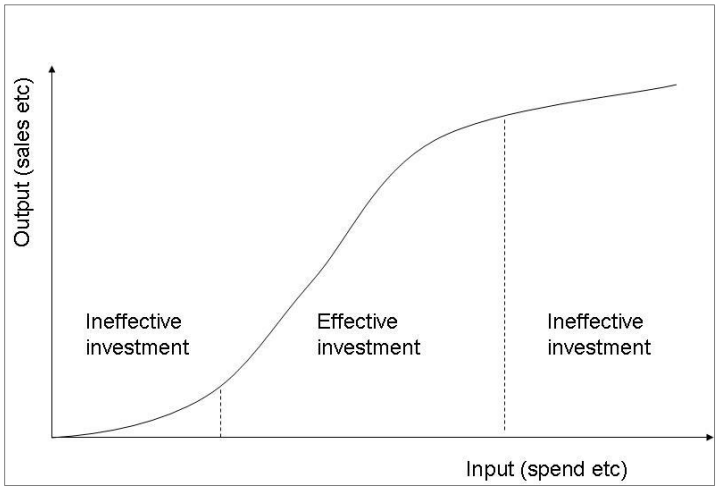
How should Bitwise spend the remaining $450,000 of marketing budget in the last quarter of the year?

The optimal allocation of the incremental budget will be to the marketing channel with the highest marginal return. The marginal return on ad spending can be estimated with a response curve, assuming sufficient historical data is available to build such a model.[1]

Response curves, which chart how consumer response rates vary over ad spending levels, typically follow an s-shape. At low spending levels, response rates are low and increase slowly. As the reach of your marketing increases, response rates increase at an accelerating pace. As the market becomes saturated, diminishing returns set in and response rates slow.



In lieu of an actual response curve, some reasonable assumptions about the reach of each marketing channel can also be used to gauge where on the hypothetical response curve you might currently be. The larger the reach, the more money can be allocated to that channel without oversaturating it.[2]

In addition to total available reach, recent spending also needs to be taken into account. The more you have spent recently in a channel, the further out on the response curve you likely are. The further out on the response curve you go, the more of a discount should be applied to your measures of average returns to come up with an expected marginal return estimate.[3] If spending $450,000 in a single quarter represents a significant increase relative to past levels, the risk of saturating the market goes up and alternative uses of the budget should be considered (more on that further down).

Whether you are using a model to construct a response curve or simply adjusting average marketing effectiveness up or down based on where you believe you currently are on the response curve, you will need to have already established some consistent method for attributing customer responses (i.e. leads or sales) back to marketing. Since this is discussed at length in Part 2, for our purposes here, we will assume such a methodology has already been established and measures of average marketing effectiveness are already available for each marketing channel in a reporting dashboard.

Apart from developing a point of view on which channel will provide the highest marginal return, Bitwise's Q4 business objectives and seasonality should both also be considered before making an allocation decisions. If Q4 is a low season for new allocations, actual response rates may be lower than recent historical data would suggest. Allocating more funds toward branding channels in Q4 could help to fill the top of the funnel, priming the pump for Q1 campaigns to drive conversions.

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[1] Sufficient data means ideally 1-2 years of weekly data with enough variability to measure a relationship between spending and customer response (e.g. leads, sales, etc.); 2 years of data at a constant spending level is no more helpful than just 2 weeks of data at varied spending levels. The more variables you include in your model (such as to measure synergistic effects), the more data you will need to get a good read.

[2] Frequency should also be taken into account; the optimal frequency will vary be media type and can be based on industry benchmarks.

[3] On the right side of the s-curve, marginal returns will be lower than the average historical returns; if you believe you are still on the upward sloping side of the s-curve, you would actually want to adjust your marginal return estimate up.

It is also worth questioning the assumption that the budget needs to be spent all. Fear that left over budget will make it harder to get budget in later quarters could lead to confirmation bias – looking for data that supports spending the money and downplaying information to the contrary.[4] If the money cannot be put to an immediately productive use on a marketing campaign (because if it could, why wasn't that money already accounted for in the Q4 campaign plans?), those funds could be spent in ways that will pay future dividends instead. That could mean investing in tooling or adding to the marketing content library.[5]

Ultimately the decision how to allocate the remaining $450,000 in budget rests on Bitwise's Q4 objectives and what is likely to yield the highest return relative to those objectives. Left over budget should not be spent unless an opportunity with an attractive expected return can be identified. That could mean running more ads in a marketing channel with a high expected marginal returns or investing in tools and other resources that will provide more longitudinal benefits.

