ORACLE

Create Irresistable Customer Experiences with Oracle Infinity

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ADVANCE YOUR BUSINESS WITH ORACLE INFINITY

The digital world produces data at an unprecedented scale and velocity. According to Gartner, by 2020 there will be more than 26 billion connected devices, producing exponentially more data. How can businesses understand and leverage this data so they can successfully adapt to changing customer expectations and business dynamics? To capitalize on new opportunities, a new and better method of digital analytics is required. The old ways of capturing, processing and reporting on customer data are no longer sufficient.

The following significant developments are forcing us to look at analytics in a very different way:

1. The need to provide relevant and contextual customer experiences – Consumers are well informed and demand superior experiences with brands. This has forced brands to better understand the discreet needs of individuals and to use that intelligence to deliver the most personalized experiences possible.

2. Channel proliferation and the Internet of Things (IoT) – The number of marketing channels and the complexity of consumer touchpoints continue to grow. The path to a purchase or conversion can involve an infinite variety of different digital and non-digital channels. Additionally, the IoT expands the definition of a digital touchpoint beyond a human to any network-enabled object. The proliferation of channels and data has resulted in customers rethinking how to process data to make real time decisions that are currently limited by incumbant business intelligence systems.

3. Concerns about data security – A data breach can destroy a brand's reputation. Data security has risen to the top of the buying criteria for any new tool or technology. There is a clear recognition that the data chain is only as strong as its weakest link and a break can be devastating.

THE ORACLE APPROACH TO ANALYTICS

- Unify all analytics functions by bringing together aggregate and visitor-level data from all digital channels in an easy-to-use interface
- Be ready for the massive scale and flexibility of collecting and processing behaviors across the IoT
- Provide fast access and make all data and intelligence available in real time for decision-making
- Deliver data accuracy at scale, including unique visitor data and analysis with no sampling
- Be able to activate the data in real time and support the highest level of data openness with the broader marketing ecosystem for personalization and deeper analysis

A NEW APPROACH WITH ORACLE INFINITY

A highly scalable platform for the collection, processing and storage of data, Infinity was built from the ground up to meet the needs of today's demanding environment. It embraces integration, security, scale, customizability, data freshness and performance. Leveraging big data technologies, it solves both current and future data IoT challenges.

This e-book highlights that innovation while illustrating how Oracle InfinityTM, an application built on top of the Infinity platform, can help analysts, marketers, technologists and digital executives build data-driven organizations in a big data world.

SECTION 1 – REAL TIME, ALL THE TIME

To satisfy the agile needs of the business, all data must be available in real time by default.

Today's challenges

In today's marketing world, marketing teams require timely feedback and measurement so that adjustments can be made before an opportunity is lost. Some analytics solutions provide real time reports. But without an end-to-end data streaming pipeline, there's no way for 100 percent of the data to actually be real time.

The default latency for reports within enterprise analytics solutions today is typically 24 or more hours. This delay is the reason there are two classes of reports: 1) standard reports and 2) real time reports. You must pre-determine and pre-configure which reports you want to see in real time. And, because not all data is available in real time, only specific metrics and reports can be selected. Turning on those real time reports is an administration task that adds upfront planning, implementation complexity and ongoing maintenance overhead for administrators.

Real time insights come from real time interrogation of the data – a traffic spike, an online anomaly or an unexpected behavior in a segment of your customers. What is important is the ability to interrogate the data in real time, rather than look at a static report that had to be defined as real time in advance.

Real time in action

"As an ecommerce manager, I spend a lot of time working to ensure that visitors have no problems making purchases on our sites. However, mistakes happen. Just the other week, our marketing department launched a new ad campaign for color printers, driving consumers to our site. Within two days, it was out of stock and visitors were exiting the site deep within the online purchase funnel. I need to be able to see this behavior immediately, so I can respond and make inventory adjustments or swap out the out-of-stock product with another one. Supply and stock mishaps cause serious headaches for our customers and lose revenue for the business. I need real time analytics, so I can quickly respond and make adjustments immediately."

How Oracle Infinity provides real time, all the time

Providing real time data, all the time, fundamentally requires a new way of collecting, storing and interrogating data. The Infinity platform applies open source technologies with our own patent-pending algorithms to create a real time streaming data pipeline that supports the massive scale of the IoT. Data flows through an analytics processing engine that is able to handle tens of billions of transactions per day.

With Infinity Analytics, marketing teams do not need to know in advance which real time reports are needed because all data is available in real time by default. There is no concept of standard reports vs. real time reports. All data is readily available for analysis so that when an anomaly is observed, you can simply use any report as an entry point for further interrogation. All collected data, whether a measure or dimension, is available, and any segment can be applied to any report in real time to hone in on the question or problem and get answers the moment they are needed.

