A Case Study of Data Visualization in the Fire Safety Industry

FireStats

The fire safety industry manages thousands of fire and health related incidents on a daily basis, generating gigabytes of high value, spatial and temporal data that needs to be quickly accessed and analyzed by the many industry staffers - from fire chiefs to government resource management agencies - to the public. In the past, much of this data has been difficult to cleanse and analyze. Ideally a data visualization would effectively and affordably allow side by side analysis of spatial data (such as incident and unit locations) and call response times while still remaining accessible to industry experts of varying technical proficiencies. Data analysis can be tricky to analyze due to the distributed nature of fire agencies and their data, a previous lack of effective geographic visualization tools, and the need to remain cost effective.

Leveraging the data analysis and visualization capabilities of Tableau, as well as an AWS cloud-hosted and open-source infrastructure, DesignMind has been able to contribute to the effective analysis and distribution of this valuable public data, by delivering both industry standard metric visualizations and spatial data analysis maps; generating insights such as fire incident hot spots, statistically high response-time areas, and measurements of the real world impact of strategic changes. Effective data visualization allows industry experts to make better informed decisions, resulting in a world that is a bit safer for everyone.

Background

Firestats provides statistical analysis and consulting services to the fire safety industry. They offer classroom seminars as well as the development and maintenance of a self-service BI platform for its clients. Prior to 2015, Firestats had developed and maintained a custom web application that allowed users to login and see a view of a map dashboard displaying a handful of previously defined metrics. The application did not meet the full range of needs of the fire agencies and was not a robust or stable data analysis platform for all users.

By working with DesignMind, Firestats was able to draw on years of industry knowledge to re-implement its self-service BI platform, migrate to a more robust and scalable solution, and minimize costs.

About DesignMind

DesignMind is a Big Data, Business Intelligence, Cloud, and Mobile Solutions consulting firm headquartered in San Francisco.

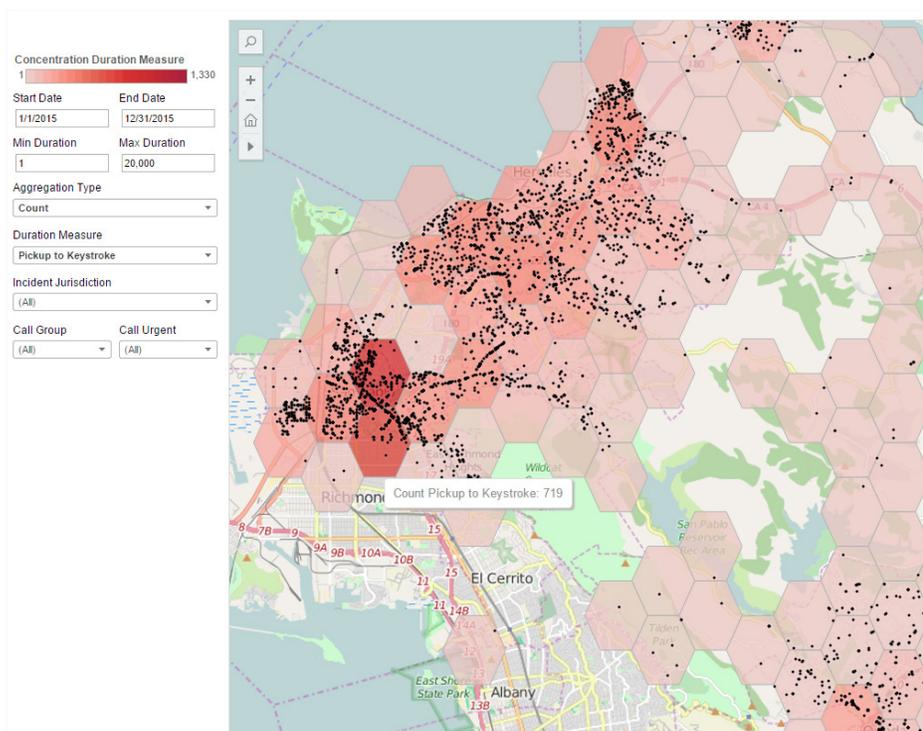A case study by **Eric Bragas and Angel Abundez** | DesignMind | May 2016

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Problems and Solutions

The Firestats self-service BI platform did not have a high availability track record, and required excessive development and maintenance costs that were cutting into a potentially prosperous revenue stream, so the immediate challenge was to introduce a more durable infrastructure.

Leveraging experience with cloud BI infrastructure, the DesignMind team decided on a combination of Amazon Web Services offerings to fully host the relational database system, as well as the web server used to host the new application. By implementing the Firestats BI platform in a cloud architecture, they were not only able to lower maintenance costs for the system, but provide the capability to scale as their user base grows. As with other cloud implementations, the team took advantage of the flexibly to develop and upgrade systems as the need arose; delivering a fully implemented database platform at an accelerated pace. Now costs are predictable and the BI platform is scalable.

Due to the variety in Firestats' clients, they needed to create a custom Extract, Transform, and Load (ETL) process from the data received from each client on a monthly basis to feed the data visualizations. Because each Firestats client is an individual fire agency, they each utilize their own individual Computer-Aided Dispatch (CAD) system to track the timestamps of individual events that take place during an incident response, as well as the telemetry data from each of the units responding, including the latitude and longitude of both incidents and units during response.

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In order to maximize the value and insight possible for each of the fire agency clients, DesignMind utilized a proven ETL Framework to quickly deliver the standard processes for data ingestion, as well as custom spatial data processing to further enhance each client's data set. By utilizing geo-spatial shape files that defined the jurisdictional boundaries of each agency, the team was able to identify the geographic area where each incident occurred. Then by additional slicing and dicing within the dashboards and utilizing visualizations, FireStats can now deliver this enhanced data to users.

Being able to derive the spatial relationship between an incident location and the jurisdictional boundaries now gives resource managers clearer insights into where to distribute funding and how to manage jurisdictional boundaries. The ultimate goal is to create better informed decisions and impact analysis.

Taking advantage of their partnership with Tableau, the DesignMind team was able to quickly implement a Tableau Server and develop new dashboards and map visualizations. The FireStats BI self-service data analysis application integrates visualizations of fire incident spatial data married to industry standard statistical measurements required by the fire safety industry. This turns existing wisdom into new data exploration opportunities. Thanks to the dynamic capabilities of Tableau, the dashboard allows the users to select the metrics and the way that they're calculated via a set of parameters within the dashboard; exponentially increasing the types of data analysis that can be performed within a single dashboard.

The fully cloud hosted architecture and the stunning dynamic data visualizations were all tied together and delivered to the client using an attractively branded web page that allows users to login and access their custom data visualizations. Through this, Firestats was able to continue to brand their product and deliver a stable, high profile data analysis experience as if it were built as a custom web application.

"New insights made possible through dynamic spatial data visualizations now provide ten times the insight at half of the cost."

Resolution

Managing costs and avoiding application down time is no longer a problem for Firestats. Their new cloud hosted architecture is now flexible and ready to scale. New insights made possible through dynamic spatial data visualizations now provide ten times the insight at half of the cost.

If you'd like to learn more, please reach out to us at info@designmind.com or call 415-538-8484.

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