How should the $30 million in new allocations be attributed back to Bitwise's various marketing efforts?

The most precise estimate of marketing's contribution to sales (i.e. new allocations) is incremental contribution, which is to say the amount generated that otherwise would not have occurred without marketing. For example, if a prospective customer searches for Bitwise with the intent to get in touch with a sales representative and put money into a Bitwise fund, if that person happens to click on a Bitwise ad alongside the search results rather than click on a hyperlink in the search results, the incremental contribution from that ad is actually zero because that sale was going to happen regardless.

The challenge when trying to measure incremental contribution is that it's impossible to know what's in the minds of prospective customers when they are exposed to marketing (i.e. where they are in the funnel/journey). Sophisticated modeling techniques can be used to control for all the factors influencing the purchase decision – including both marketing and non-marketing factors – but models are only as good as the data used to train them. Data on all those factors is going to be incomplete and fragmented, making it impossible to stitch together a complete picture of all the contributing factors, thereby undermining the value of such sophisticated models.

Another shortcoming of more sophisticated predictive models is that they can be hard for non-technical people to understand and therefore trust. Given that true incrementality is unknown and unknowable, simpler, easier to understand attribution methodologies often lead to better decisions, especially when the alternative is either analysis paralysis or naïve overconfidence.

On the other end of the spectrum, simple rules-based approaches to estimating marketing contribution have problems and limitations as well, which is why I always recommend using more than one method and empowering stakeholders to triangulate on what they believe to be closest to ground truth.[6] To quote statistician George Box, "All models are wrong, but some models are useful." Before we worry about methodology, though, we will need to pull all our marketing and sales data together in one place.

In this case, the marketing and sales efforts that are assumed to have contributed to the new allocations over the past week include: 1) display advertising, 2) other digital ads purchased programmatically through ad exchanges, 3) webinars and 4) direct mailers. The new allocations are all attached to specific accounts which

[4] "If you tortured data long enough, it will confess to anything." – Ronald Coase

[5] Investments in tooling may come with recurring costs that would also need to be accounted for when deciding how to spend the budget.

[6] Analytics tools that allow users to run different scenarios can be particularly useful in that regard.

can be tied back to mailing addresses and email addresses and even potentially IP addresses associated with those locations and entities as well (the sort of "fuzzy matching" in LeanData's value proposition).

