



CORVIDAE
By QueryClick



Corvidae Data Rebuilding and Attribution Modelling:

TECHNICAL OVERVIEW

The Marketer's Problem

The pressure on marketers to spend accurately, efficiently and to drive growth is more intense than ever.

Traditional digital channels have become saturated, meaning growth is often only achievable at loss making acquisition cost. Brand activity is under heavier scrutiny and its effectiveness for new customer growth is increasingly being questioned by finance leaders.

Marketers, as a result, are overwhelmingly left with last click reports and disconnected channel strategies that make it impossible to remove wasted spend, cannibalisation, or identify incremental spend opportunities. Meanwhile, high spending competitors erode market share and drive up CPAs across all channels, worsening ROI and making recession-strapped budgets struggle to perform, let alone offer growth.

The impending removal of 3rd party cookies from Google's Chrome browser, and the sub-standard tracking alternatives being offered all compound rather than relieve this issue for marketers.

Finding value has never been harder.

Leaning on nearly two decades of performance marketing experience with enterprise brands, and over eight years of research and investment, we have taken a new and sophisticated AI approach to cut through the silos preventing optimisation and dramatically improve the quality of our clients' marketing data. We achieve this with our Corvidae platform, which uses AI and a cookie-free approach to measurement to intelligently connect customer journeys across common online and offline marketing channels.

We understand that is a bold claim, and so this document outlines some of the key technologies and processes that have enabled our breakthrough and the launch of Corvidae as a standalone product.

Chris Liversidge, CEO and Founder



Corvidae Overview

Corvidae uses a 1st party pixel, is GDPR and CCPA compliant, and is the only cookieless attribution solution on the market thanks to its innovative use of AI in its session stitching and attribution process.

This technology is globally patented and uses predictive modelling to join sessions across data silos. This means you don't need to match IDs to understand how individuals move through your marketing material.

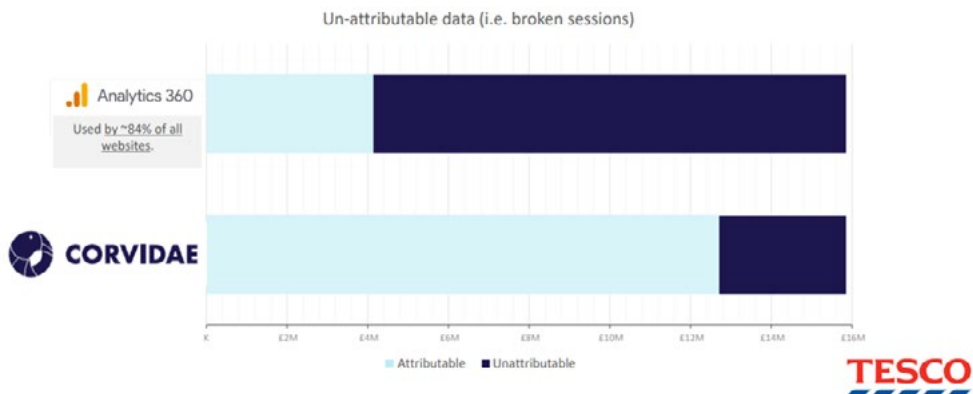
Corvidae provably rebuilds marketing data to above 95% accuracy - giving you a single, unified view of attribution across your marketing campaigns.

To give an idea of how revolutionary that accuracy is - cookie-based measurement systems typically deliver accuracy across multiple data silos of around 20%, due the multi device world we operate in today.

Corvidae is focused on delivering accurate data and standardised SaaS reporting for the largest spend advertising mediums - principally Alphabet and Meta properties. As well as click-based tracking for all site traffic and events in a typical analytics interface allowing expected understanding for:

- Organic
- Direct
- Affiliates
- Display
- and other Search and Social activity.

This is all part of Corvidae's 'Essential' package.



Our clients have a wide and rich advertising environment that goes well beyond Google Search and Facebook or Instagram Social. So, as we develop Corvidae's SaaS reporting to incorporate in-demand activity like:

- Criteo
- Pinterest
- YouTube
- DV360
- and a variety of CRM and Offline sources,

we deliver customised reporting using Corvidae's raw data stitching capability with extensible PowerBI reports.

We also offer an API for 'roll your own' reporting.



Average Campaign Impact:



Onboarding is supported by our CSM team and a well-oiled process, to make implementation simple, fast, and possible for teams tight on time and expertise.

We are Azure Gold Partners, and Corvidae is deployed within relevant Azure data centre regions to allow tight security and easy compliance for even the strictest environments. For example, we have onboarded Finance, Banking and Health clients, and can deploy in regions such as Germany where user data compliance is the strictest in the world.

Using state of the art AI, Corvidae performs intensive processing that provides our customers with an instantly understandable value proposition, and obvious paths to improving the effectiveness and efficiency of their marketing efforts.

For example, we regularly find significant differences between last click and Corvidae attribution models that allow for major budget reallocation and double-digit ROAS in common high spend channels such as Search and Social.

There is a three-stage process covering the setup and ongoing operation of Corvidae, which has been designed to make it easy to get up and running and for the majority of your marketing activity to be correctly allocated.

After initial consultation, we provision an event stream pixel for 1st party serving that once deployed offers unified attribution in between 30 and 45 days with provable accuracy of above 95%.

Deploying Corvidae & Delivering Insight

Corvidae's 3-Step Process

Data Ingestion



We use Corvidae's first party pixel to ingest your raw clickstream data.



