Traffic Source Analysis & Channel Portfolio Management

1 – Top Traffic Source Analysis (with Trending & CVRs)

Analyzing traffic sources to gain an understanding of where customers are coming from and **which channels are driving the highest quality traffic.**

Assignment 1.1: Pull data on website sessions volume breakdown by UTM Source, UTM Campaign and referral domain.

```sql
SELECT
    utm_source,
    utm_campaign,
    http_referer,
    COUNT(website_session_id) AS sessions
FROM website_sessions
WHERE created_at < '2012-04-14' -- date of the assignment
GROUP BY 1,2,3
ORDER BY 4 DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

utm_source	utm_campaign	http_referer	sessions
gsearch	nonbrand	https://www.gsearch.com	3891
NULL	NULL	NULL	34
NULL	NULL	https://www.gsearch.com	34
gsearch	brand	https://www.gsearch.com	31
bsearch	brand	https://www.bsearch.com	7
NULL	NULL	https://www.bsearch.com	7

- **Gsearch nonbrand** drives the most traffic for the period specified in the assignment.

Assignment 1.2: So far, **Gsearch** seems to be the biggest driver for the business. Pull **monthly trends for Gsearch sessions and orders** to showcase the growth for the past 8 months.

```sql
SELECT
    YEAR(s.created_at) AS yr,
    MONTH(s.created_at) AS mo,
    COUNT(DISTINCT s.website_session_id) AS sessions,
    COUNT(DISTINCT o.order_id) AS orders,
    COUNT(DISTINCT o.order_id)/COUNT(DISTINCT s.website_session_id) AS conv_rate
FROM website_sessions s LEFT JOIN orders o
    ON s.website_session_id = o.website_session_id
WHERE s.created_at < '2012-11-27' -- date of assignment
    AND s.utm_source ='gsearch'
GROUP BY 1,2;
```

Result Grid | Filter Rows: | Export:

yr	mo	sessions	orders	conv_rate
2012	3	1858	60	0.0323
2012	4	3572	92	0.0258
2012	5	3408	97	0.0285
2012	6	3582	121	0.0338
2012	7	3807	145	0.0381
2012	8	4879	184	0.0377
2012	9	4491	188	0.0419
2012	10	5532	234	0.0423
2012	11	8895	373	0.0419

- In general, **sessions and orders have both increased substantially**. Session volume has gone up from around only 1,800 to almost 9,000, orders increased from 60 since the beginning to 373 by the end.
- **Conversion Rate (session to order) improved** from roughly 2.8% over the first three months to over 4% for the most recent three months.
- With at least 4% of the sessions are converting to sales, the marketing manager would be happy with the current bids paying for clicks.

Assignment 1.3: Pull data to show a similar **monthly trend for Gsearch**, but this time **splitting out nonbrand and brand campaigns separately** to evaluate if the brand is picking up.

```
SELECT
    YEAR(s.created_at) AS yr,
    MONTH (s.created_at) AS mo,
    COUNT(DISTINCT CASE WHEN utm_campaign = 'nonbrand' THEN s.website_session_id ELSE NULL END) AS nonbrand_sessions,
    COUNT(DISTINCT CASE WHEN utm_campaign = 'nonbrand' THEN o.order_id ELSE NULL END) AS nonbrand_orders,
    COUNT(DISTINCT CASE WHEN utm_campaign = 'brand' THEN s.website_session_id ELSE NULL END) AS brand_sessions,
    COUNT(DISTINCT CASE WHEN utm_campaign = 'brand' THEN o.order_id ELSE NULL END) AS brand_orders
FROM website_sessions s LEFT JOIN orders o
    ON s.website_session_id = o.website_session_id
WHERE s.created_at < '2012-11-27'
    AND s.utm_source ='gsearch'
GROUP BY 1,2;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

yr	mo	nonbrand_sessions	nonbrand_orders	brand_sessions	brand_orders
2012	3	1850	60	8	0
2012	4	3507	86	65	6
2012	5	3294	91	114	6
2012	6	3442	114	140	7
2012	7	3656	136	151	9
2012	8	4676	174	203	10
2012	9	4226	172	265	16
2012	10	5197	219	335	15
2012	11	8510	356	385	17

- **Brand** sessions and orders have both increased greatly since firm started which shows that **consumers are getting familiar with the brand, i.e. the company is getting brand traction.**

2 – Bid Optimization for Paid Traffic

Understand the value of various **segments** of paid traffic to optimize marketing budget.