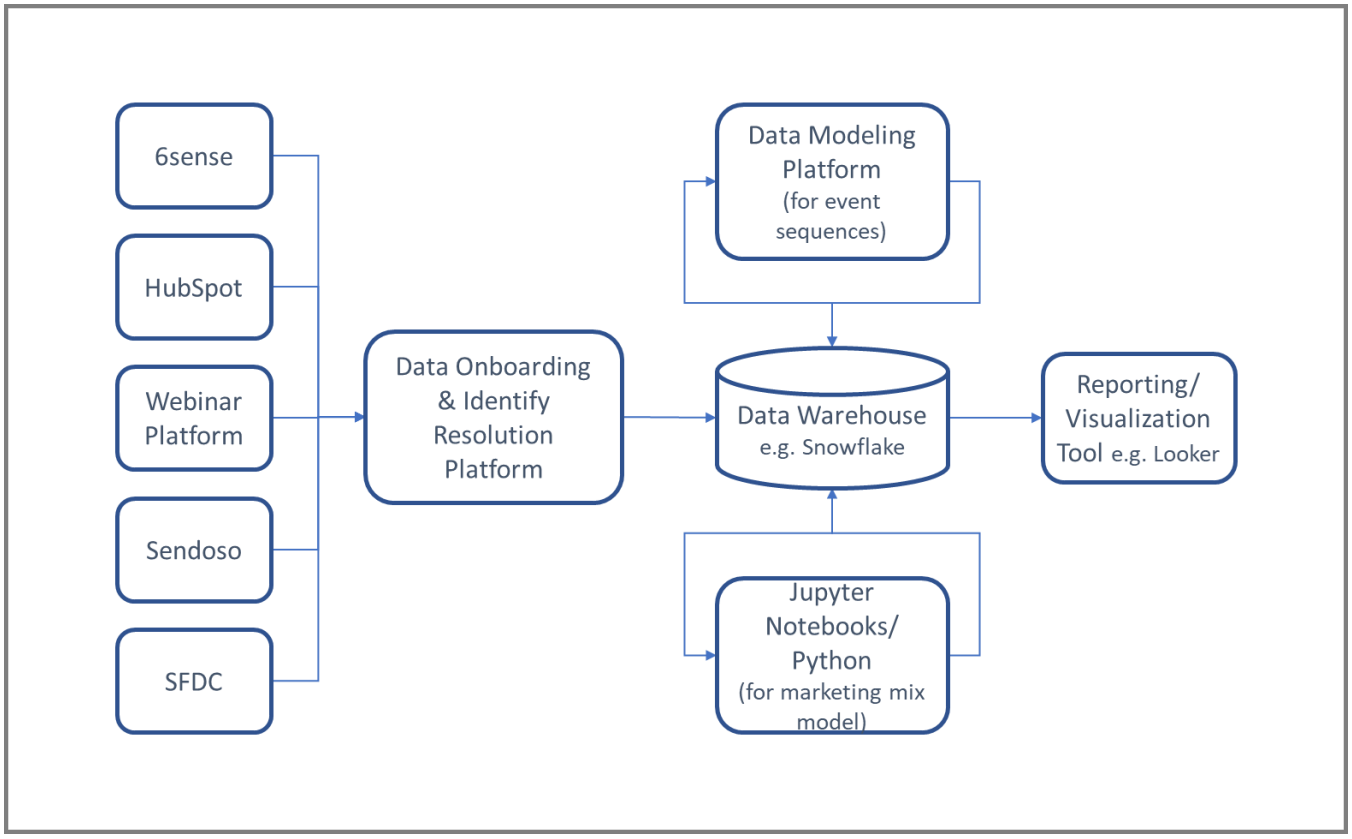

Figure 1: One potential systems architecture

The process of joining disparate marketing data sets together and resolving entity identities across those data sets (aka matching) is very hard to do well so it would be best to use a third-party solution, be it LeanData or something else.[7] The optimal tool will onboard all the marketing data, do the matching and then construct the event sequences. Match rates can be tested empirically as a confidence building measure, and a separate tool used to contruct the event sequences if necessary.[8]

Event sequences (where an event is defined as a marketing touchpoint or exposure event) will tell us how many times an account was exposed to marketing prior to a sale and in what order. Some marketing is better for building awareness, other marketing for closing the deal, so all this information is valuable. In constructing the event sequences, we will need to decide how to handle differences in the precision of time measurements; for mailers, we may know the day something went out but not necessarily when it was received (unless it includes something like a customized, redeemable offer or vanity URL) whereas digital ad impressions can be measured down to the millisecond.[9]

[7] There are lots of identity resolution providers; Neustar and LiveRamp are among industry leaders (for individuals but not necessarily larger entities); identifying a preferred provider, however, is considered to beyond the scope of this exercise.
[8] A more generalized data modeling tool such as Narrator.ai could actually provide the flexibility to analyze more data than a more specialized marketing tool.
[9] Given the mixed media involved, an alternate approach would be to use multi-variate regression to build a marketing mix model and estimate contribution. Since that approach is based on average effects, I am focusing primarily on multi-touch attribution instead to provide a more precise estimate of contribution to the new allocations specifically.

Another potential problem with event sequences to be aware of is orphaned sequences. A sequence is orphaned if we are unable to resolve the identity of the individual or entity involved, which prevents you from knowing whether that sequence ultimately resulted in a conversion or not. Someone using multiple devices from multiple locations may be exposed to a variety of marketing before contacting a sales representative, but that last touchpoint may be the only one we are able to connect to a lead in the data. This is a perennial problem in digital marketing with no real solution other than to exclude orphaned sequences from data samples.

Some additional data cleansing steps to take care of before finalizing the event sequences include de-duplication and lookback windows. De-duplication collapses multiple events into one (such as when both an impression and a click event are logged). If multiple events are logged for the same ad creative within a short time interval, those events should be treated as just one event to avoid over-estimating the contribution from that marketing channel.

Lookback windows are a reflection media persistence relative to the time a conversion took place. (i.e. how long someone is likely to recall or be influenced by the marketing message) and vary by media type; if someone was exposed to an SEM ad three months ago, it's unlikely that ad had any influence over a purchase decision being made today. Events occurring outside the lookback window would not qualify credit for a lead or sale.

