Live Location: The Future of Mapping

Platform of the Year Award

NORTH AMERICA

A Frost & Sullivan Research Insight

www.frost.com

January 2019

50 Years of Growth, Innovation and Leadership

Contents

Background and Company Performance

Industry Challenges

Location-based services rely on an expanding array of terrestrial, satellite, and software-based measurement technologies to pinpoint the geographic position of a mobile user or asset. This location information then integrates with various contextual data (e.g., turn-by-turn driving directions, traffic conditions, various points of interest, weather) to provide a highly personalized, location-aware experience.

Frost & Sullivan distinguishes *'location-based'* and *'location-enhanced'* services. In the case of a location-based application, the service is clearly premised on location or relies heavily on location information for its core function. In other words, location comprises the key value proposition of the service (i.e., navigation). In the case of location-enhanced offerings, location is a peripheral or add-on capability that enriches the experience but is not an absolute requirement. Social networking, for example, is an area in which location is often co-opted to serve as an enhancement to an already robust community-building capability.

In today's environment, both *location-based* and *location-aware* services have proven to extract new monetization and revenue generating opportunities from previously untapped data sources. In addition to first-movers in the automotive and mobility industries, verticals such as retail, financial services, healthcare, and field services are increasingly relying on applications highly dependent on accurate, real-time location. Additionally, data intelligence and data visualization vendors are beginning to see the potential of accurate geolocation, capturing as much live data as possible related to the 'mapped' world and associated trends of how people and assets operate and interact in it.[1]

Thus, geolocation has become an essential utility, not only in consumer environments but across a range of industry verticals and business uses cases. As geolocation and mapping now sit at the confluence of many technological advances, application developers are increasingly in search of innovative platforms to enhance their service offerings with location to personalize and contextualize end-user experiences further.[2]

The Key Challenge for Application Providers: Tapping into Live Location

Mapping and geolocation typically rely on site surveying. Creating a map with data from many sources traditionally requires labor and computationally intensive processing. All of this must be accomplished before sending the map back to the application layer for use. However, between surveys, there are often enormous gaps between historical and real-time data. Thus, the data integrity is inherently tied to the speed of the data collection or refresh.

In this environment, a key competitive differentiator for providers is the ability to offer a platform that can efficiently collect and process large amounts of crowd-sourced live data from mobile users or remote assets. The decision to 'scale up' a mapping platform versus an emphasis on enhanced features, often sets up a tradeoff between the accuracy of the data and the built-in capabilities of the platform. The tradeoff can force potential customers and developers to prioritize one over another.

---

[1] *Automotive Data Monetisation Pricing and Business Models: By 2025, Data Monetisation is Expected to Unravel ~$33 Billion in Opportunity for OEMs, with the Potential to Monetise $100 per Car Across 140 Unique Use Cases*, (Frost & Sullivan, October 2017).

[2] *Critical and Actionable Customer Experience (CX) Trends, 2017 Part 1: Key Developments to Drive Growth-Enabling Strategies and Tactics*, (Frost & Sullivan, July 2017).

Platform Attributes and Business Impact of Mapbox

Visionary innovation involves the ability to scout and detect unmet needs, and proactively address them with solutions that cater to evolving customer demands, products, lifestyles, and technologies. Previously recognized as a Frost & Sullivan Enabling Technology Leader in location-based services, Mapbox has developed a truly innovative and highly impactful platform for mapping and live location applications. Mapbox's founders were pioneers in understanding that better real-time location tools and techniques are necessary to enhance applications that are increasingly impacting our complex and fast-moving daily experiences. More than merely delivering static data, Mapbox provides a true developer-friendly platform for building richly detailed and dynamic enterprise and consumer applications.

Rich Detail of the Real Environment

Source: Mapbox

Leveraging Massively-sourced Live Data

Mapbox leverages the advantage of massive and continuously refreshed data inputs derived from approximately half a billion monthly active users. Typically, partner applications and processes generate inputs that, ultimately, report back to the application layer with live and updated data in near real-time. Mapbox's live location platform collects approximately 250 million miles of anonymized road data daily, creating highly precise and dynamic geospatial maps. Live location also structures maps with time functions; i.e., when and where an object was located opens up vast possibilities for asset tracking, delivery, and shared-mobility use cases.