Assignment: Dive deeper into the top driver **Gsearch Nonbrand**, pull **monthly sessions and orders split by device type** to understand trended device-level performance.

```
SELECT
    YEAR(s.created_at) AS yr,
    MONTH (s.created_at) AS mo,
    COUNT(DISTINCT CASE WHEN device_type = 'desktop' THEN s.website_session_id ELSE NULL END) AS desktop_sessions,
    COUNT(DISTINCT CASE WHEN device_type = 'desktop' THEN o.order_id ELSE NULL END) AS desktop_orders,
    COUNT(DISTINCT CASE WHEN device_type = 'mobile' THEN s.website_session_id ELSE NULL END) AS mobile_sessions,
    COUNT(DISTINCT CASE WHEN device_type = 'mobile' THEN o.order_id ELSE NULL END) AS mobile_orders
FROM website_sessions s LEFT JOIN orders o
    ON s.website_session_id = o.website_session_id
WHERE s.created_at < '2012-11-27'
    AND s.utm_source ='gsearch'
    AND s.utm_campaign ='nonbrand'
GROUP BY 1,2;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

yr	mo	desktop_sessions	desktop_orders	mobile_sessions	mobile_orders
2012	3	1126	50	724	10
2012	4	2137	75	1370	11
2012	5	2275	83	1019	8
2012	6	2676	106	766	8
2012	7	2771	122	885	14
2012	8	3517	165	1159	9
2012	9	3172	155	1054	17
2012	10	3933	201	1264	18
2012	11	6460	323	2050	33

- Both desktop sessions and mobile sessions have shown increase over the past 8 months.
- **Desktop sessions are a lot more than mobile and desktop volume is increasing much faster**. It was a little less than 2:1 for desktop sessions in relation to mobile sessions since the beginning in March 2012; the ratio has gone up to more than 3:1 at the end of this period.
- **Desktop orders are increasing throughout the period while mobile order volume has been pretty flat and it bounced around a bit during May to August**. At the beginning, the ratio of desktop to mobile orders was 5:1, and by the end, it has increased to 10:1.
- Takeaway: Based on the analysis of isolating the overall device performance, the Marketing Manager could adjust spends to **bid on different devices specifically**, i.e. increase bids on desktop and dial down on mobile, and then monitor device-level volume and conversion performance so as to bring more traffic to the website and make more money for the business.

3 – Analysis for Channel Portfolio Management

Dive deeper into Channel Mix, analyze the entire portfolio of marketing channels (various paid traffic and free traffic) to maximize the effectiveness of marketing budget.

Assignment 3.1: Multi-Channel Bidding: show nonbrand sessions, orders, and conversion rates from session to order for Gsearch and Bsearch with a breakdown by device type to figure out if Bsearch nonbrand traffic should have the same bids as Gsearch nonbrand.

