Resultant

Data Transformation Enables Analysis and Performance Tracking

Advanced data analysis through the Management Performance Hub improves State efficiency and services delivered to citizens by enabling data-informed decision making.

Upon receiving a phone call for an incident of abuse or neglect, a caseworker is deployed. Today, a caseworker arrives ready to assess the scenario onsite. Imagine instead, a caseworker arrives armed with knowledge of a family pet, criminal history, children's recent absence from school, any history of drug use, the family's participation in government programs, and more.

Properly equipped with historical data and insights, caseworkers can assess risk in addition to utilizing the information to inform decisions. Caseworkers can evaluate what has worked in the past on similar cases by comparing attributes and evaluating the programs and services families participate in – all to better inform case planning.

Examples such as this are possible with the use of connected data.

> Leveraging data from across the State, data was transformed into information, which, in turn, became the knowledge needed to support the important decisions of tomorrow.

JOSH MARTIN
MANAGEMENT PERFORMANCE HUB CHIEF OF STAFF, STATE OF INDIANA

THE SITUATION

State governments have an extensive history of data collection; it's a requirement for securely providing service to citizens. State agencies, such as the Department of Revenue, collect income information for residents and businesses; the Department of Transportation collects traffic and accident information; the Department of Health and Human Services collects information about residents' health, families, and social service needs, and so on.

Advancements in technology have made data more accessible than ever before. Resultant and the State of Indiana (the State) worked together to develop a plan to put data and sophisticated analytical techniques at the heart of determining the underlying drivers of individual problems to unlock insights. The State believed leveraging data would provide the opportunity to inform spending and strategically focus on issues impacting citizens.

OVERCOMING CHALLENGES

The State faced a few barriers to leveraging data to its full potential. The major initiatives the State was interested in solving spanned multiple agencies and datasets, which all needed to be brought together in a usable manner. To further complicate matters, within the datasets that spanned agencies, data was duplicated; there were shared data sources; and there was a general lack of information sharing across the government – a common issue among state government.

To overcome these challenges and enable data sharing across the government, the State had to remove the technical barriers between datasets, all while dealing with mandatory legal and process requirements.

THE RESULTANT APPROACH: PARTNERSHIP

Grasping the substantial effort required to solve these challenges, the State partnered with Resultant to:

- **Transform data across agencies** to make it usable, workable, and secure, allowing analysis and performance tracking.
- **Create a public facing website and internal employee dashboards** to track performance against key performance indicators (KPIs).
- **Develop the framework** to handle massive scale projects as well as assist in project completion.
- **Continue to refine and improve the solution** through strategic guidance, ongoing management and oversight, and technological improvements.

With the State of Indiana as the first state to undertake the challenge of creating a centralized data repository, Resultant set out to assist the State in positioning Indiana as the most effective, efficient, and transparent State government in the country.

DIRECTION ESTABLISHED

With huge volumes of data stored in disparate systems in the State, action was taken to initiate the launch of a comprehensive, enterprise-wide, data-driven management system dubbed the **Management Performance Hub** (MPH).