Data Rebuild & Join



We rebuild the data using ML to 'see' the individuals behind the clickstream data and their full conversion journey.

Each journey is then stitched into data silos where ad exposure overlaps with a customer and improved conversion.



Automate & Report



Dynamic API endpoints and hourly model refresh means customer data can be bedded into any tech stack. Also gain access to our multichannel performance marketing suite.

Data Ingestion

Corvidae uses clickstream data served 1st party from your own domain. To collect 1st party data, a pixel is generated in an Azure instance provisioned for you to which a DNS record is pointed. That pixel is then required to be deployed across your web properties.

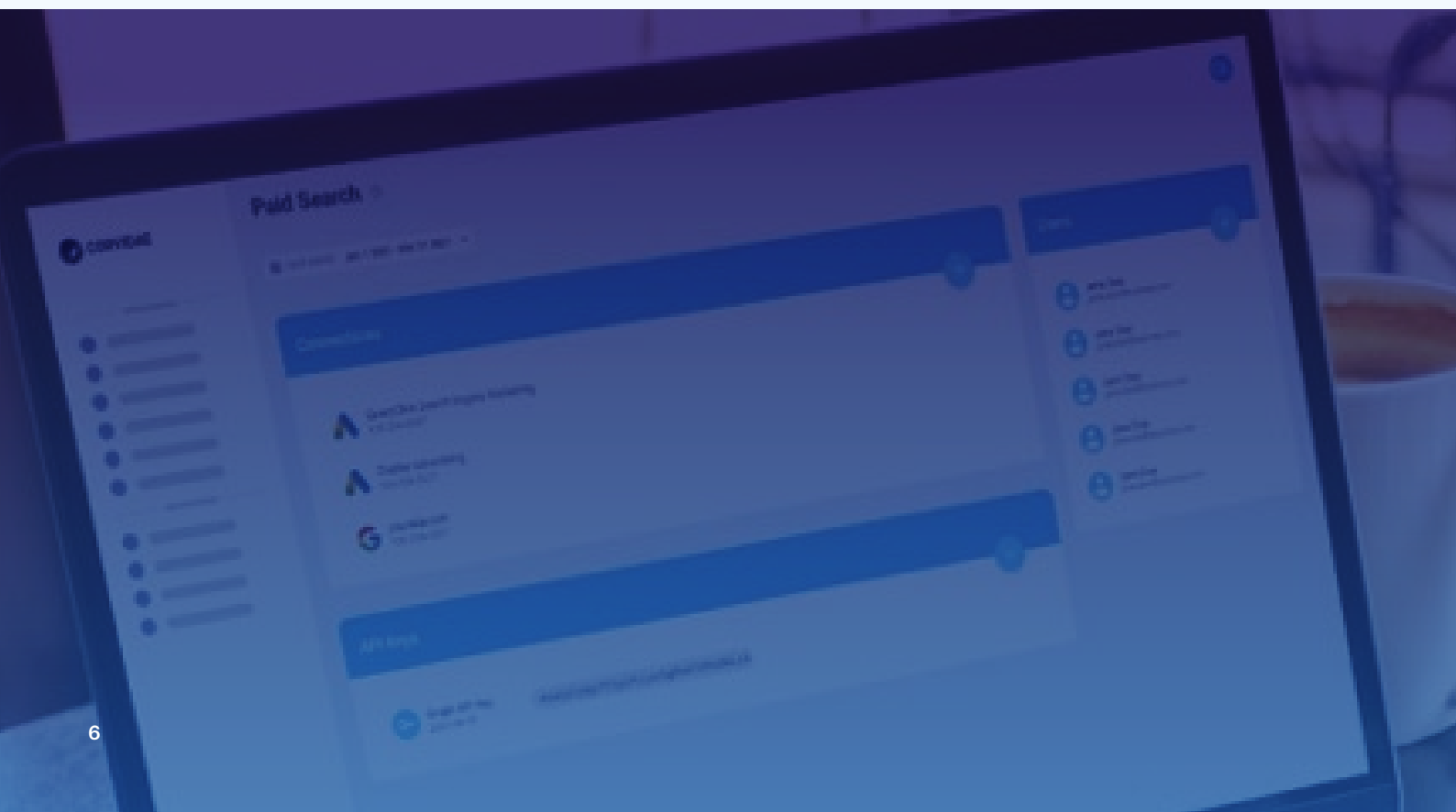
To ensure the pixel can collect all ad activity, our CSM team will share a specifications document and agree tagging for all relevant marketing activity and support with advice on integrating middleware, such as DV360, to ensure all activity is tracked accurately wherever possible.

Corvidae uses an Event Stream architecture, meaning we have fine-grained data feeding back for our AI processing. The clickstream data is irreversibly anonymised at point of collection to ensure GDPR and CCPA compliance. A single client can have millions of individual data points every day. Corvidae can easily ingest and process this data, with all processing occurring overnight for your timezone. Data ingestion and processing is completely automated.

We also ingest clickstream data from some mainstream data analytics platforms - notably Meta and Alphabet properties. This allows us to automate the collection of rich, relevant campaign information such as:

- impressions
- cost
- bid strategies
- and creatives.