```
-- Multi-Channel Bidding/Cross-Channel Bid Optimization
SELECT
    s.device_type,
    s.utm_source,
    COUNT(DISTINCT s.website_session_id) AS sessions,
    COUNT(DISTINCT o.order_id) AS orders,
    COUNT(DISTINCT o.order_id)/COUNT(DISTINCT s.website_session_id) AS conv_rate
FROM website_sessions s LEFT JOIN orders o
    ON s.website_session_id = o.website_session_id
WHERE s.created_at > '2012-08-22' -- specified in assignment
    AND s.created_at < '2012-09-19' -- the time of the assignment
    AND s.utm_campaign = 'nonbrand' -- Limiting to nonbrand paid search
GROUP BY 1,2;
```

device_type	utm_source	sessions	orders	conv_rate
desktop	bsearch	1161	44	0.0379
desktop	gsearch	3010	135	0.0449
mobile	bsearch	130	1	0.0077
mobile	gsearch	1017	13	0.0128

- With both Desktop and Mobile traffic, Gsearch outperforms Bsearch.
- Specifically, within Desktop, Gsearch has a better conversion rate than Bsearch, 4.5% versus 3.8%.
- Similarly, within Mobile, Gsearch converts at 1.3%, compared to 0.7% for Bsearch.
- Thus, the Marketing Manager would bid down on Bsearch based on its under-performance.

Assignment 3.2: Impact of Bid Changes: based on the above previous analysis, the Marketing Manager bid down Bsearch nonbrand on December 02. Pull weekly trended session volume for both search campaigns sliced by device type to show to show the impact of bid adjustment.

```sql
-- Analyze Channel Portfolio Trends / Impact of Bid Change
SELECT
    MIN(DATE(created_at)) AS week_start_date,
    COUNT(DISTINCT CASE WHEN utm_source ='gsearch' AND device_type ='desktop' THEN website_session_id
    ELSE NULL END) AS g_dtop_sessions,
    COUNT(DISTINCT CASE WHEN utm_source ='bsearch' AND device_type ='desktop' THEN website_session_id
    ELSE NULL END) AS b_dtop_sessions,
    COUNT(DISTINCT CASE WHEN utm_source ='bsearch' AND device_type='desktop' THEN website_session_id
    ELSE NULL END)
    /COUNT(DISTINCT CASE WHEN utm_source ='gsearch' AND device_type='desktop' THEN website_session_id
    ELSE NULL END) AS b_pct_of_g_dtop,
    COUNT(DISTINCT CASE WHEN utm_source ='gsearch' AND device_type='mobile' THEN website_session_id ELSE
    NULL END) AS g_mob_sessions,
    COUNT(DISTINCT CASE WHEN utm_source ='bsearch' AND device_type='mobile' THEN website_session_id ELSE
    NULL END) AS b_mob_sessions,
    COUNT(DISTINCT CASE WHEN utm_source ='bsearch' AND device_type='mobile' THEN website_session_id ELSE
    NULL END)
    /COUNT(DISTINCT CASE WHEN utm_source ='gsearch' AND device_type='mobile' THEN website_session_id
    ELSE NULL END) AS b_pct_of_g_mob
FROM website_sessions
WHERE created_at > '2012-11-04' -- specified in assignment
    AND created_at < '2012-12-22'  -- the time of the assignment
    AND utm_campaign = 'nonbrand' -- Limiting to nonbrand paid search
GROUP BY YEARWEEK(created_at);
```

week_start_date	g_dtop_sessions	b_dtop_sessions	b_pct_of_g_dtop	g_mob_sessions	b_mob_sessions	b_pct_of_g_mob
2012-11-04	1028	401	0.3901	325	29	0.0892
2012-11-11	956	401	0.4195	290	37	0.1276
2012-11-18	2655	1008	0.3797	853	85	0.0996
2012-11-25	2058	843	0.4096	692	62	0.0896
2012-12-02	1326	517	0.3899	396	31	0.0783
2012-12-09	1277	293	0.2294	424	46	0.1085
2012-12-16	1270	348	0.2740	376	41	0.1090

- As to Desktop traffic, before the bid down on December 02, relatively stable numbers of Bsearch were seen as being about 40% of Gsearch volume. After the bid down, Bsearch dropped more than Gsearch and the relative percentage was down to 23% and 27% in that following two weeks.
- Although there was no bid change on Gsearch Desktop, the session volumes fluctuated a bit which might due to seasonality.
- With Mobile traffic, Bsearch as a percentage of Gsearch were much lower than desktop but the numbers were fairly steady which might be that Bsearch is less price elastic on mobile and the session volume is less sensitive to bid changes.
- The slightly drop-down on Gsearch traffic after holiday seasons wouldn't need to be worried too much.

Assignment 3.3: Analyzing Direct, Organic, and Brand-Driven Traffic

Analyze branded and free traffic to understand how well your brand is doing with consumers.

Assignment: Show monthly trended Organic, Direct, and Paid Brand search traffic, and a comparison of those sessions with nonbrand traffic as a % of Paid Search Nonbrand.

