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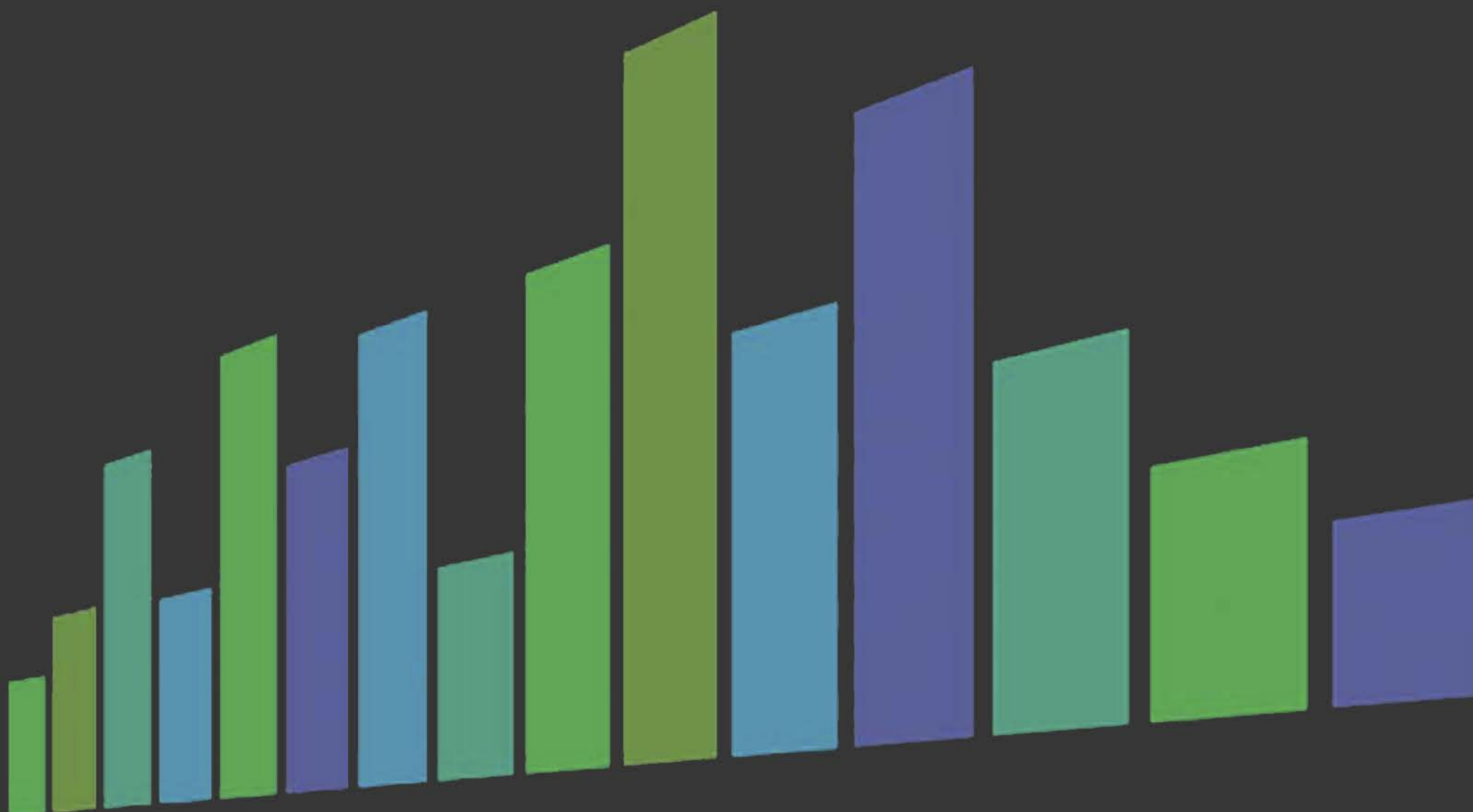
E-BOOK

Curiosity Got the Cat Promoted

(The Case for Behavioral Analytics)



Introduction

Digital transformation is happening across virtually every industry. It is being delivered by disruptive new entrants and established organizations alike. It is powered by a wide range of new technologies from mobile and web self-service to cloud, IoT, bots and virtual reality.