SECTION 2 – UNLIMITED SCALE & FLEXIBILITY

An analytics solution must be built from the ground up with big data technologies to handle the inevitable scale that IoT will demand.

Today's challenges

According to a report published by the United Nations, there are 3.2 billion people globally who are using the Internet. Gartner forecasts that 8.4 billion connected things will be in use worldwide in 2017, up 31 percent from 2016, and will reach 20.4 billion by 2020*. This means more digital touchpoints to monitor, more behaviors to cross-analyze and more interactions to optimize. The implications are far reaching when it comes to relying on data to gain a clear picture of customers and to ultimately use that picture to provide a relevant and impactful experience.

There are many challenges that stand in the way of gaining a clear picture of customer interactions with your brand, including:

Data collection – Today, there are often limitations in the volume of data points that can be collected with a given analytics solution. This is typically due to the limitations inherent in traditional relational data models – i.e., there are only so many 'slots' in which to put data. With these solutions, when you run out of parameters, you need to figure out which data to no longer collect to make room for the new data point. Limits on parameters can greatly increase implementation and ongoing maintenance costs, issues customers don't hear about until later.

Sampling at collection is another technique that some solutions use to side step technology limitations. Sampling can be effective if you simply want to roughly measure trends. But as soon as you want to use data about an individual to take action, sampled data is unacceptable, as it will miss certain online behaviors, resulting in missed opportunities for marketers and brands.

Any limits that exist at the time of data collection may result in increased implementation time and costs due to the complexity and additional planning that is needed. It is important to look closely at the total cost of ownership, not just the upfront costs. There may be unexpected maintenance costs down the road when you run out of parameters or variables.

Data processing – How data is processed and stored can limit the depth and flexibility of the analysis that can be done. It is extremely limiting to have pre-defined parameter types and to limit which parameters can be correlated to others. This limits the questions that can be asked of the data. The need to preprocess reports greatly impacts the speed at which that data can be made available. Report processing can take 24 or more hours to complete in some solutions, meaning you cannot see the results of a campaign until the next day. The requirement to differentiate between standard and real time reports adds planning complexity and administrative overhead.

Data exploration – As the volume and variety of data grow, so will the assciated with the data. Due to scale limitations, analytics solutions today often restrict the ways in which the data can be interrogated. Common techniques used to restrict the data include:

- Switching to sampled data when asking a non-standard question
- Use of time buckets to limit data in order to increase processing speeds
- Inability to apply custom measures to historical data (going back in time)
- Static ordering of dimension values, requiring duplicate reports with a different dimension order
- Limited report dimensionality and depth to which you can drill into a report
- Inability to dynamically segment reports on the fly
- Limiting the number of queries that can be run on the data
- Inability to get accurate unique user counts in every report

All of these data exploration restrictions and limitations reduce a marketer's ability to be more self-sufficient and an analyst's ability to answer ad hoc questions quickly and to perform dynamic data exploration at the right moment. Limits to scale and flexibility make it impossible to gain a complete picture of your customers.

Unlimited scale & flexibility in action

"I am a data scientist at a national online retailer and my job is to use data to predict online behaviors. A single visit by a person to my website can generate hundreds of pieces of data associated with what he is looking at, what he puts in his cart, his geographic information and the physical attributes of the device he is using. I am both excited and concerned about the data overload that the world of IoT is going to bring. Since it is not restricted to just human interactions, but the interaction of 'things,' the number of data points that need to be collected and processed will be staggering. The challenge I face is around limits with my analytics vendor. Only capturing a subset of data means I am not getting the complete picture of the interactions with my brand, which will impact the experience we can ultimately provide customers."

How Oracle Infinity provides unlimited scale & flexibility

Oracle Infinity places no restrictions on the types and quantity of collection parameters. Infinity users don't run out of parameters because parameters are 'self-describing' as opposed to having a limited number of 'named slots' to put parameters in. Once collected, Oracle Infinity enables any collected parameter to be used in any report and be correlated with any other parameter. A parameter can become a measure or a dimension, or both at the same time.

At no point from collection to consumption are there limitations and at no point through the data pipeline does Infinity sample or lose a raw event. With data collection technologies for almost any digital property, allowing teams to collect everything needed, on any digital property without the risk of running out as businesses grow.