```sql
-- Site Traffic Breakdown
WITH t1 AS --Step 1: Define Channel Groups (organic, paidbrand, paidnonbrand, direct)
(
SELECT
    website_session_id,
    created_at,
    CASE
        WHEN utm_source IS NULL AND http_referer IN ('https://www.gsearch.com', 'https://www.bsearch.com') THEN
        'organic_search'
        WHEN utm_campaign = 'nonbrand' THEN 'paid_nonbrand'
        WHEN utm_campaign = 'brand' THEN 'paid_brand'
        WHEN utm_source IS NULL AND http_referer IS NULL THEN 'direct_type_in'
    END AS channel_group
FROM website_sessions
WHERE created_at <'2012-12-23' -- date of assignment
)

SELECT -- Show relative session volume with year_month trend
    YEAR(created_at) AS yr,
    MONTH(created_at) AS mo,
    COUNT(DISTINCT CASE WHEN channel_group = 'paid_nonbrand' THEN website_session_id ELSE NULL END) AS non_brand,
    COUNT(DISTINCT CASE WHEN channel_group = 'paid_brand' THEN website_session_id ELSE NULL END) AS brand,
    COUNT(DISTINCT CASE WHEN channel_group = 'paid_brand' THEN website_session_id ELSE NULL END)
        /COUNT(DISTINCT CASE WHEN channel_group = 'paid_nonbrand' THEN website_session_id ELSE NULL END) AS
        brand_pct_of_nonbrand,
    COUNT(DISTINCT CASE WHEN channel_group = 'direct_type_in' THEN website_session_id ELSE NULL END) AS direct,
    COUNT(DISTINCT CASE WHEN channel_group = 'direct_type_in' THEN website_session_id ELSE NULL END)
        /COUNT(DISTINCT CASE WHEN channel_group = 'paid_nonbrand' THEN website_session_id ELSE NULL END) AS
        direct_pct_of_nonbrand,
    COUNT(DISTINCT CASE WHEN channel_group = 'organic_search' THEN website_session_id ELSE NULL END) AS organic,
    COUNT(DISTINCT CASE WHEN channel_group = 'organic_search' THEN website_session_id ELSE NULL END)
        /COUNT(DISTINCT CASE WHEN channel_group = 'paid_nonbrand' THEN website_session_id ELSE NULL END) AS
        organic_pct_of_nonbrand
FROM t1
GROUP BY 1,2;
```

yr	mo	non_brand	brand	brand_pct_of_nonbrand	direct	direct_pct_of_nonbrand	organic	organic_pct_of_nonbrand
2012	3	1850	10	0.54%	9	0.49%	8	0.43%
2012	4	3507	76	2.17%	71	2.02%	78	2.22%
2012	5	3294	139	4.22%	151	4.58%	150	4.55%
2012	6	3442	165	4.79%	170	4.94%	190	5.52%
2012	7	3656	195	5.33%	187	5.11%	207	5.66%
2012	8	5320	263	4.94%	250	4.70%	265	4.98%
2012	9	5588	339	6.07%	285	5.10%	331	5.92%
2012	10	6883	431	6.26%	440	6.39%	428	6.22%
2012	11	12267	558	4.55%	571	4.65%	624	5.09%
2012	12	6643	464	6.98%	482	7.26%	492	7.41%

Looking at the three columns with percent figures, **all of the high-margin traffic (Brand, Direct, and Organic) was picking up and growing faster than Nonbrand**. They all started off at around 2% of nonbrand in April and were building up all the way up to 7% or higher by December. This is a **positive trend** as it means that the brand is building up and the company has achieved more cost-effective way of customer acquisition.