> *Gartner: "Predicts 2016: Changes Coming in How We Buy Business Analytics Technology"*
>
> *"Business users are increasingly demanding access to self-service tools that allow them to explore data to find important actionable insights for their companies without IT assistance. The potential business value from new insights is fueling users' appetites for more combinations of data at a faster rate than IT can deliver through traditional, governed data integration approaches."*

Yet digital transformation is about more than a bunch of hot new technologies. It's powered just as much by a new work culture. One where fewer employees are empow-ered to do more, independently. Trial and error is encouraged. This works when these employees are inherently curious - and their curiosity can be satisfied by the ability to get answers to questions about how their digital services really perform.

Organizations going through this transformation are thus learning that they need a new kind of broad, self-service access to data to support digital initiatives. According to Gartner's recent report '100 Data and Analytics Predictions Through 2020,' "data and analytics are key to a successful digital business." Digital businesses are evaluating a wide range of technologies to deliver this capability. They are often surprised that most data and business intelligence platforms still assume pre-digital business models and work cultures. Even many newer analytics approaches are very limited in the kinds of digital businesses and level of data democratization that they support. Despite all the "big data" and "data democratization" hype, the people that power digital businesses are almost universally frustrated with the limitations of their analytic tools.

> *"Furthermore, As every business user in the organization demands fast and deep insights from new combinations of complex, large and diverse datasets, data discovery tools will need to evolve to meet these business requirements."*
>
> *"Now the market looks to evolve visual data discovery architectures along several paths, in particular to enable the data discovery process to accommodate larger, more varied datasets, with more complex analysis."*

The tools that most businesses going through digital transformation have available are either general business intelligence tools that are based in answering the kinds of questions typical in pre-digital businesses, or they are simple clickstream reporting tools that provide simple metrics on web and mobile services. Both are extremely limited in their flexibility and scalability for end users to answer new questions about behaviors of people and things accessing the full range of digital services today.

By contrast, behavioral analytics is the emerging category that was created from the ground up for the new analytic workloads and work cultures of digital native organizations.

This paper explains what behavioral analytics is, why it is essential to digital transformation, how it is different from and often complements other data and analytics categories, and what technical capabilities as they are embodied in Interana are essential to delivering it.

What is behavioral analytics?

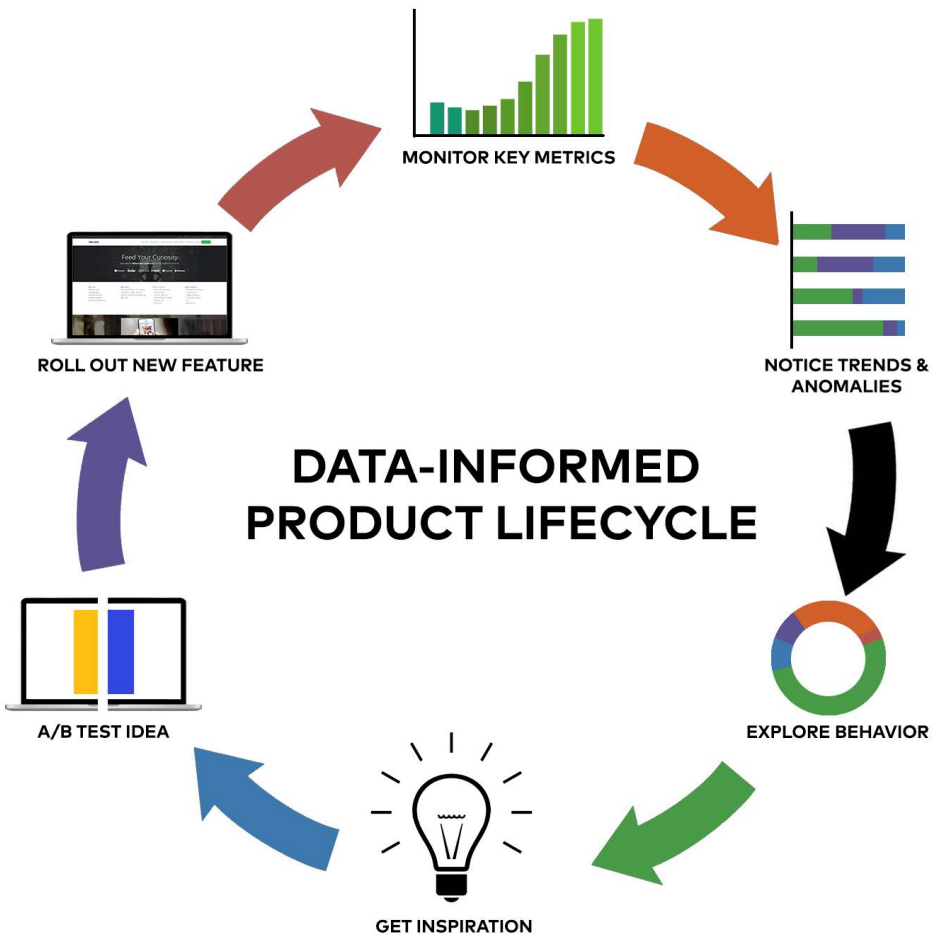
Behavioral analytics is an organization-wide capability to interactively explore real behavior on digital services. What distinguishes behavioral analytics from other categories of data and intelligence software is that it:

- Is directly accessed by anyone across nearly all digital business functions
- Lets users iterate through new behavioral questions on massive volumes of event data without waiting for specialized help or new pre-processing
- Is applicable to any behaviors of any kind of actor on any kind of digital service, not just consumers accessing simple mobile and web apps

Who uses behavioral analytics and how?

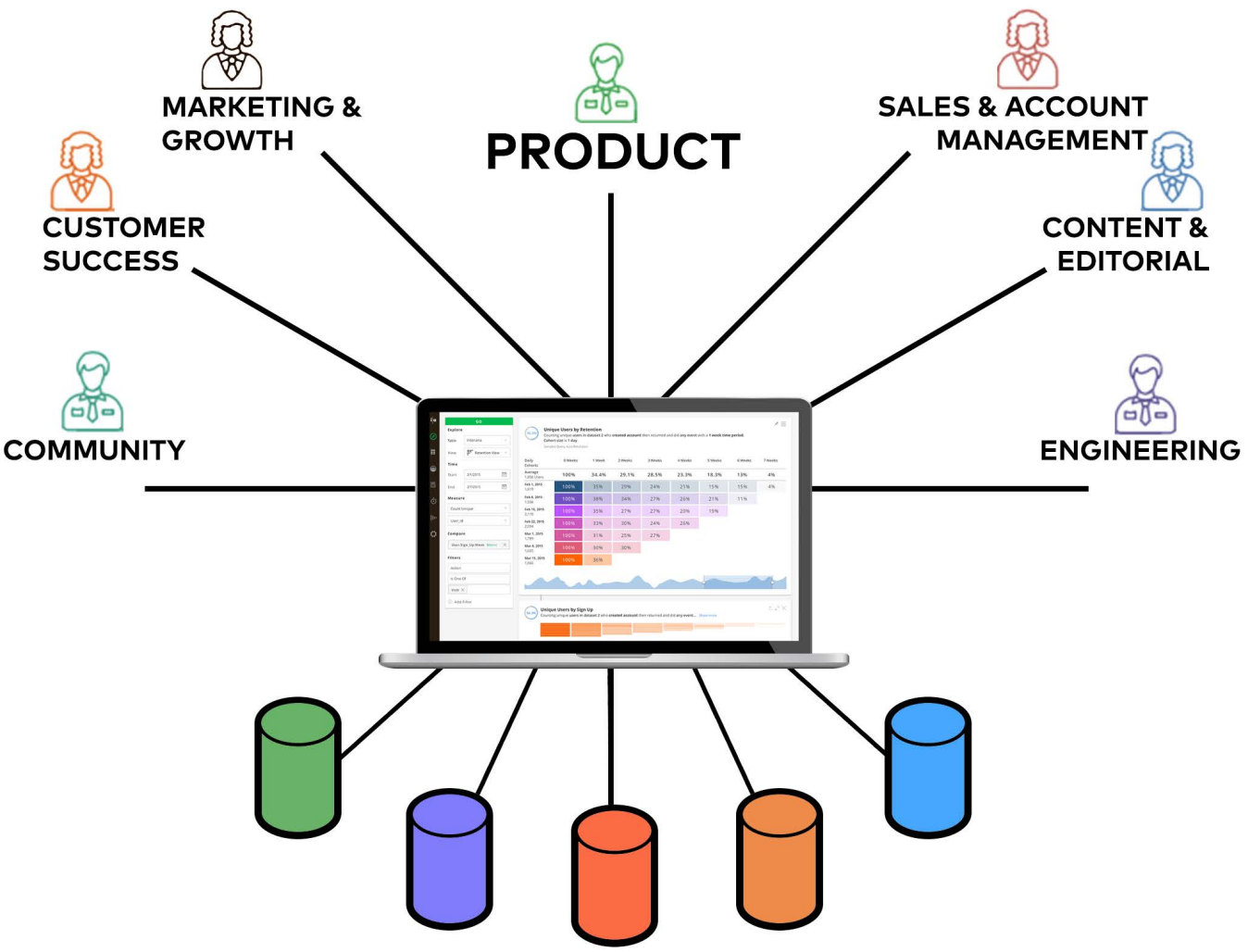
Organizations leveraging behavioral analytics often have 50% or more of their employee base routinely exploring behavior in event data to inform everyday decisions. Exploring is not reviewing a few dashboards or getting a few daily alerts or even changing a few parameters of a canned report. Instead, it is asking new questions driven by curiosity and the desire to gain new insights into growing and optimizing all areas of the digital business.