The platform serves up valid addresses, places, and points of interest globally, funneling over 130 data sources and translations in 39 languages. The maps render at a fast 60 frames per second, delivering a 'video game like' quality feed to the end user. Data collection only becomes richer as more users access the applications delivered with Mapbox services, resulting in richer maps that help make applications more impactful.

Vision SDK and Advanced Data Sources

In a demonstration of its commitment to continuous innovation, Mapbox released its Vision Software Development Kit (SDK) in 2018. The Vision SDK leverages connected cameras, working in conjunction with real-time traffic and navigation, to bring live visual context to the platform. Thus, developers on Android or iOS can create a heads-up display experience in their native apps. These 'eyes at the edge' detect vehicles, pedestrians, cyclist, construction sites, school zones, and live environmental conditions with more detail than ever before. Neural networks at the edge power feature extraction, requiring minimal bandwidth (rather than sending imaging back and forth). Moreover, the data and metadata are consistently refreshing the overall platform, enriching the global services and opening the door for new types of applications and business models.

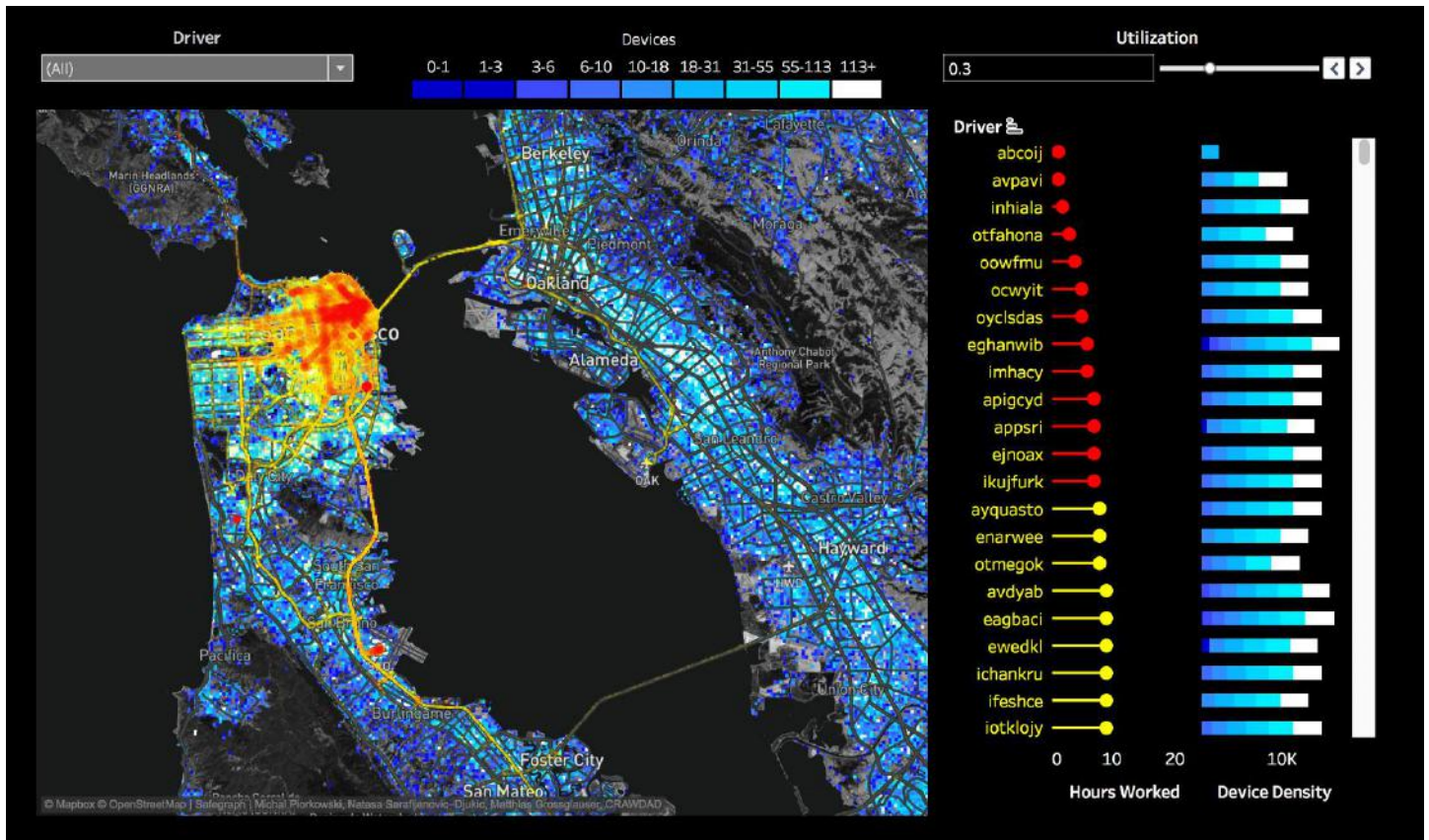**Location with Visual Context: The Vision SDK**