SECTION 3 – INDIVIDUAL LEVEL INTELLIGENCE

Analytics is no longer just for the analyst, it must also satisfy the needs of the data-driven marketer. One easy-to-use home for all analytics that combines aggregate and visitor-level data with ad hoc analysis and segmentation capabilities gives brands the power to consume powerful insights throughout the business.

Today's challenges

Due to technology limitations, combining large volumes of historical trending data with rich and granular visitor-level details has not been possible. In many cases, separate applications have been built or stitched together by vendors in order to provide the different views of the data that different stakeholders need.

What's developed in response to these limitations are complex applications that are hard to use for anyone other than a savvy digital analyst. And that results in too few analytics experts within a company, creating knowledge gaps and staffing challenges.

Individual level intelligence in action

"I am a marketer for a global bank and standard campaign performance reports are important tools that I use to determine the success of my marketing efforts. Recently, we launched a new credit card promotion and I wanted to understand how it was performing by country, but the standard report I get raised more questions than answers. For example, I see that the clicks on the offer link peaked on the 23rd of the month, but because I'm responsible for justifying our mobile channel, I would like to know how much of that traffic came from mobile and which countries had the highest conversion rates. I need to be able to drill into this report on the 23rd and segment the report on mobile devices and geography. I also want a view of mobile's global performance, irrespective of country. For those who have logged in on their mobile app, I want a list of user names so I can send them a personalized email.

I need to be able to ask questions of the data when they arise and not have to always rely on my analysts to generate the right reports for me. They do a great job of setting up my standard reports, but there are always additional questions that are unique to me. I want to be more self-sufficient so that even though I may start with aggregated reports, I can drill into the individual-level data to get exactly what I need, when I need it."

How Oracle Infinity provides individual level intelligence

Oracle Infinity provides a unified and intuitive user experience to support completely different tasks, roles and people – making it both easy to learn and manage. Built on a single data platform, there is no movement of data between data stores and no need for extra data processing or transformations.

Oracle Infinity collects and stores all behaviors at the individual level, for real time data exploration and for connecting that data to the marketing ecosystem. The visitor behaviors across different sessions and channels can be stitched together leveraging a user graph that ties multiple user IDs. This approach, coupled with our end-to-end data streaming pipeline, can extract the most detailed

information in the shortest amount of time possible. All visitor records are available for extraction from Oracle Infinity. No sampling or aggregation is done.

Infinity provides a consistent UI, empowering users to gain business insights from their analytics application. It eliminates the hunt for analytics data, optimization data, ad hoc analysis data, audience insights and segment data etc. Users can select a webpage and drill down to look at visitor-level activity, apply, and compare segments of visitors on the fly – all in the same place. The result is an analytics application that is easy to learn with higher adoption across the organization.

SECTION 4 – ACCURACY AT SCALE

Analytics data must advance beyond approximate trends to an accurate source of digital performance that is trusted by the business for decision making.

Today's challenges

Understanding how many people took a specific action in a given time period is important for marketers and analysts to understand as it provides an important measure of the success of a program or promotion. And, if a visitor takes the same action twice within a certain time period, you may only want to count them once, not twice. These types of situations require counting distinct values, which can be problematic at scale and therefore produce inconsistent answers based upon the sample size. Technology limitations have impacted the ability to answer these types of questions consistently when data volumes increase. This is because analytics vendors use two common techniques to approximate distinct counts, sampling and pre-aggregation.

Sampling – Sampling can occur at the time of collection and/or at the time of reporting. Sampling works well when one can make some statistical assumptions about the distribution of the data being stored. However, when information about the shape of data is unavailable or the distribution changes over time (i.e. seasonality, trend or unknown external effects impact site traffic), the results are less predictable. Sampling can suffice if the distribution of data doesn't change over time or if users don't need consistent results such as looking at general trends. But sampling produces inconsistent results.

Pre-aggregation – This approach typically involves building and then caching pre-aggregated result sets, which quickly returns pre-computed query results. Of course, the downside is that if the user wants to ask a new question or explore the data in an ad hoc manner, it can take considerable time to compute the new results. Moreover, from a maintenance perspective, storing large volumes of pre-aggregated results can become as storageintensive as the raw data itself. Pre-aggregation works well for smaller datasets and where ad hoc exploration of the data and 'what-if' analysis not required.

Sampling does not provide consistent results unless the data distribution is predictable. Pre-aggregation is storage intensive and does not lend itself to ad hoc data exploration. Both of these methods fall short in the world of big data.

This is generally why counts of unique users are not available in all reports across arbitrary time boundaries in most enterprise analytics tools today. As long as the dataset is limited or time-bounded, an accurate unique user count is possible. But, as soon as you need to cross time boundaries, the results are no longer reliable.