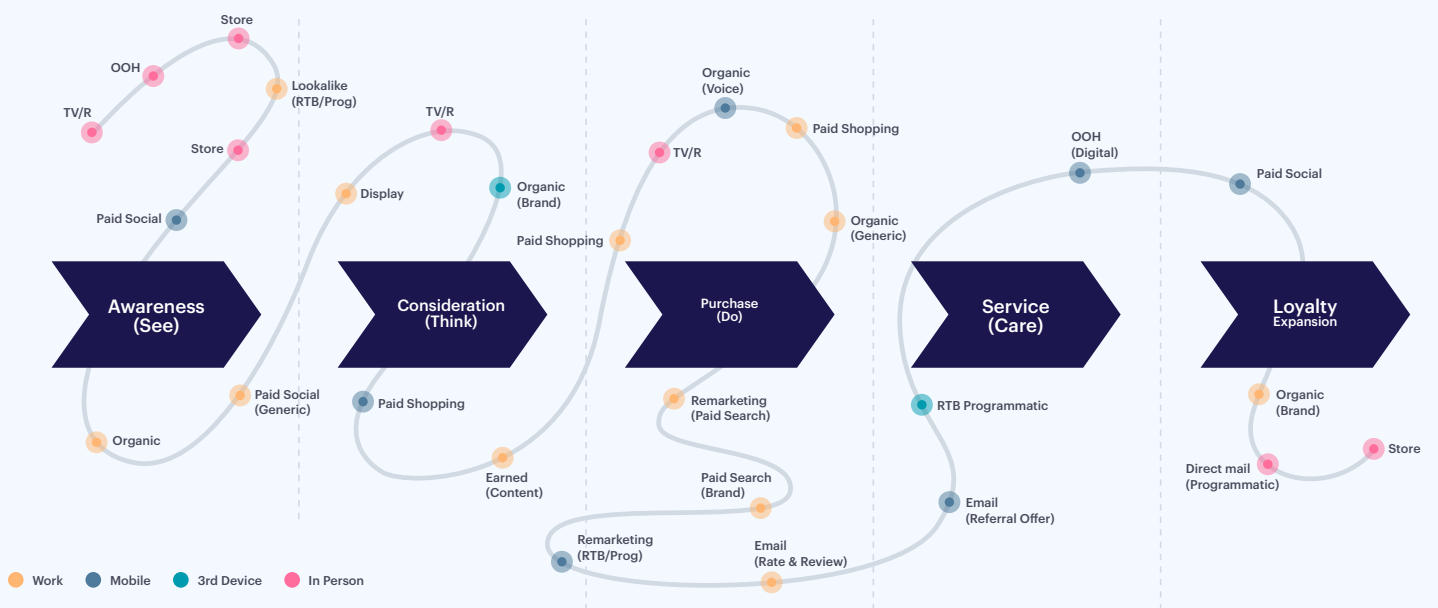
Including these data connectors allows you to have a single source of truth for the performance of your marketing activity in those platforms, using Corvidae's unified attribution view. A simple permission granting process, or service account setup is all that is required for QueryClick to access this data, and again, or CSM team will guide you through that process.



The range of supported connectors will increase as we continue development of the Corvidae platform, and we publish our high-level roadmap to share our progress and priorities with our customers. As an early adopter of our technology you will become an influencer for our priorities, and help steer the development path of Corvidae’s adoption of new connectors.

Where we don’t already support a connector, we are able to collect parameters and guide the tagging process to ensure accurate reporting on performance from those platforms is available to you in your PowerBI reports, which can be customised to highlight particular and unique priorities. This is a consultative process we undertake with you using our CSM team and your input during onboarding.

Offline data, if available, can be combined with the online journey to give a much fuller view of the customer journey for certain client businesses. This allows Corvidae to attribute to offline as a channel further improving tracking of the customer journey.



Ingesting Impressions

If impression data is able to be processed by Corvidae, it will be attributed as any other event would be.

Corvidae is able to capture ad impressions in many cases, and can serve the pixel directly in a range of common middleware. Not all providers allow Corvidae pixels, so please consult with your rep to understand if a particular source can be directly pixelated for impressions.

Walled garden impressions – such as Facebook Impressions - are handled by Corvidae's AI as well. This is validated in the AI testing process to establish 95% accuracy. However some granular reports are not available where individual impression data is not made available. This means that we can serve campaign and AdSet level attribution for Facebook impressions but for individual creative impressions there is no available data to be attributed.

TV/Radio Data

Corvidae can split all output analysis very granularly. This is key to accurate attribution analysis for TV & Radio. This channel analysis is also very dependent on us being supplied with ad campaign data regarding times and types of ads. From ingesting and analysing the known campaign data, this can be aligned to the insight we wish to generate from the onsite click data we are evaluating.

The foundation of attributing to these offline channels is to build accurate estimations of visits and conversions at varying time slices. Anything from specific minutes of the day, to specific days of the month.

Once this is known and compared with the ad campaign schedules we receive from the client, the model can begin to learn a lot about your customer's behaviours in relation to the TV and Radio ads being used. This allows accurate levels of visits and conversions to be attributed to individual instances of ad exposure, including down to the detail of regional ads if appropriate.

Beyond this, we can extrapolate on customer behaviour to give several valuable insights. Common information garnered from this analysis are:

- response time from customers being exposed to an ad until a notable uplift in relevant factors is observed (uplift analysis)
- re-attribution of 'lost' customers who have been driven to progress conversion due to the effect of a TV or radio ad

It is important to note that at this time all TV & Radio reporting is offered post-campaign, meaning the analysis is not processed live as in digital attribution but instead after the completion of a specific campaign.