Source: Mapbox

Customization at Every Layer

Mapbox's cloud-based platform serves as the foundation for developers to build layers of personalization into the maps and leverage the geolocation potential for creative use-cases. The location platform organizes data in over 130 layers of information (such as vector basemaps, geocoding, and points of interest) allowing developers to pick and choose which they want to draw from in addition to their own layers. Additionally, Mapbox's platform allows developers to create and personalize the appearance of maps with different customization features such as colors, shapes, icons, fonts, or selections from style templates.

Developer-first Focus

The customization potential inherent in Mapbox's live location platform arises from the company's deep commitment to developer-friendly tools and flexibility. Generating a broad set of developer tools for mapping, routing, geocoding, visualization, and mobility, Mapbox allows developers the freedom to use what they want and control the user experience, rather than a "full stack or no stack" model. Catering to the more than 1,200,000 registered developers already using the platform, Mapbox ensures that outreach and responsiveness to their concerns are a part of the primary mission. Maintaining open source roots, Mapbox releases much of its code—including over 660 public repositories on GitHub—and focuses on general-purpose modules so developers can build on and use package managers. The emphasis on extensible and flexible tools grants developers full control to build unique experiences while reseeding rich data that informs and improves the overall platform.

Built by and for Designers, Developers, and Cartographers

Source: Mapbox

Commitment to Security

Data security is always a priority. Mapbox directs serious attention to maintaining firewalls and elastic scaling to mitigate distributed denial-of-service attacks, industry-leading cryptographic standards, and anonymized mobile telemetry. Private maps with access control are available for enterprise customers with sensitive security requirements. Finally, Mapbox invests heavily in software stability, continuous integration testing, and performs vulnerability scans and code reviews before deployments.
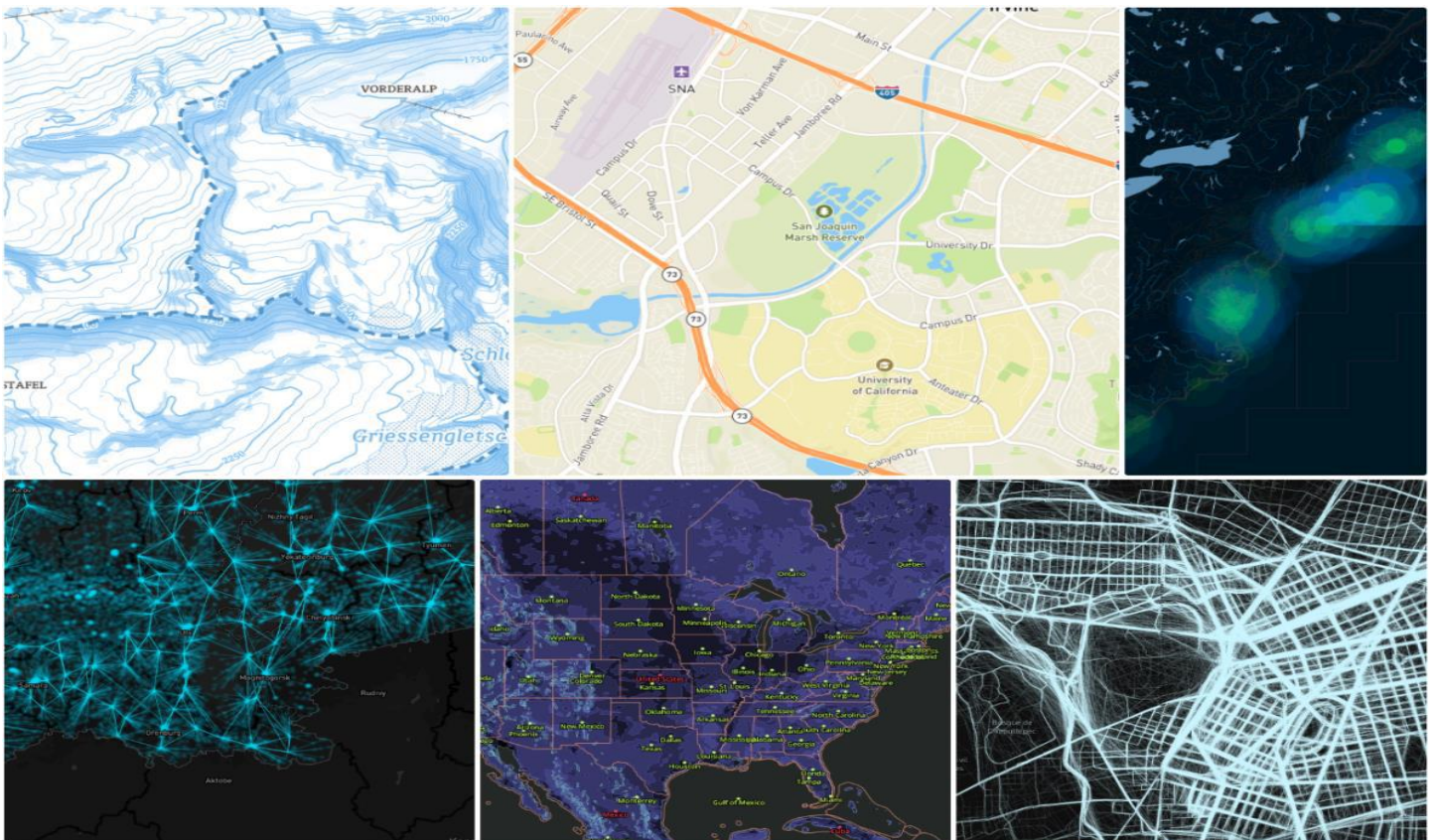
Open Source Data & Transparency