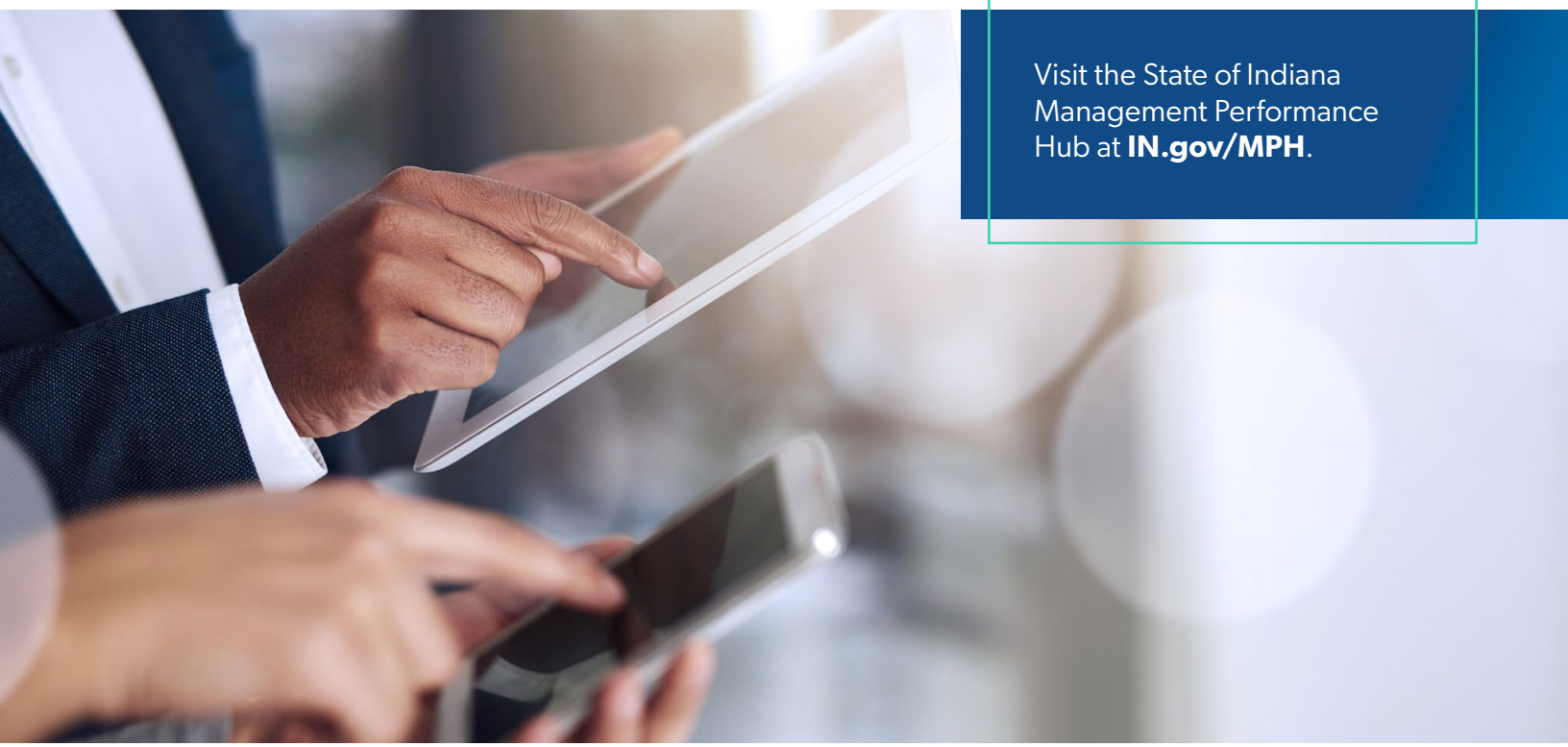
MPH is comprised of:

- Usable, workable, secure data
- Performance management through data analytics
- A framework for use cases

March 17th 2014

Executive Order for the creation of the Governor's Management Performance Hub issued by Governor Mike Pence.

Visit the State of Indiana Management Performance Hub at **IN.gov/MPH**.



TRANSFORMING DATA

With data needed to resolve the State's major initiatives housed in various agencies, the aggregation of data was required to create a structure for work to begin. As a result, transforming the State's data was the first priority for the Resultant Data Analytics team. To accomplish the objectives of MPH, the team was tasked with making the data usable, workable, and secure to allow the State to analyze and track its performance. The team first established a secure data environment by combining disparate datasets from Indiana's 90+ state agencies (which includes agencies such as the Department of Revenue, Department of Workforce Development, and the Department of Child Services), and stored the clean data in a data warehouse.

Securing the Data Environment

Securing massive amounts of sensitive data is no simple feat. The State and Resultant took the utmost precaution to ensure the data would remain secure and agencies would feel comfortable sharing data.

To alleviate any fears, the Data Analytics team ensured robust data protection by creating an environment for data storage that met the combined maximum data security requirements for FERPA, HIPAA, and FTI.1 Using the standards as a baseline, the team met, and in most instances exceeded, the standards. The result was a secure environment for data storage.

Combining Data

Behind the scenes, the team faced technical and non-technical barriers. Extensive work, ranging from the probalistic matching of disparate datasets to linking and deduplication, was completed to collect and clean data across Indiana's 90 state agencies. Previously a significant inhibitor to progress in the State, the data - combined and cleaned from over 70 disparate datasets – is now usable and workable.

Storing Data

With the data transformed into a usable and workable manner, the data needed a place to live; therefore, a database was established. From a technical perspective, a table schema was set up that answered questions for all of the data and a robust computational environment to facilitate data science work was developed.

DATA-DRIVEN DECISION MAKING

In parallel, the Resultant Data Analytics team assisted the State with developing a more robust solution to track the performance of individual agencies through the use of data analytics. This was achieved by streamlining and automating key performance indicators (KPIs) and creating operational dashboards.

Best in Class Tools and Open Source Analytics

To meet the requirements of this project, traditional database technologies and analysis tools were used in conjunction with advanced in-memory database, scalable and flexible noSQL database technologies, and open source machine learning languages such as R and Python.

> We're not going to have to wait on data. We're not going to have to make decisions based on stale or old information. We've now been able to make decisions in real time.

CHRIS ATKINS
FORMER CHIEF FINANCIAL OFFICER, STATE OF INDIANA

Getting in the Weeds

With a deep understanding of the data security requirements, the Resultant team structured procedures on how to properly access data and catalog access, restrict access, and then created the structure the environment would live in.

