data was queried from 'page_visits' table, using a SQL function 'MAX' to take the maximum value of the 'timestamp' variable for each page visit, listed by user ('user_id') campaign ('utm_campaign') and source ('utm_source').

The query then counted the total page visits by each source and campaign, summarizing the output in following table:

source	campaign	total_last_touches
email	weekly-newsletter	447
facebook	retargetting-ad	443
email	retargetting-campaign	245
nytimes	getting-to-know-cool-tshirts	232
buzzfeed	ten-crazy-cool-tshirts-facts	190
medium	interview-with-cool-tshirts-founder	184
google	paid-search	178
google	cool-tshirts-search	60
Total		1979

```
/*Here is the query used to return a summary of last
touches by source & campaign:*/
WITH last_touch AS (
    SELECT user_id,
           MAX(timestamp) as last_touch_at
    FROM page_visits
    GROUP BY user_id),

lt_attr AS (
    SELECT lt.user_id,
           lt.last_touch_at,
           pv.utm_source,
           pv.utm_campaign
    FROM last_touch lt
    JOIN page_visits pv
    ON lt.user_id = pv.user_id
    AND lt.last_touch_at = pv.timestamp
)
SELECT lt_attr.utm_source AS 'source',
       lt_attr.utm_campaign AS 'campaign', COUNT(*) AS
       'total_last_touches'
FROM lt_attr
GROUP BY 1, 2
ORDER BY 3 DESC;
```

2.5 How many visitors are buying?

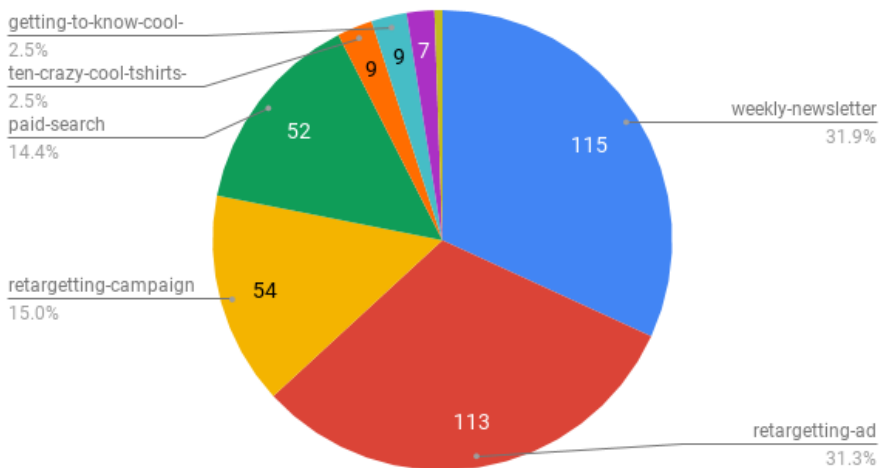
Out of the total 1,979 page visitors, **361 (18.24%)** made purchases

visitor_purchases	% of visitors purchasing T-Shirts
361	18.24%
visitor_non_purchases	
1618	

Breaking down these purchases by campaign, we see that **4 campaigns drove more than 92.5% of purchases:**

- Weekly Newsletter email
- Facebook retargeting ad
- Retargeting campaign email
- Paid Google search

Total Purchases by Campaign



2.6 How many visitors are buying? Cont'd

Data was again queried from 'page_visits' table, this time to generate last touches where the page name was '4 - purchase,' then join this table with a second query result listing the related campaign and source for each user. The following table lists the query results:

source	campaign	total_purchases	% of total purchases
email	weekly-newsletter	115	31.86%
facebook	retargetting-ad	113	31.30%
email	retargetting-campaign	54	14.96%
google	paid-search	52	14.40%
buzzfeed	ten-crazy-cool-tshirts-facts	9	2.49%
nytimes	getting-to-know-cool-tshirts	9	2.49%
medium	interview-with-cool-tshirts-founder	7	1.94%
google	cool-tshirts-search	2	0.55%

```
/*Here is the query used to return a summary of last
touches on the '4 - purchase' page, by source &
campaign:*/
WITH last_touch AS (
    SELECT user_id,
           MAX(timestamp) as last_touch_at
    FROM page_visits
    WHERE page_name = '4 - purchase'
    GROUP BY user_id),

lt_attr AS (
    SELECT lt.user_id,
           lt.last_touch_at,
           pv.utm_source,
           pv.utm_campaign
    FROM last_touch lt
    JOIN page_visits pv
    ON lt.user_id = pv.user_id
    AND lt.last_touch_at = pv.timestamp
)
SELECT lt_attr.utm_source AS 'source',
       lt_attr.utm_campaign AS 'campaign', COUNT(*) AS
'total_last_touches'
FROM lt_attr
GROUP BY 1, 2
ORDER BY 3 DESC;
```