Analytics and BI professionals are very aware of the problem of high cardinality data or the "long tail." The most common examples are page titles or URLs. Finding the top pages that had the most unique users is quite a complex problem and one that analytics solutions that use the sampling or pre-aggregation methods fail to produce accurate or consistent results. Answering this question using sampling will produce wildly different answers at different times with potentially large bounds on error rates. Those results are inconsistent and not reliable.

Accuracy at scale in action

"As an analyst, I get a lot of questions from my marketing team as to why my analytics reports differ so much from the reports in their marketing automation system. My marketers need to know more than just trend information when it comes to how their campaigns are performing. They ask me questions like, 'How many distinct users visited my landing page in the last 55 days?' And, 'What were the top product pages that had the most unique users?' If the answers differ from what the marketers sees elsewhere, this leads to a lack of credibility and ultimately incorrect conclusions and actions that may not lead to the expected outcomes."

How Oracle Infinity provides accuracy at scale

The query engine within Infinity is built to ensure the most accurate results possible. It leverages massively parallel processing capabilities coupled with a version of an advanced counting algorithm, called HyperLogLog. HyperLogLog estimates the number of distinct values in a very large set of data with a high degree of accuracy. It does not do this by sampling, but by inspecting all the data in the desired time range. The results are consistent, meaning that the same question asked at different times will produce the same answer.

This contrasts with analytics solutions that rely on sampling. Sampling uses a randomly generated subset of the input data each time the question is asked producing inconsistent answers. Pre-aggregation is also not needed within Infinity due to the massively parallel processing architecture and its ability to handle large volumes of data in real time.

SECTION 5 – CROSS-CHANNEL INSIGHTS

Analytics must change from simply reporting on the success of each marketing channel to providing comprehensive insights on the customer's cross-channel journey.

Today's challenges

Successful marketers seek the best ways to identify and measure the buying intent of prospects and customers so they can engage them with consistent, personalized content at scale. To compete in an oversaturated market, they need to be able to understand how customers interact within each channel at every stage, from acquisition to conversion and even customer advocacy.

Marketers risk losing customers when they're not able to coordinate the right message at the right time in the right channel. Per McKinsey, "How companies engage customers in these digital channels matters profoundly—not just because of the immediate opportunities to convert interest to sales but because two-thirds of the decisions customers make are informed by the quality of their experiences all along their journey."

Key areas where deep analytics can help tailor content:

- Topics need to be modeled based on user interest and content developed systematically so that marketers always fill their funnel with the most relevant assets
- Personas need to be developed and iterated so that marketers ensure they are talking to the right person. Marketers who understand their buyers' interests and pains create relevant conversations that convert
- Marketers need to understand the current Buyer/Funnel Stage so that they can create content that directly correlates to where the customer is in the decision process

Cross-channel insights in action

"As the VP of Marketing of a large nationwide retailer, I need to know how individual customers interact with my brand across all channels. For instance, a couple looking to purchase a washer and dryer typically start their journey by visiting our website. Then, they often visit a store in person since they consider it a relatively big purchase. Once they complete their research, they typically complete the purchase on their tablet at home. I have to provide services tailored to their purchase in a timely manner (such as delivery or installation costs). To accomplish all this, I struggle to consistently gather unstructured data like behaviors and preferences that may be is captured in online reviews and social-media posts. Even after I've compiled customer information, identifying actionable insights from multichannel data can be overwhelming. Today's customers expect an easy and relevant experience at every touchpoint. They expect us, as a brand, to know what piques their interest and what content they'll need to make a decision. I need an analytics solution that will help me deliver a comprehensive view of my customer and allow me to act on these insights."

How Oracle Infinity enables cross-channel insights

It all starts with the ability to collect the behaviors of your customers, and how they engage with your brand, whether that be on your web, mobile or social properties or on any connected device. Oracle Infinity has technology that helps marketers do that at scale.

But this is only part of the cross-channel challenge. The ability to connect the data across different digital touchpoints is key in transforming your marketing from a series of independent interactions with a “visitor” to a single conversation with an individual.

This is where Infinity can help. The ability to connect previously anonymous interactions with individuals once they become known is also critical in truly understanding cross-channel behaviors.

Oracle Infinity is built with cross-channel marketing in mind and provides a foundation that marketers can leverage to understand their customers as individuals and use that intelligence to deliver an experience that is highly relevant.

SECTION 6 – DATA-ACTIVATION AND OPENNESS

Analytics data should be open and available for easy extraction and integration into your marketing ecosystem.