Many enterprises have found that leveraging the open source data of Mapbox's platform has clear advantages over building their own closed proprietary ecosystem. As part of the belief in openness, Mapbox maintains a commitment to transparency. More specifically, the company prides itself on automating service assurance—remediating and escalating enterprise support services quickly; documenting and making public its incident history.

Integrations and Applicability for Creative and Experimental Use Cases

Industry leaders across sectors (Snap, Facebook, Tinder, CNN, Microsoft, Tableau, IBM, NNG) are increasingly using Mapbox's platform. Mapbox integrates with additional enterprise platforms—opening the door for collaboration with existing systems for resource management and data visualization.

Frost & Sullivan believes that there are two critical differentiators between Mapbox and the existing competition. Firstly, while Mapbox has developed a live, real-time mapping *Platform,* the lion's share of the competition is simply offering a static mapping *Product.* Thus, Mapbox embraces a forward-thinking, developer-focused platform-approach, whereas much of the competition is merely providing customers with static maps. Secondly, in contrast to certain competitors, partnering with Mapbox allows developers to support their own predefined business models, without adhering to stack structures. Top competitors, for example, have locked developers into an ad-driven business model, which is not always conducive to the goals of customers. Thus, the Mapbox model provides the flexibility for developers to work within the confines of their desired business models and provides the flexibility to experiment creatively with new use cases.

Custom Maps to Fit Your Brand

Source: Mapbox

Conclusion

Leveraging massive amounts of sourced, real-time geolocation and anonymized telemetry data, the Mapbox live location platform provides the foundation for richly detailed consumer and enterprise applications. With a deeply ingrained commitment to flexible, developer-first toolsets, Mapbox's platform enables highly customizable experiences and encourages developers to push the "creative" envelope. Moreover, partnering with Mapbox allows developers to support their unique business models, in contrast to competitors that obligate customers to conform to models of self-interest.

Mapbox's innovation in mapping and live location provides developers with the tools to deliver differentiated applications that conform to evolving behaviors and expectations of both businesses and consumers. The Mapbox live location platform fundamentally enhances the growth opportunities for application developers, delivering unique benefits that can greatly improve business performance as well as customer experiences. With a cutting-edge platform, coupled with a developer-first mentality, Mapbox earns Frost & Sullivan's 2019 North America Platform of the Year Award in mapping and live location market.