2.7 The User Journey: First to Last Touch & Purchase

Combining first touch, last touch and purchase data, we see that all users began their journey to CTS's landing pages via the CoolTShirts founder interview on Medium; the NYT 'Getting to know CoolTShirts' ad; the 10 crazy CoolTShirts facts ad on BuzzFeed; and non-paid Google searches for CoolTShirts. Those who converted and ended their journey as buyers did so largely via 4 different campaigns: the Weekly Newsletter email; Facebook retargeting ad; Retargeting campaign email; and Paid Google search:

source	campaign	total_first_touches	total_last_touches	Total Purchases
medium	interview-with-cool-tshirts-founder	622	184	7
nytimes	getting-to-know-cool-tshirts	612	232	9
buzzfeed	ten-crazy-cool-tshirts-facts	576	190	9
google	cool-tshirts-search	169	60	2
google	paid-search	0	178	52
email	weekly-newsletter	0	447	115
facebook	retargeting-ad	0	443	113
email	retargeting-campaign	0	245	54
	Total	1979	1979	361

2.6 User Journey, cont'd:

How can more users complete the trip?

Additional queries examining the number of 'purchase page' visits by user, as well as the total 'last touch' count for each page, found:

- Of the 361 users making a purchase, **NONE were repeat customers**
- **Over half** of visitors to CTS pages **ended their journey on the 'checkout' page** (see the chart below)

CTS should analyze the 'Checkout' page to determine how to boost 'visitor' conversions to 'buyer'. CTS should also strongly consider re-engaging existing customers to drive repeat purchases, e.g., via referral codes, additional collateral included with T-shirts, or discount codes, e.g., for an amount up to the Customer Acquisition Cost (CAC).

last_page	visitor_count	% visitors' last touch
1 - landing_page	98	4.95%
2 - shopping_cart	457	23.09%
3 - checkout	1066	53.87%
4 - purchase	358	18.09%

```
/*This simple query yields 'purchase page' visits by user, listed in descending order to attempt to identify repeat customers:*/
```

```
SELECT user_id, COUNT(user_id) AS  
'purchase_page_visits'  
  FROM page_visits  
     WHERE page_name = '4 - purchase'  
  GROUP BY user_id  
  ORDER BY 2 DESC  
  LIMIT 5;
```

```
/*The following query returns the 'last touch' visitor count grouped by page:*/
```

```
WITH last_page AS (  
  SELECT user_id, MAX(timestamp), page_name  
    FROM page_visits  
   GROUP BY user_id)  
SELECT page_name AS last_page, COUNT(*) AS  
visitor_count  
FROM last_page  
GROUP BY page_name;
```

3. Optimizing CTS Marketing Spend

3.1 Driving ROI with Campaign Conversion %

We can calculate purchase rates not only relative to other campaigns, but also relative to all last touches for a given campaign. Doing so, we arrive at a Conversion Rate % for each campaign, representing the proportion of visitors that a campaign should convert into buyers.

source	campaign	total_last_touches	total_purchases	Conversion_%
google	paid-search	178	52	29.21%
email	weekly-newsletter	447	115	25.73%
facebook	retargeting-ad	443	113	25.51%
email	retargeting-campaign	245	54	22.04%
buzzfeed	ten-crazy-cool-tshirts-facts	190	9	4.74%
nytimes	getting-to-know-cool-tshirts	232	9	3.88%
medium	interview-with-cool-tshirts-founder	184	7	3.80%
google	cool-tshirts-search	60	2	3.33%
	Total:	1979	361	

3.2 Revenue Model and Projecting Campaign ROI

Combining the first-touch, last-touch, and conversion percentages from CTS's first campaign, we constructed the following revenue model. The model assumes equal cost among campaigns (\$100), constant per-purchase revenue (\$30), and a campaign mix that generates 1,000 visits.