Key Performance Indicators and Performance Measures

Within every State agency, KPIs are used to monitor performance. To effectively analyze performance, the team worked with each agency to determine what would best represent its performance, resulting in two-to-three KPIs per agency. In addition to KPIs, each State agency provides programs for which additional performance measures are created to track performance. The combination of these metrics alongside KPIs represents how the State is doing.

Previously, to update KPIs, employees had to manually input and submit a form via a web page. The Resultant team streamlined this process by automating the data extraction of KPIs for agencies - saving employees time and ensuring accuracy. In total, there are over 70 automated extracts delivering up-to-the-day information to the State.

With well over one-thousand performance measures to track, the Resultant team developed a new tool for employees to update their performance measures with ease. The tool syncs up with the automated KPIs to holistically evaluate performance measures. Now, employees are able to measure their performance based on outcomes as opposed to the quantity of services delivered.

Operational Dashboards

To further enhance understanding of the State's performance, the team developed operational dashboards to provide analysts with the ability to visualize granular information around the KPIs. The result is an in-depth view into the information impacting agencies. For example, the Department of Child Services can drill down into information that may factor into client success, such as a child's current residence and length of time in foster care. The dashboards additionally display a visualization of up-to-the-minute revenue reports, what-if budget scenarios, staffing levels to evaluate trends and assess turnover, and more.

THE FRAMEWORK

With a deeper level of insight into the State's performance, employees gain increased insight into why a specific KPI is trending in a positive or negative direction. In many scenarios, if a KPI is trending in a negative direction, employees are able to determine the root cause and make corrections. In instances where an obvious answer does not present itself, the State desires to put forth a concentrated effort leveraging advanced tools to get to the root of the issue. These deeper challenges are at the heart of the creation of MPH. With the framework established, the State is now equipped to handle massive scale projects, deemed use cases, to focus on issues impacting citizens.

As its first advanced data analytics endeavor, the State, along with Resultant, undertook the challenging task of combating infant mortality. The State continues to initiate analysis of multifaceted use cases.

Ongoing Management

Throughout the project, the Resultant Data Analytics practice assisted with solution strategy, project management, project coordination, solution architecture, data engineering, data analysis, data science, and custom software development for the State of Indiana. Resultant continues to play a role in the ongoing development of MPH as the State tackles new use cases.

THE OUTCOME

By developing MPH, the State sought to drive innovation and improve the effectiveness of services by increasing attention to the privacy, security, transparency, and reliability of the disparate data sources maintained by State agencies. Through the use of data, the State is now leveraging an iterative and creative process to solve its toughest challenges.

With the creation of MPH, disparate data across agencies was brought together in a usable, workable, and secure manner. A major undertaking, the State made a long-term investment in working toward effective solutions that improve programs and ultimately the quality of life for more citizens. The tangible impact of many use case solutions such as infant mortality, given its nature, will take years to surface, but day-to-day decision making and performance monitoring has allowed agencies to think differently and, as a result, act differently.

Today, with data readily available, agencies have the information needed to support informed, data-driven decisions to assist in the allocation of resources and heightened confidence in the probability of success. Data can now be leveraged to challenge assumptions and apply new strategies and tactics.

Citizens have an increased understanding of how their State government is performing through the transparency displayed on IN.gov/MPH. State agency KPIs were refined, data collection was streamlined to further a culture of data collection, and operational dashboards provide employees insight into historical trends and an in-depth view into agency performance management. Practical and efficient solutions are developed regularly as a result of the KPI refinement. A few practical applications include reports on vehicle accidents, which are being used to determine where State troopers should be stationed on patrol, and the State is now tracking whether meth usage is increasing or decreasing, based on the number of meth-related arrests in certain areas.

The ultimate goal of establishing MPH was to achieve program outcomes in the most cost-effective manner. For example, reducing infant mortality was one use case the State undertook. Historically, funding was evenly allocated to counties across the State to use as they deemed effective in reducing infant mortality. When data analysis revealed counties with significantly higher infant mortality rates, the State was able to justifiably redirect funding to where a greater impact would be made.

The first of its kind, MPH brings together performance metrics across the State all centrally managed and visible. With sophisticated analytical models that yield insights, the State has the ability to learn from historical outcomes and predict future services through prescriptive analytics. The MPH tool has enabled data analytics to better understand and inform decisions on the allocation of resources across State agencies all leading to improved life for citizens.

ABOUT RESULTANT

Our team believes solutions are more valuable, transformative, and meaningful when reached together. Through outcomes built on solutions rooted in data analytics, technology, and management consulting, Resultant serves as a true partner by solving problems with our clients, rather than for them.