In addition TV data is reported in custom PowerBI reports due to the very varied and mixed quality of spot data offered by the wide variety of media planners that clients work with.

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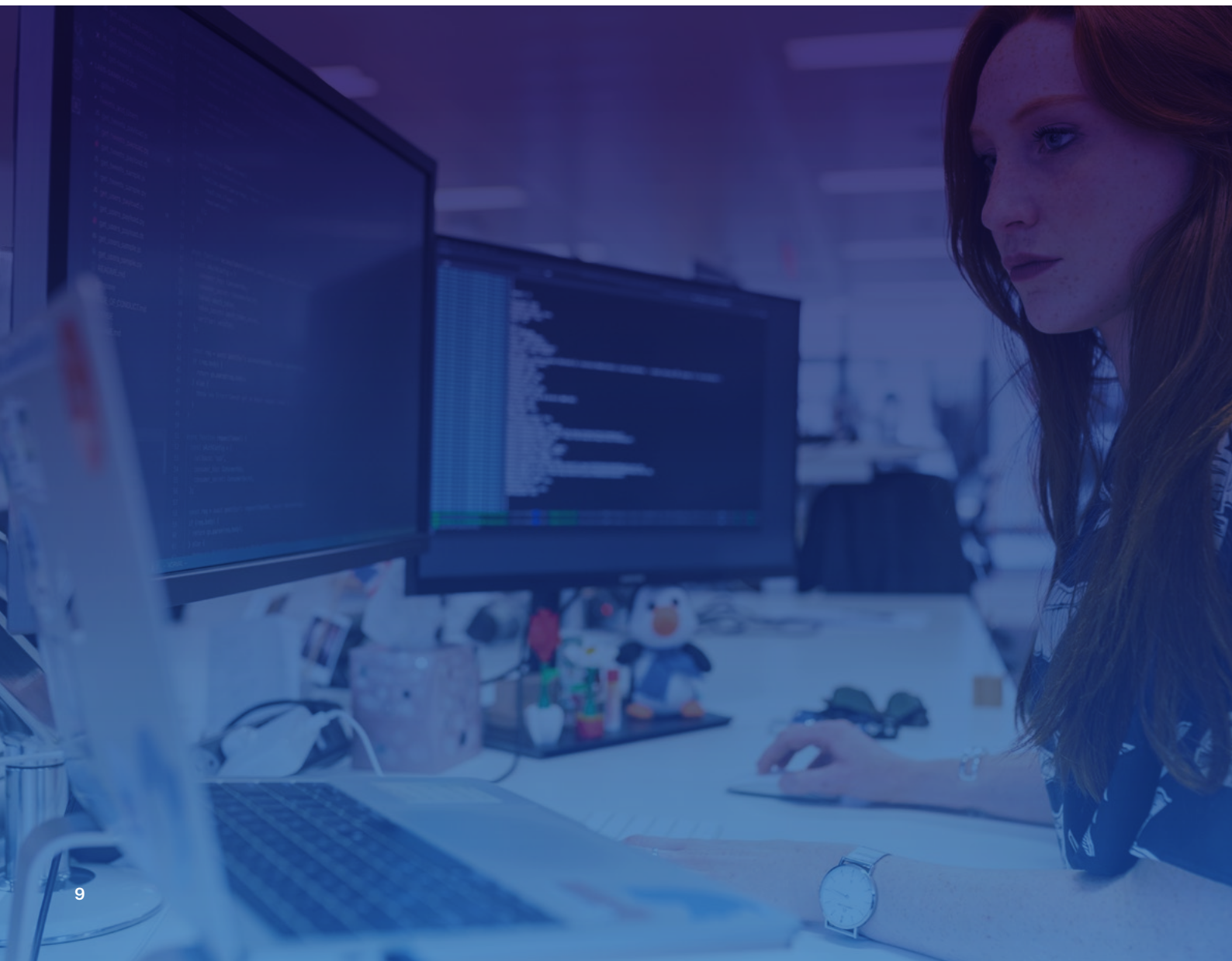
Offline Data

It is possible to include offline data for our AI to include as a channel in attribution reporting. The way in which this is performed can differ between individual clients.

For instance, we can use customer identifiers which are used offline to consolidate this as part of an overall customer journey, adding to the online information we've gathered. This could be a loyalty card scanned at checkout, email address collection by store assistants at checkout, a custom firing of the Corvidae pixel, or anything where the data can create a connection between online and offline.

In some instances, Corvidae can predict patterns which will help identify different sessions as the same user both online and offline. This relies on the ability to train our models with sufficient data from both online and offline, so behaviours and patterns can be discovered by the model and used when reporting channel value and generating insight.

As with TV & Radio spot data, offline reporting will be served via our PowerBI reporting suite.



Data Rebuild & Unification

The poor quality of raw marketing data being collected by other attribution solutions which use cookies has presented a challenge to providing meaningful and trustworthy analysis.

It is this challenge that prompted the development of Corvidae's unique approach to rebuilding raw data, prior to performing any analysis.



Through our research, we discovered that the most popular analytics packages (including Google and Adobe Analytics) are providing data that is only 20% accurate. This is a result of use of 1st party cookies that remain siloed across devices and which cannot be reliably joined across devices with the removal of 3rd party pixels from 40% of the market - and of course the remaining 60% will go in the next year.