Campaign	Cost	Relative First Touch % Projection	Total Projected First Touches	Last Touch Relative % Projection	Total Projected Last Touches	Conversion %	Total Projected Buyers	Average \$ Purchase	Total Revenue	ROI:
interview-with-cool-tshirts-founder	\$100.00	50.41%	504	12.40%	124	3.80%	5	\$30.00	\$150.00	50.00%
getting-to-know-cool-tshirts	\$100.00	49.59%	496	15.63%	156	3.88%	6	\$30.00	\$180.00	80.00%
weekly-newsletter	\$100.00	0.00%	0	30.12%	301	25.73%	77	\$30.00	\$2,310.00	2210.00%
retargeting-ad	\$100.00	0.00%	0	29.86%	299	25.51%	76	\$30.00	\$2,280.00	2180.00%
paid-search	\$100.00	0.00%	0	11.99%	120	29.21%	35	\$30.00	\$1,050.00	950.00%
Total:	\$500.00		1000	100.00%	1000	(n/a)	199	(n/a)	\$5,970.00	1094.00%

3.3 Revenue Model & Campaign ROI, cont'd

Paid Search vs. Re-targeting Campaign: Conversion over Touch

Though the 'retargetting-campaign' yields a higher % of total 'last touches' compared to 'paid-search,' 'paid-search' offers a higher conversion percentage (29% vs. 22%), contributing to overall **higher** ROI when it is part of the campaign mix.

Campaign	Cost	Total Revenue	ROI
interview-with-cool-tshirts-founder	\$100.00	\$150.00	50.00%
getting-to-know-cool-tshirts	\$100.00	\$180.00	80.00%
weekly-newsletter	\$100.00	\$2,220.00	2120.00%
retargetting-ad	\$100.00	\$2,190.00	2090.00%
retargetting-campaign	\$100.00	\$1,050.00	950.00%
TOTAL:	\$500.00	\$5,790.00	1058.00%

Campaign	Cost	Total Revenue	ROI
interview-with-cool-tshirts-founder	\$100.00	\$150.00	50.00%
getting-to-know-cool-tshirts	\$100.00	\$180.00	80.00%
weekly-newsletter	\$100.00	\$2,310.00	2210.00%
retargetting-ad	\$100.00	\$2,280.00	2180.00%
paid-search	\$100.00	\$1,050.00	950.00%
TOTAL:	\$500.00	\$5,970.00	1094.00%

3.4 Optimizing ROI with the right campaign mix

We optimize marketing spend by selecting the campaigns that:

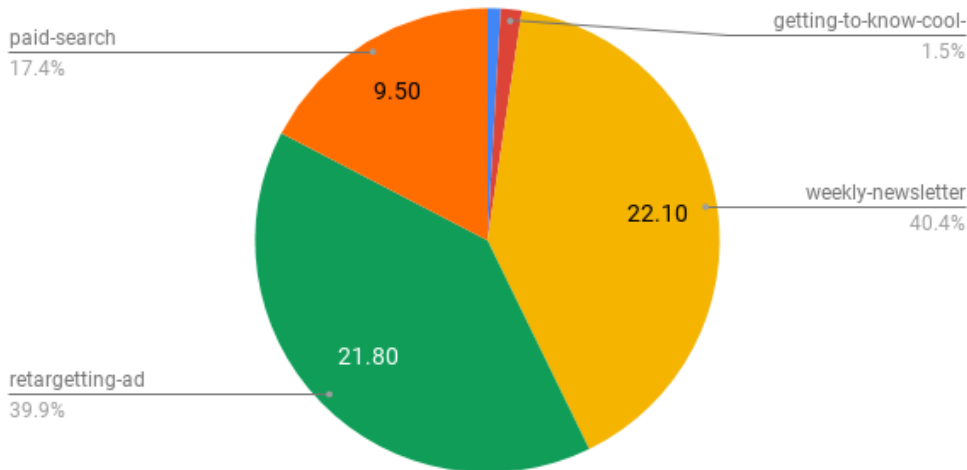
- Generate the highest number of visitors
- Are associated with a higher relative proportion of last-touches
- Convert the highest % of these last-touch visitors to buyers.

Based upon these criteria and past campaign performance, CTS should select the **following 5 campaigns**:

1. interview-with-cool-tshirts-founder
2. getting-to-know-cool-tshirts
3. weekly-newsletter
4. retargeting-ad
5. paid-search

CoolTshirts Optimal Campaign Mix

ROI by Campaign, based on projected last-touch purchases



Questions?