This is often led by product, with a virtuous data-informed product life-cycle. Routine exploration of behavior leads to inspiration for new features and improvements. A B tests prove the impact of these changes. Ongoing monitoring tracks the long-term impact and sustained usage of the feature, with anomalies sparking curiosity to drive more exploration and inspiration for the next features.



Yet it doesn't stop with product. Growth and marketing teams explore behavior to identify opportunities and track impact of new initiatives and campaigns. SaaS managers review their customers' behavior and derive insights to help those customers get more out of their services. Customer success and support teams look for evidence of experience and quality issues so they can become more proactive. Community managers identify virtuous and abusive users and affinities of interest. Editorial and content teams identify trending topics and segment audiences based on patterns of content consumption. Even engineering and data teams often choose to use the behavioral analytics solution's visual interface for fast answers even when they have more specialized tools at their disposal.

TRUE DATA DEMOCRATIZATION



Where does it apply?

The types of digital services and the actors and behaviors they support are exploding, leading to much more varied behavioral analytics applications than even a couple of years ago.

The first wave of digital services were primarily e-commerce, advertising and subscription supported services offered directly to consumer end users. Their behavioral focus was on increasing conversions, engagement and retention in a fairly straightforward business model. These remain valid concerns for many, but have been joined by more complex digital services with new behaviors of interest, including two-sided marketplaces; consumer/enterprise hybrid SaaS services; platforms-as-a-service; IoT; bots and AI; virtual reality; and clicks-and-bricks services that combine digital records of both physical and digital interactions.

This is particularly relevant for traditional industries that are going through leading-edge digital transformation. Logistics companies doing fleet management, retailers combining in-store loyalty with e-commerce, media service providers looking at the customer journey across channels -- they all have behavioral questions that are new and distinct from simple conversion funnels and web and mobile engagement. Even pure digital disruptors moving from simple web and mobile apps to two-sided marketplaces and messaging apps have far more complex and new behavioral questions than they did a few years ago.

For all of these emerging digital services, the behaviors of interest are often highly speciffc to a particular business and as often concern physical and virtual things like machines or bots as they do human end users. A sufficiently powerful behavioral analytics solution must allow end users to model and analyze multiple kinds of actors performing complex patterns across channels that could never be anticipated by canned analytics.

Why is behavioral analytics essential to digital transformation?

The companies that pioneered our digital future -- from Google, Amazon and Facebook to Apple, Microsoft and Salesforce-- may be different from one another in important ways, but they share something even more important - an empowered work culture of “makers and doers” characterized by curiosity and the universal internal access to data that could satisfy that curiosity. Everything they did was new and rested on inspirations and hypotheses about how users and eventually bots and machines would behave given certain capabilities. The ability to find unexpected opportunities and test the outcomes of new ideas quickly became critical to inventing and growing these disruptors’ radical new services.

These pioneers all had to build homegrown data infrastructures because of the lack of commercial solutions that offered the speed, scale and flexibility necessary to ask new questions of fresh data, or to ask the sort of questions that arise around the behaviors of new kinds of services.