Significance of Platform Leadership

Ultimately, growth in any organization depends upon customers purchasing from a company and then making the decision to return time and again. A comprehensive platform, filled with high-quality, value-driven options, is the key to building an engaged customer base. To achieve and maintain product excellence, an organization must strive to be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Platform Leadership

Demand forecasting, branding, and differentiating all play a critical role in finding growth opportunities for your platform. This three-fold focus, however, must be complemented by an equally rigorous focus on pursuing those opportunities to a best-in-class standard. Customer communications, customer feedback, pricing, and competitor actions must all be managed and monitored for ongoing success. If an organization can successfully parlay platform excellence into positive business impact, increased market share will inevitably follow over time.

Key Benchmarking Criteria

For the Platform Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Platform Attributes and Business Impact—according to the criteria identified below.

Platform Attributes

Criterion 1: Match to Needs

Requirement: Customer needs directly influence and inspire the design and positioning of the platform.

Criterion 2: Reliability and Quality

Requirement: The platform consistently meets or exceeds customer expectations for performance and length of service.

Criterion 3: Platform Value

Requirement: The platform offers the best value for the price, compared to similar offerings in the market.

Criterion 4: Positioning

Requirement: The platform addresses unique, unmet need that competitors cannot easily replicate or replace.

Criterion 5: Design

Requirement: The platform features an innovative design, enhancing both visual appeal and ease of use.

Business Impact

Criterion 1: Financial Performance

Requirement: Overall financial performance is strong in terms of revenues, revenue growth, operating margin, and other key financial metrics.

Criterion 2: Customer Acquisition

Requirement: The platform's features enables acquisition of new customers, even as it enhances retention of current customers.

Criterion 3: Operational Efficiency

Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard.

Criterion 4: Growth Potential

Requirements: The platform's differentiation among competitors strengthens the brand, reinforces customer loyalty, and enhances growth potential.
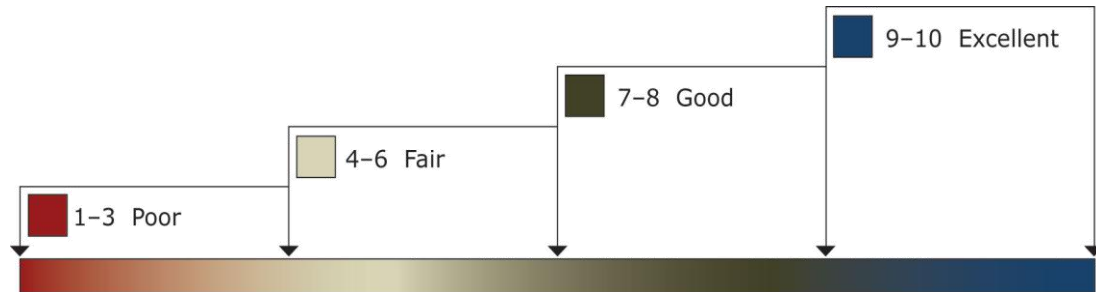
Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to quality and customer impact, which in turn enhances employee morale and retention.