With the event sequences ready, we need to decide on the business rules for assigning credit for the new allocations back to marketing efforts. I favor rules-based attribution for all the reasons mentioned above, but a simple cost/benefit analysis can also be used to decide the best approach. The costs associated with different attribution methods (whether direct or in time and effort) are relatively easy to determine; the benefit, then, is the information value that it provides.

In my experience, unless you are spending tens of millions on marketing, the costs of sophisticated multi-touch attribution and marketing mix modeling solutions are hard to justify so I would recommend starting by estimating contribution using both last touch and simple linear attribution methods.

Last touch awards full credit to the last event in the sequence. Linear attribution evenly distributes credit across all of the events in the sequence. Last touch can be good for identify the marketing channels that are best for "closing the deal," while linear can help identify those contributing more indirectly to awareness, consideration and preference.

Side Bar Estimating information value starts with a basic decision tree. Without any information other available, what is the probability of making the wrong decision and what would the probability weighted, expected cost? How much would more information (i.e. the attribution estimates) reduce the likelihood of making the wrong decision? If the difference in the expected cost of the wrong decision in the two scenarios is less than the cost to adopt a more sophisticated attribution methodology, then it's not worth pursuing. See *How to Measure Everything* by Douglas Hubbard to learn more.

As a further refinement on linear attribution, I might also consider adjusting the weightings of each event type in the sequence (i.e. each type of marketing). Google and Facebook, for example, give more weighting to higher intent media exposure events (e.g. clicking on an ad being considered higher intent than a display impression). Similarly, we might want to give more weighting to webinar attendance than to direct mailers.

To come up with weightings, I would look at all converting event sequences (not just those for the new allocators) over a 12 months period (depending on seasonality) and calculate the relative frequency with which each type of marketing occurs in those converting sequences (i.e. event sequences that result in a sale or new

allocation).[10] Some good judgement may also be needed to come up with weightings since a marketing event type that frequently occurs in converting sequences could be playing an important role in lead generation or could just be an indicator of market saturation.[11]

Given the sales motion involved, how to split the credit between marketing and sales would also need to be decided.[12] For that, I would recommend using a marketing mix model with sales efforts included as variables and data coming from Salesforce and other sales tools to quantify sales contribution. Based on the marketing mix model, some portion of the credit for the new allocations would go to sales and other marketing factors by running the new allocations data through the model. The remainder of the credit would then be distributed across the various marketing channels according to established attribution methodology (e.g. 20% to webinars, 10% to display, etc.).[13]

In truth, getting everyone to agree on the methodology (or methodologies) for estimating contribution should happen well advance of deciding how to attribute the new allocations specifically. Once decided, the important thing is to apply the chosen method(s) consistently to avoid confusion and undermining confidence in constantly shifting contribution estimate. Different methods will produce different estimates, and that's ok.[14] Everyone just needs to understand the utility and limitations of each method in advance, and the data (and results) can flow automatically through into the chose reporting/visualization tool.

The world is inherently uncertain, and good analytics (marketing or otherwise) is about reducing that uncertainty so that we can make better decisions – not providing the illusion of certainty. A marketing mix model, using weekly aggregate data, can help in deciding how much credit to give marketing overall, while multi-touch attribution (rules based or otherwise) can provide a more precise estimate of how to distribute that credit across marketing channels. Just stay consistent and know the limitations of your chosen methods when interpreting the results.

[10] The coefficients of a marketing mix model can also help in coming up with weightings so that the aggregate contribution estimates from multi-touch attribution remain relatively consistent with the marketing mix model estimates.
[11] A third approach to measuring contribution, not discussed herein because it would not be viable in the case of the new allocations, is the experimental approach. The control group receives no marketing and while the treatment does and the difference in the response rates reflects the incremental contribution of the marketing.
[12] PR and earned media might be still another consideration.
[13] This is important to calculating accurate return on ad spending (ROAS) estimates. If Sales and Marketing are both claiming credit for the same sale/allocation dollars, then ROAS estimates will be overstated.
[14] While frequent tinkering with attributions rules is discouraged, marketing mix models should be refreshed approximately once a quarter because you need approximately one quarter's worth of weekly data to detect a meaningful change in model coefficient estimates.