As the next wave of digital transformation is washing across virtually every industry, there is both a new class of more vertical digital disruptors, and the new digital business units within incumbent industry leaders. These new digital businesses recognize that there is no roadmap to their new services. Instead they need to hypothesize and iterate quickly, supported by the same kind of data culture and access that powered the first wave of digital behemoths.

However, this expanding roster of digital businesses has less time to build their own analytics infrastructures. That's why they are searching for a turnkey behavioral analytics solution that offers them the speed, scale and flexibility that the behemoths had to build for themselves.

How is behavioral analytics different?

Behavioral analytics is often confused with point mobile and web clickstream reporting from established vendors like Adobe and Google Analytics and niche players like Mixpanel and Amplitude. Behavioral analytics is distinguished from these point solutions primarily by its flexibility to address behaviors and actors beyond the scope of end users going through a simple conversion funnel and performing a few simple activities in a single mobile or web app. These clickstream reporting tools answer a narrow range of questions fast and easily by virtue of pre-aggregation on very limited data sources.

However, even for services that do fit the narrower web and mobile model of clickstream reporting tools, the scale and flexibility of true behavioral analytics is often required for larger services and more complex organizations. Most of the clickstream reporting offerings are designed as multi-tenant SaaS and usually do not meet the scale or security requirements of the larger web and mobile services. Behavioral analytics often displaces point clickstream reporting as digital businesses reach a greater level of sophistication or scale. More innovative digital businesses starting today may choose to immediately adopt behavioral analytics in place of clickstream reporting from the beginning because of their strategic view of defining and measuring new business models and methods.

The data democratization message of behavioral analytics is also often confused with data discovery and new BI tools from Looker and Zoomdata to Tableau and Qlik. 'Self-service analytics' and 'data democratization' are becoming givens in any new data platform project. Yet careful inspection shows a huge hype/reality gap. Even modern data discovery and so-called "self-service BI" tools typically distinguish between "data

consumers" and "data modelers." Such systems are severely limited in the ability for "data consumers" to do true ad hoc analysis on new dimensions and to answer new questions. End users are still often found waiting for data teams to do new modeling and for systems to compute new dimensions. Moreover, these tools usually remain rooted in SQL and data cube concepts that make it difficult, if not impossible, to do sophisticated behavioral analysis such as behavioral segmentation and analysis of custom ows. Their generalized approach to data lacks the optimizations for event data as a source and sequential analysis as a workload that are necessary to answer new behavioral questions quickly and easily.

Many organizations are also evaluating and applying various new cloud and hardware-accelerated data warehouse technologies to this problem, from Amazon Redshift and Google Big Query to Snowflake and Exasol. Projects based on data warehouse foundations usually require custom or separate reporting interfaces and rarely result in a user experience that enables true self-service for non-engineering, non-analyst roles. They are also often extremely expensive with long lead times and high risk. And, like the BI tools, they are not optimized for behavioral questions on event data.

Over on the IT side, some organizations have made investments in IT operations analytics tools such as Splunk, SumoLogic, New Relic and AppDynamics to centralize, monitor and report on event data primarily for IT and security. They sometimes try to use these platforms to provide dashboards to business users on KPIs for their digital businesses. This approach sometimes provides a fast way to deliver basic metrics, but the architecture of these tools does not provide the user experience, performance or exibility for most end users to do ad hoc analysis for routine daily questions in areas such as product management, business operations, marketing and growth. They are also very limited in their ability to perform complex behavioral analysis that require summarizing the sequences of actions by actors on various dimensions. Thus, such organizations usually nd themselves searching for a more user-friendly alternative once data becomes part of their business culture.

Full-stack, exploratory behavioral analytics is thus emerging as a critical new capability for leading digital businesses. It often exists alongside a data warehouse with a business intelligence tool as the interface to deliver "system-of-record" statistics, but delivers an agility of analysis to the bulk of end users that the other systems cannot. The behavioral analytics system is where users get new insights and discover new ideas about what matters. Their business intelligence tool may be where they turn that into routine reporting.

What technical capabilities define behavioral analytics?

For an organization to have a mature behavioral analytics capability, end users must be able to ask and answer their own questions iteratively. This requires a visual interface that they can learn through exploratory use, rather than a specialized query language requiring training and technical skills. It also requires end users to be able to operate on raw data so that they do not need to ask and wait for data engineering teams to model and process new dimensions or pre-aggregations to answer new questions. Response times on raw data need to be seconds or less to encourage open-ended exploration.