In our early investigation of customer data, which led to the development of Corvidae, we found that both third- and first-party cookies aren't fit for purpose. They fail to see the entire picture when it comes to the modern customer journey. As users switch between channels and devices, cookies struggle to piece together their activity resulting in broken user journeys that are presented to marketers as complete.

Using Corvidae's proprietary and patented AI - and with a unique training process for each onboarding customer overseen by skilled data analysts, Corvidae's raw clickstream data is cleansed and rebuilt with probabilistic joins made across siloed sessions to unify these complex, modern user journeys without the use of cookies.

Corvidae's AI allows individual cross-device paths to be identified by gathering hundreds of behavioural and contextual identifiers from clickstream data, and looking for relationships and commonality between these identifiers to predict a likelihood that disparate sessions belong to a single pseudonymised individual. We use many factors such as activities undertaken on site, device information and generalised location information.

Our data analysts evaluate the accuracy and quality of the raw data from each client's Corvidae deployment as we undertake the stitching and attribution process.

The first stage involves reviewing the raw data to find patterns of poor quality matches and improve the data quality to a more acceptable standard. This includes evaluating previously identified 'referrers' in data samples across different channels to cleanse a conversion path that automated and non-AI systems cannot interpret easily. Once these patterns are discovered and acknowledged, rules can be setup to automate the cleansing beyond that point.

As the below shows, compared to Google Analytics 360, the value of attributable data from our initial efforts dwarfs the attributable value of a system where the data is required to be at a high level of quality beforehand.

All data being processed is irreversibly pseudonymised before any processing occurs.