Today's challenges

The need to extract data out of analytics applications has been top of mind for analysts for many years and most enterprise solutions can extract aggregate report data. But this is not enough.

The practical business uses for analytics data include:

- Analysis, data visualization and BI – Further analysis of aggregate and disparate data sources within a common BI tool, such as Tableau, PowerBI or Excel.
- Personalization – Using discreet in-session behaviors to tailor the customer experience based upon next best action; typically done using a content testing and personalization application or a remarketing solution.
- 360° customer view – Consolidating online and offline data into a comprehensive view of the customer for the purposes of segmentation, customer service, product development; typically done within an on-premise customer warehouse or big data initiative.

Even though aggregate report data can be extracted to satisfy the analysis, data visualization and BI uses, limitations in today's analytics solutions make it challenging to satisfy the personalization and 360° customer view use cases because:

- Visitor-level data is often not available within the analytics application.
- Processing delays inhibit the ability to make the data available in real time.
- The ability to deliver visitor-level details in a secure and reliable way is limited and error prone.

As data volumes grow and the need for access to discreet visitor behaviors increases, traditional analytics solutions will struggle to deliver at the speed and granularity that today's businesses need.

Data activation and openness in action

"I am the VP of marketing for a large retail bank that manages millions of online interactions per day. I need to understand my customers so I can provide them with the most relevant experience possible. Behavioral data from the website is critical, but is only one part of the complete customer view. To really understand my customers, I need to be able to connect their web behaviors with their transactional and product holdings data. The challenge is that this information comes from many different sources and getting a consolidated view is both difficult and takes time. And as the data volumes grow, my IT department has pointed out that the integration of this data will become slower and less reliable."

How Oracle Infinity provides data activation and openness

Analytics data is a critical source of customer behavior that when connected with other data sources, can be used to transform the way a brand interacts with its customers. Data connectivity and openness is a core design principle for the Infinity data platform.

Oracle Infinity collects and stores all behaviors at the visitor level, for real time data exploration and for connecting that data to the marketing ecosystem. The visitor behaviors across different sessions and channels can be stitched together leveraging a user graph that ties multiple user IDs. This approach, coupled with our end-to-end data streaming pipeline, can extract the most detailed information in the shortest amount of time possible. All visitor records are available for extraction from Oracle Infinity. No sampling or aggregation is done.

For advanced analysis, data visualization and BI – Oracle Infinity enables aggregate reports to be extracted via REST and delivered in JSON, XML, CSV formats for consumption by 3rd party BI tools such as Tableau, PowerBI and Qlik.

For personalization – Oracle Infinity enables enriched visitor-level records to be streamed in JSON as the events happen for the consumption by marketing automation and personalization applications. The stream of data is user configurable and can be segmented down to any discreet dataset needed. Visitor-level behaviors are available immediately to influence in-session content and next-best-action decisions.

For 360° customer view – Oracle Infinity enables all the enriched visitor-level records to be extracted in several formats (e.g. ORC, JSON, XML, CSV) and securely delivered to your on-premise customer intelligence warehouse. Data is encrypted using PGP with ability to connect to systems such as Amazon S3, Microsoft Azure, Kafka, HDFS, Teradata file systems, etc.

ORACLE INFINITY

A new standard of digital analytics to help brands success in an increasingly data-saturated world that is real time, easy to use, scalable, open, accurate, and secure.

What does this mean for you?

For the digital analyst, Oracle Infinity provides the ability to deliver a flexible analytics program that is trusted across the organization, providing rich insights that help identify opportunities to drive the business forward. You can enable greater self-sufficiency for marketers and reduce the overhead associated with managing your analytics program.

- *For the marketing technologist* – Oracle Infinity provides an analytics solution that: supports your company's marketing technology strategy, integrates well with existing marketing technology investments and satisfies the corporate data security needs of your global organization while maintaining brand reputation and ensuring individual privacy.

- *For the digital marketer* – Oracle Infinity provides all the data needed to understand the customer journey, no matter where or how they interact with brands in order to provide the most relevant and contextual experience. It enables business leaders to optimize and impact the complete customer journey, as it happens based on a complete understanding of a customer's behaviors, historical and present.

- *For the digital executive* – Oracle Infinity helps brands build an agile marketing organization that continues to strive for and deliver the optimal customer experience, while being able to respond faster than the competition.

The Infinity platform provides a fundamentally new way to do analytics and solves the data challenges of today while not only providing real time business insights, but also pushing those insights into action systems. Oracle InfinityTM helps brands collect, transform and activate data that drives business growth resulting in deeper and more profitable customer relationships.

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