Users must also be able to perform sophisticated behavioral analysis themselves, including behavioral segmentation and modeling of complex behavioral flows, not just simple "slide-and-dice" aggregation by defined dimensions. This requires an underlying processing model that can do on-the-fly state processing of sequences of events by independent actors. This sequential processing is mathematically distinct from simple aggregations.

For example, a system must be able to find and ask questions about the cohort of resurrected users that came in through a particular text alert campaign, read a particular promoted story, and proceeded to read more than a dozen other articles over a minimum week long period following their resurrection. A product or content manager needs to be able to conceive of this as an interesting question and ask it themselves, without this particular cohort or flow being pre-defined as an important model in advance by data analysts or engineers.

Example Behavioral Questions

Here are some of the kinds of questions that are asked of event data about how people and things behave on digital services. Questions like these are best answered by a dedicated interactive behavioral analytics solution that can be used by anyone, not just data scientists or analysts.

Are users with a good startup experience more likely to still be users 6 months later?

How is my next day retention rate doing after my recent product change?

What's my distribution of lag time between first use and taking a specific action?

Do users who come back based on a text alert stay re-engaged 30 days later?

What are leading indicators of connected device failures in the field?

What other topics are popular amongst users who like my top advertiser's ads?

How many on demand gigsters are canceling gigs last minute?

What topics have the most active threads?

Which users getting referrer credits have referred the most valuable new users?

What are common actions amongst users who resurrected?

Are users who signed up after my last major change churning less?

What are the most common actions between sign-up and upgrade?

What are my conversion and retention stats by campaign?

These capabilities cannot be delivered with traditional SQL-derived business intelligence and reporting front ends or data warehouse back ends. They require a new full-stack architecture with a back end optimized for fast answers to complex sequential questions against raw data, and an appealing and visual interface that is centered on events and behavior that can be effectively shared by many users across an organization. Neither the front or back end can be restricted to assumptions about specific types of services, actors, actions, or flows.

How does Interana deliver behavioral analytics?

Interana is the only full-stack solution built from the ground up to deliver turnkey interactive, self-service behavioral analytics across almost any kind of digital service in virtually every industry. Our version of behavioral analytics feeds and rewards the curiosity that is the hallmark of the effective digital business.

Interana combines an interactive, visual interface with a proprietary distributed columnar data store. Interana's data engine is optimized for fast "while-you-wait" response times for complex behavioral queries against massive volumes of raw event data. While others are applying columnar database approaches to this class of problem, Interana has advanced the state of the art with patent-pending techniques that directly result in unique capabilities and performance characteristics.

Interana's power is rooted in the deep technical capabilities of its founding team. Bobby Johnson, our CTO and co-founder, was responsible for scaling Facebook's infrastructure during its growth from millions to over a billion users and wrote Cassandra, Hive and Scribe.

Lior Abraham, our other technical co-founder, personally built Scuba, a visual interac-tive time series data reporting interface that was adopted by over 50% of employees at Facebook. His vision has driven Interana's visual explorer, which brings the same democratized and flexible access to all kinds of questions about digital behavior on any service.

Interana has been adopted and proven by dozens of the leading digital organizations from Tinder and Sonos to Microsoft, Asana, Imgur and Reddit.

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Critical Technical Capabilities for Behavioral Analytics