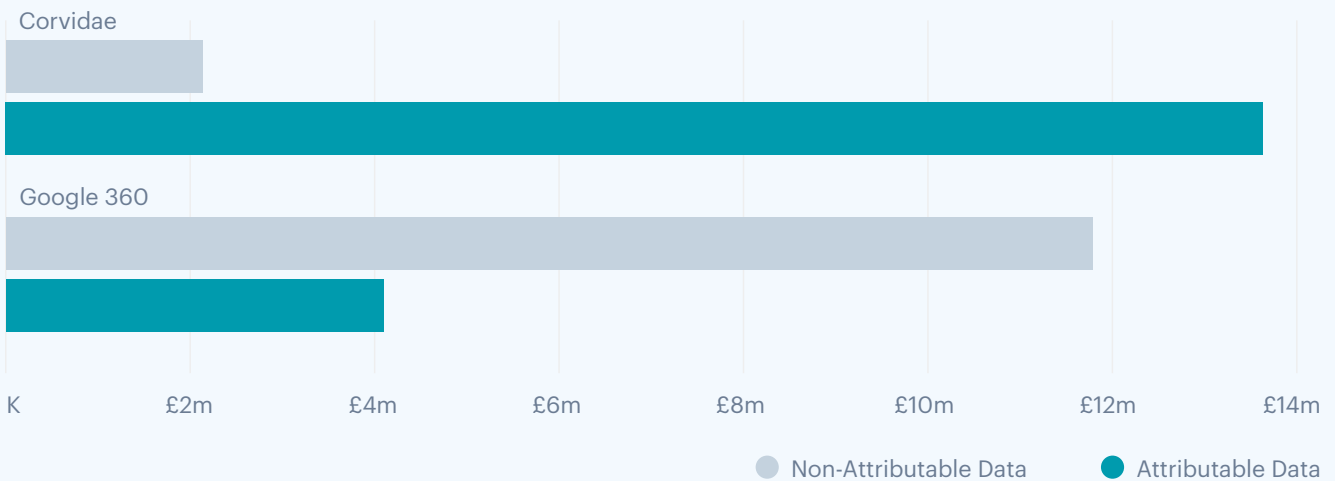


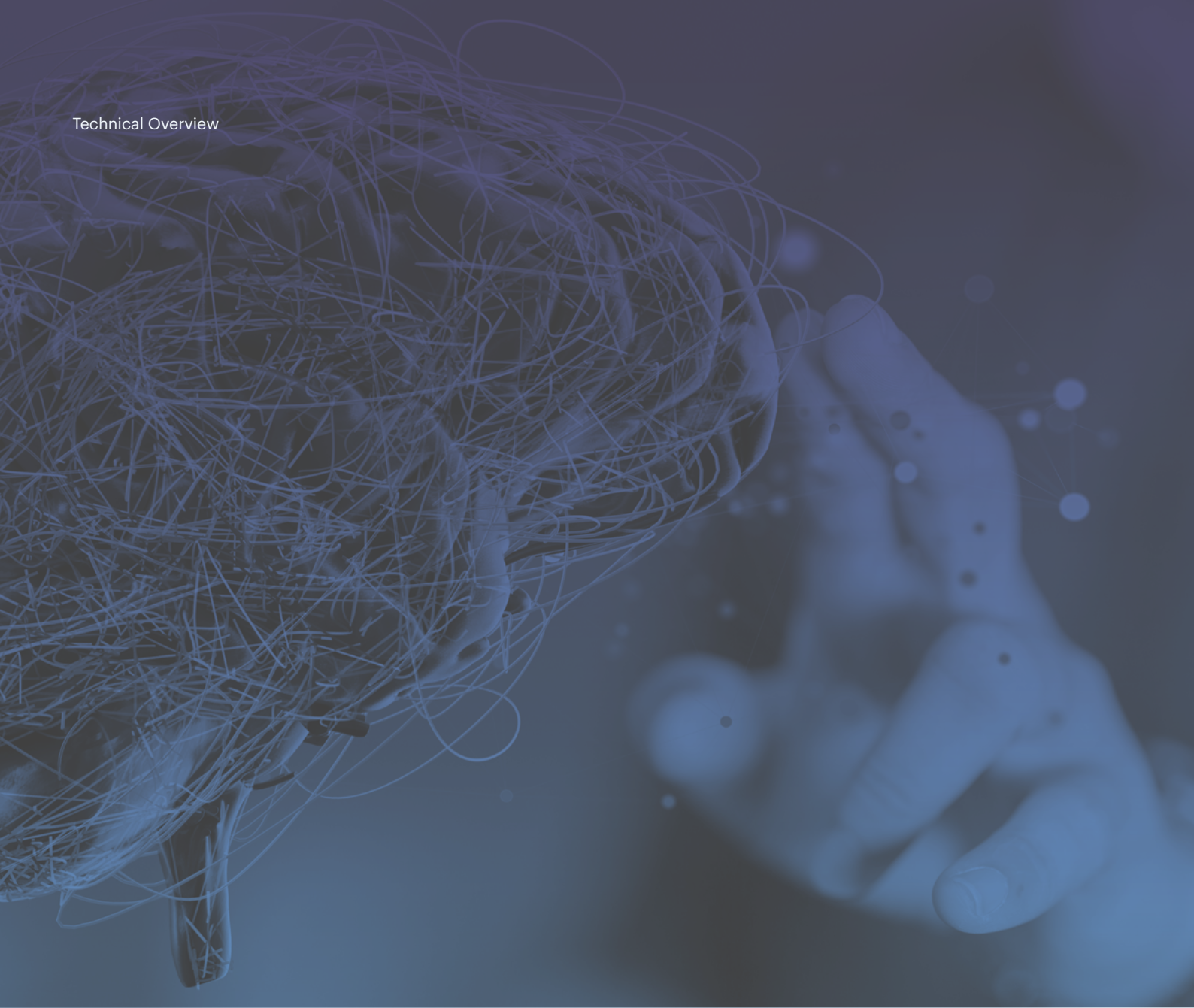
Data Segmentation

By creating unified conversion paths during the data rebuilding process, Corvidae can then segment this raw data into the aggregated data that is useful for performance optimisation reporting and automation in Corvidae’s SAAS and PowerBI interfaces.

Individual paths also reveal useful cohorting data such as first on/offline purchase and repeat purchase value, and so on which can be connected to CRM or CDPs for further optimisation of customer acquisition.

Daily attributable data (i.e. Repaired broken sessions & enhanced cross device)





Validating Attribution and Predictive AI

Once the data is cleansed and ordered, Corvidae's AI provides insight into your customer behaviours and valuable conversion patterns. Corvidae's AI is a predictive model, predicting the probability of conversion at each individual event in a conversion path - this is the basis of its attribution scoring - weighting each event's contribution towards a previous or future conversion event.

This patented approach is innovative and allows for validation of our AI's predictive capability. As part of completing data onboarding the AI model is tested by

selecting 10,000 or so conversion paths that have converted - and so provably do transact - removing the transaction and then asking the AI to select those 10,000 conversions for a wider set that includes 10,000 non-converting paths that look otherwise identical.

For your Corvidae deployment to be signed off from onboarding that selection needs to be more than 85% correct. We find that between 30 and 45 days of data is more than sufficient to allow that test to pass.