Best Practices Award Analysis for Mapbox

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation. Ratings guidelines are illustrated below.
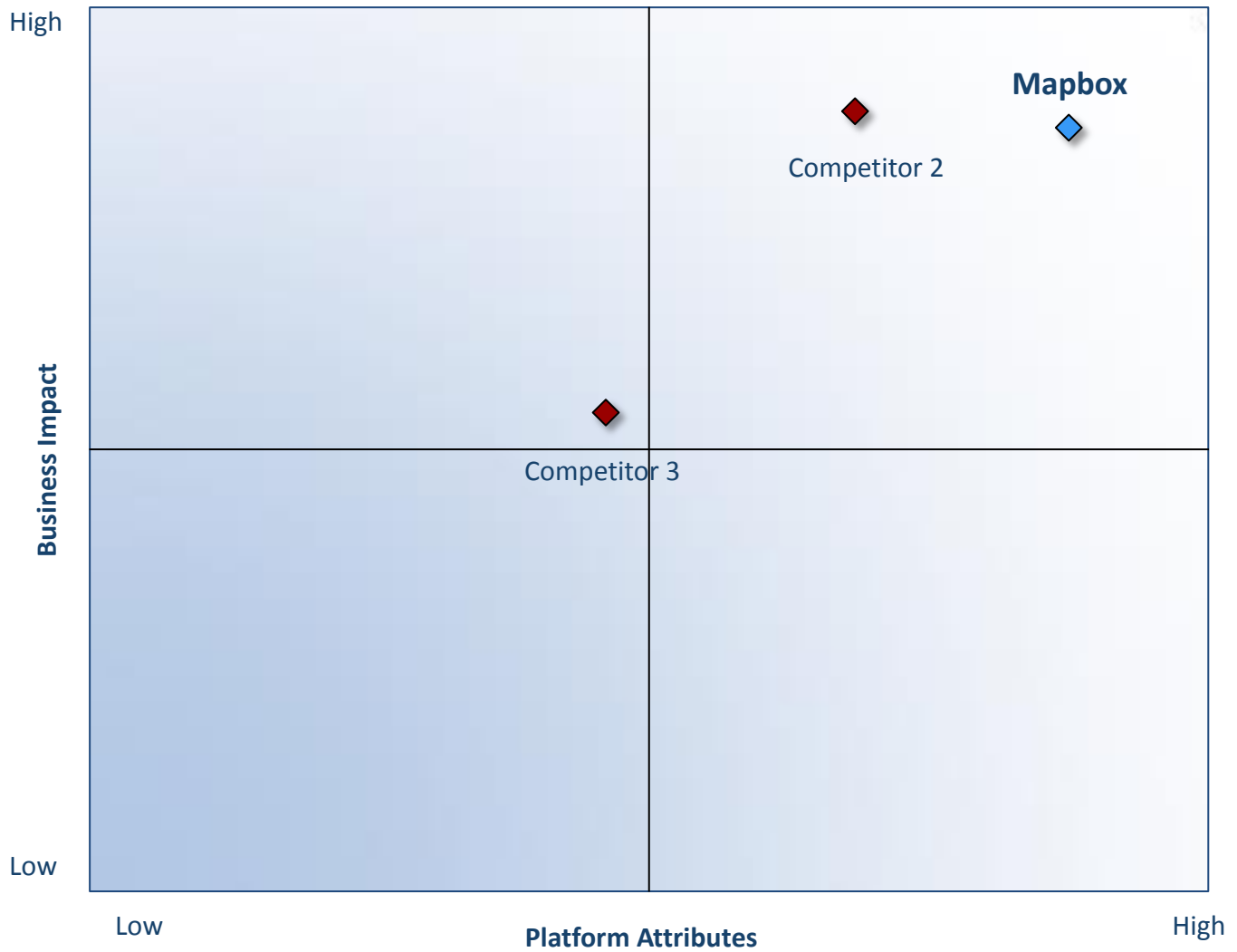
Ratings Guidelines

The Decision Support Scorecard is organized by Platform Attributes and Business Impact (i.e., these are the overarching categories for all 10 benchmarking criteria; the definitions for each criterion are provided beneath the scorecard.). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key participants as Competitor 2 and Competitor 3.

Measurement of 1–10 (1 = poor; 10 = excellent)			
Platform Leadership	Platform Attributes	Business Impact	Average Rating
Mapbox	10	9	9.5
Competitor 2	8.5	9.5	9.0
Competitor 3	6	7	6.5

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP		OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	**Monitor, target, and screen**	Identify Award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6	**Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform Award recipient of Award recognition	• Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10	**Take strategic action**	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.

F R O S T *&* S U L L I V A N

NEXT STEPS ⊘

> **Schedule a meeting with our global team** to experience our thought leadership and to integrate your ideas, opportunities and challenges into the discussion.

> Interested in learning more about the topics covered in this white paper? Call us at 877.GoFrost and reference the paper you're interested in. We'll have an analyst get in touch with you.

> Visit our **Digital Transformation** web page.

> Attend one of our **Growth Innovation & Leadership (GIL)** events to unearth hidden growth opportunities.

Frost & Sullivan, the Growth Partnership Company, works in collaboration with clients to leverage visionary innovation that addresses the global challenges and related growth opportunities that will make or break today's market participants. For more than 50 years, we have been developing growth strategies for the Global 1000, emerging businesses, the public sector and the investment community. Is your organization prepared for the next profound wave of industry convergence, disruptive technologies, increasing competitive intensity, Mega Trends, breakthrough best practices, changing customer dynamics and emerging economies?

For information regarding permission, write:
Frost & Sullivan
3211 Scott Blvd
Santa Clara CA, 95054