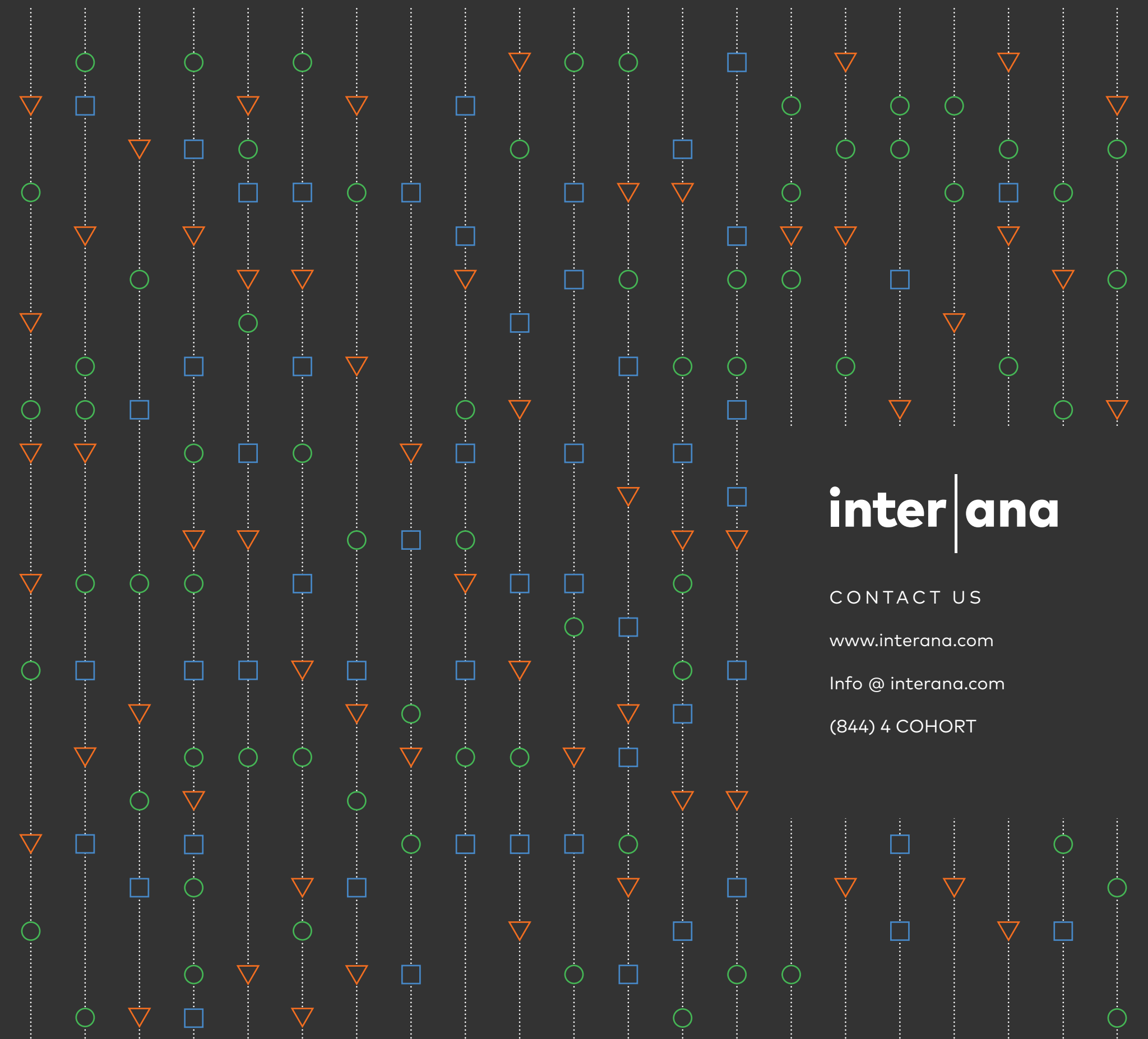
- ✓ Provides visual, interactive exploration against raw event data to anyone
- ✓ Full-stack solution with web-based interactive user interface and scalable back-end data store and query processing engine
- ✓ Ingests and persists raw, timestamped event data at massive scale
- ✓ Does not require expert modeling or pre-processing for any kind of summarization
- ✓ Allows for sharding and behavioral analysis along multiple actor dimensions actors may be people or things
- ✓ Can blend multiple data sources and adapts schema on-the-fly
- ✓ Allows users to save and share analyses via personal and published dashboards
- ✓ Dashboards are "live" with results updated on load with ad hoc filtering and exploration immediately available to all consumers
- ✓ Returns results for queries at interactive speeds, allowing iteration over many questions during a single user session
- ✓ Computes sequential summaries such as funnels and sessions on-the-fly not just aggregations like counts and averages
- ✓ Funnels and sessions can be evaluated against extended time periods of days, weeks or months for long term behavioral questions
- ✓ Allows end users to define, re-use and share behavioral building block expressions such as metrics, sessions, funnels and cohorts
- ✓ Allows behavioral segmentation of actors based on any building block including metrics and funnel completion

Interana is ready to feed your curiosity.

Contact us for a demo today or read more at www.interana.com.

REQUEST DEMO

Thanks for reading!



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