Automate & Report

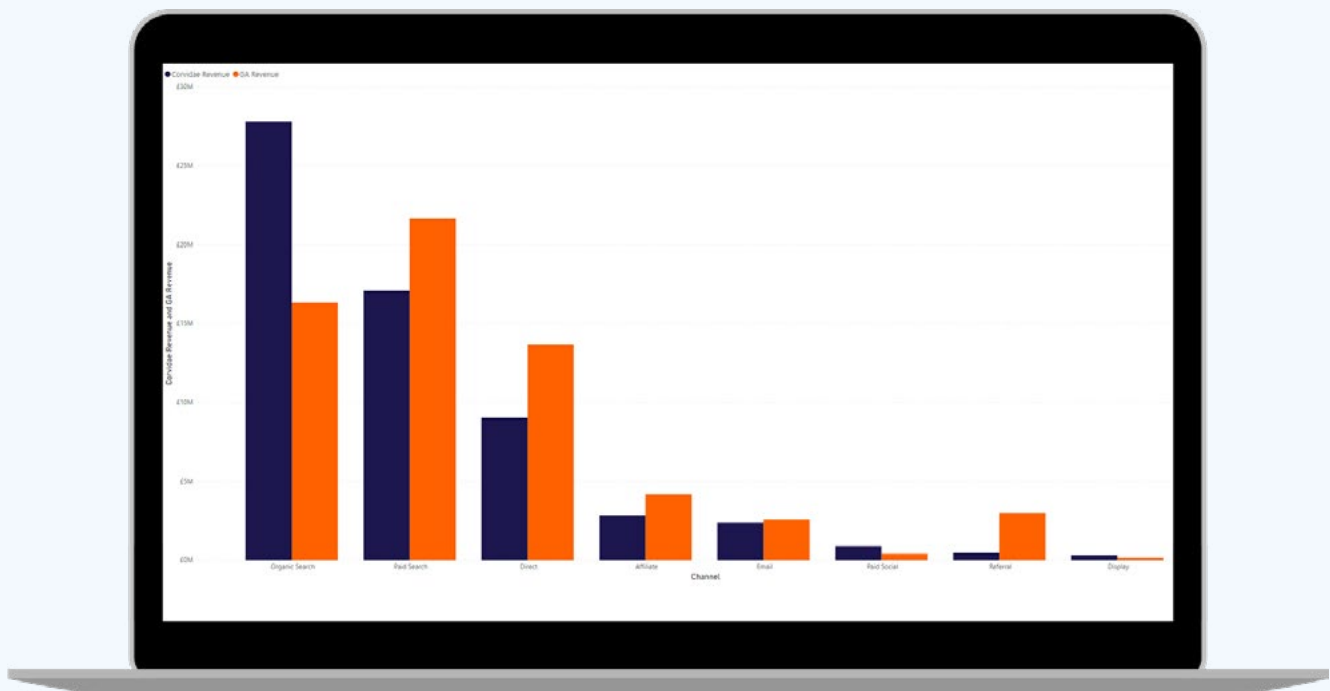
Attribution Modelling

Once clickstream data has been rebuilt and joined, it is much more accurate than before having passed the onboarding validation phase confirming above 95% accuracy.

This improves the quality, value, and accuracy of all resulting reporting. For ease of onboarding, your PowerBI reports will show existing analytics revenue alongside Corvidae's AI generated attribution to demonstrate the difference in both.

Corvidae is used to understand the value of an individual visit and the contribution of each recorded event on the path to conversion - or non-conversion. This accurate, granular base is then aggregated to offer standard reports for the most common marketing activity.

Corvidae's attribution model then, is derived from the contribution of an event towards conversion. This is a predictive process using an LSTM AI model, which is predicting a conversion - or non-conversion - with attention used to attribute.



1. Compare existing analytics to Corvidae's attributed data to understand the impact of 95% accurate data on your drivers of revenue.

QueryClick hold a global patent on this usage of AI to stitch sessions together predictively. We also have developed our modelling in partnership with Europe's largest data science faculty as part of a two-year primary research project.

Corvidae's attribution modelling has shown considerable differences to existing models our clients have used.

In parallel with our AI attribution solution, we calculate value distributions according to all common models, including:

- last click
- polynomial time decay
- and data driven.

Our intelligent model exposes client-specific insight significantly different and demonstrably more valuable than these dated attribution approaches. In contrast to xassumptive models, our AI is rigorously tested against scientific standards and is re-evaluated if its predictive accuracy falls.



2. Segment channels to understand trends and high performing activity on a clickstream basis.



3. Connected sources, such as Facebook allow ROAS comparison, which shows a stark difference between Ad Platform self reporting and Corvidae's fully attributed view.

Campaign	Impressions	Cost	Corvidae Transactions	Corvidae Revenue	Corvidae ROAS	Corvidae CTR	Clicks	Platform Revenue	Platform ROAS
62785	20654326	€60,777	1,917.61	€199,983	3.29	30.39%	692,134	€45,418	7.49
62780	11858945	€44,514	151.36	€36,454	6.82	122.11%	84,713	€142,570	3.20
2022	11858945	€44,514	151.36	€36,454	6.82	122.11%	84,713	€142,570	3.20
Qtr 2	11858945	€44,514	151.36	€36,454	6.82	122.11%	84,713	€142,570	3.20
June	13320945	€44,514	151.36	€36,454	0.82	122.11%	84,713	€142,570	3.20
62784	10666505	€43,658	558.42	€166,013	3.68	27.16%	153,348	€349,434	10.64
62854	7932185	€88,260	813.80	€782,690	8.87	11.28%	136,889	€2,208,626	25.02
Qtr 2	7932185	€88,260	813.80	€782,690	8.87	11.28%	136,889	€2,208,626	25.02
Qtr 2	7932185	€88,260	813.80	€782,690	8.87	11.28%	136,889	€2,208,626	25.02
May	3445577	€37,524	97.16	€247,826	5.52	15.20%	56,593	€121,280	19.02
April	8764673	€17,049	128.03	€292,362	7.89	12.67%	61,290	€96,184	21.76
June	1323933	€13,287	87.82	€242,562	18.25	5.40%	23,026	€680,062	31.73
62855	7025448	€73,522	235.72	€438,104	5.96	16.78%	158,707	€869,612	11.83
62787	6441553	€48,060	209.20	€262,199	5.45	18.33%	160,087	€716,966	16.92
53225	6288942	€49,780	75.57	€578,800	11.63	8.60%	41,633	€2,158,420	43.36
62740	5212867	€30,728	206.99	€118,720	3.86	25.88%	48,156	€472,538	15.38
62862	2078343	€4,171	8.12	€9,893	2.32	43.03%	3,928	€2,188	7.70
62739	1847011	€6,388	162.88	€16,340	2.56	39.09%	27,879	€47,745	7.47
62738	1470086	€13,658	487.00	€62,076	4.54	22.00%	73,744	€114,437	8.38
53229	1330609	€3,789	33.33	€18,767	4.95	20.19%	31,628	€42,292	11.16
61180	518300	€2,849	2.06	€13,787	5.17	19.24%	938	€68,180	25.62
66684	460513	€4,028	11.29	€42,224	10.48	9.54%	1,808	€173,506	43.08
61180	418573	€2,108	5.45	€6,997	3.32	30.13%	842	€33,358	15.82
70023	163881	€680	0.10	€414	0.61	164.37%	3,926	€721	1.06
62856	46714	€472	0.42	€4,900	10.28	9.64%	184	€24,488	51.88
62742	42959	€98		€823	3.28	30.46%	58	€1,615	16.41
70075	27372	€201	1.03	€1,210	6.03	16.58%	303	€4,737	23.72

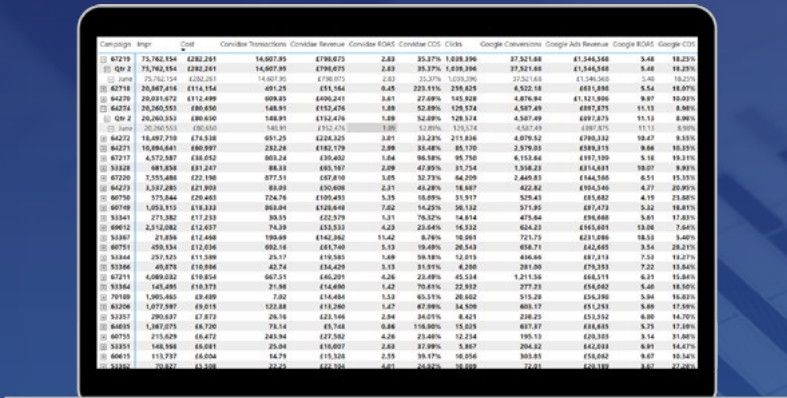
4. All campaign and adset detail is available to drill into, allowing fine grain control of bid strategies.



5. Easily call out performance opportunities with PowerBi reporting and features in our pre-built templates.



6. Drilling into individual campaigns to understand overall and trended performance allows easy identification of ROAS & growth opportunity.



7. ROAS comparison by spend shows the huge opportunities available when removing self reporting. As seen here with a Google Ads campaign self reporting 11:1 ROAS but actually only delivering 1.8:1 - a potentially lossmaking use of £80k a month.



8. Clickstream reporting allows measurement of adtech which doesn't have a connector included in your package - here Criteo display ads show significantly different results from existing Google Ads reporting. Including a connector allows granular reports.

Data Presentation and UI

Corvidae reporting data is presented to the client through a SaaS front end; PowerBI templates for deeper and more custom configurable reporting; and via an API for visualisation in other reporting suites.

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Corvidae's reporting data is aggregated as part of your data pipeline configuration which is refined during onboarding, then refreshed nightly. In addition to this reporting data layer, the raw conversion path data lake can also be made available

for ingestion by CDP or CRM products where requested and scoped. This allows for use of Corvidae conversion paths in Cohorting and further acquisition automation. Please discuss any such requirement with your rep to allow for verification of the required CRM or CDP.

The standard reporting templates contain a set of easily navigable reports and dashboards that are updated automatically when newly processed data is available. Attribution data and standard insights will be refreshed daily.

Some examples of the insight provided within the Corvidae are highlighted below.



Corvidae's Advertising Report



Paid Social Report

The Paid Social report is a collection of activity from Facebook, including provision for un-clicked ad impressions and clicks collected by our pixel. Campaigns and Ads are modelled separately for granularity of analysis. After modelling both Campaigns and Ads are joined on to your media spend to calculate return.



Paid Search Report

The Paid Search report is intended for the interrogation of all paid search marketing activity. It is made up of data from our pixel, joined on to media spend from Google Ads and shows the modelled value of each of your campaigns and their respective keywords, plotted against their cost.



Display Advertising Report

The Display report contains any pixel activity from referrers who are assigned to the Display channel.

The data in this report is broken down into three tiers:

- Source - The display network used to disseminate the ad.
- Campaign - An ad, or collection of ads, as determined by the campaign parameter.
- Referrer - The publisher who displayed the ad when it was clicked.



Native Advertising Report

The Native report contains any pixel activity from referrers who are assigned to the Native channel.

The data in this report is broken down into three tiers:

- Source - The native partner used to disseminate the ad.
- Campaign - An ad, or collection of ads, as determined by the campaign parameter.
- Referrer - The publisher who displayed the ad when it was clicked.



Affiliate Advertising Report

The Affiliate report isolates traffic from your Affiliate marketing partners and organises that data by publisher, exposing your most - and least - profitable publishers.



The IIC Report

The Introducer, Influencer, Closer report demystifies which marketing efforts are more or less effective at different points in the customer journey.

- Introducer - These touchpoints are the first-touch in a customer journey, they represent the marketing activities which first introduced your brand, service, or product to a customer.
- Influencer - This broad category includes all touchpoints which were involved in a customer journey, but did not ultimately introduce the product or close the sale.
- Closer - These touchpoints are the last in the customer path before a purchase was made and represent the activity that is most likely to close a sale.

Corvidae's Analytics Report



Referrers Report

This holistic report details all referring websites, regardless of channel, and calculates the revenue generated by each according to our AI modelling process.



Attribution Report

This report shows how an attributed view changes your picture of channel effectiveness. Incorporating offline. See how your revenue actually stacks up by channel.



Traffic Report

The traffic report exposes ingestion-level data, allowing you to interrogate exact impressions, visits, visitors, conversions, and revenue by day. We also disclose individual transactions, transaction ID and financial values to facilitate granular interrogation of inbound data.



Audience Report

Our audience report contains a mix of customer demographic information, all plotted against our AI modelled attribution: Device, City, Weekday, Hour.



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