

Federal Big Data Analytics

*Helping federal agencies to make sense of
“Big Data”*



Highlights

- Discover the true value of big data
 - Understand the power that big data analytics can bring to an agency or service branch
 - Put the power of big data where it belongs, with business users and domain experts
 - Identify key big data opportunities such as fraud, inspection and insider threat analytics
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Big data is everywhere. Each day brings news of more and more astounding statistics about the rise of “big data”. Federal agencies are struggling to make sense out of their big data challenges while trying to utilize big data to improve their mission performance. Much of the work to date around big data involves managing the sheer volume and complexity of it. Big data takes the form of both structured databases and unstructured text. Finding ways to deal with it is daunting, at best.

However, in all the complexity of worrying about big data, something is often lost. The whole point of dealing with this mass of bytes, megabytes, gigabytes and petabytes is to leverage it to improve agency and service branch performance. While these battles are being fought in the halls of IT, it’s the mission heads, program managers and business users who are left waiting for the promise of big data insights. The cry has become, “we are data rich and information poor”. Agencies know they cannot ignore their big data. The Federal government is investing hundreds of millions of dollars on initiatives to try to get value from big data.

The cost of ignoring the insights available within the vast stores of growing information is high. Today, agencies are being asked to do even more with less. They have less money, fewer people and less time. While commercial companies are leveraging big data to make even more accurate and timely decisions, federal agencies can feel like they are behind the eight ball.



The answer lies not in organizing and evaluating big data; the value of big data is in the insights that can be found within it. Unlike commercial organizations, the value of big data to federal agencies is found in things like better healthcare, improved public safety, crime prevention, national security and improved environmental health. Making sense out of big data leads to improved decision-making for programs across the federal government.

What can IBM Big Data Analytics bring to your organization?

IBM Big Data Analytics drives value from big data into the hands of analysts and decision-makers. IBM solutions can draw information from a variety of sources, both structured and unstructured and deliver value to everyday business users. Often, this takes the form of simple reports or dashboards. The ability for domain experts to visualize information in a variety of ways allows them to gain new insights into how real-world events are affecting agency or service branch performance. A picture is said to be worth a thousand words but it can also save millions of dollars in taxpayer money and even save lives.

Visualizing and sharing big data information is just the start. Agencies gain greater big data leverage through advanced and predictive analytics. A statistical understanding of trends, relationships and the ability to identify outliers in the sea of big data allows agencies to act in ways as never before. For example, instead of spending days or weeks reviewing spending data for fraud detection, advanced analytics can automatically identify likely violations and bring them to the attention of auditors. This type of insight can be applied to missions across the federal government.

IBM Big Data Analytics is about finding relevant insights for your agency or service branch. Analytics delivers actionable intelligence where you need it and when you need it. Ultimately, IBM Big Data Analytics is about delivering better decisions and better outcomes by utilizing all available data.

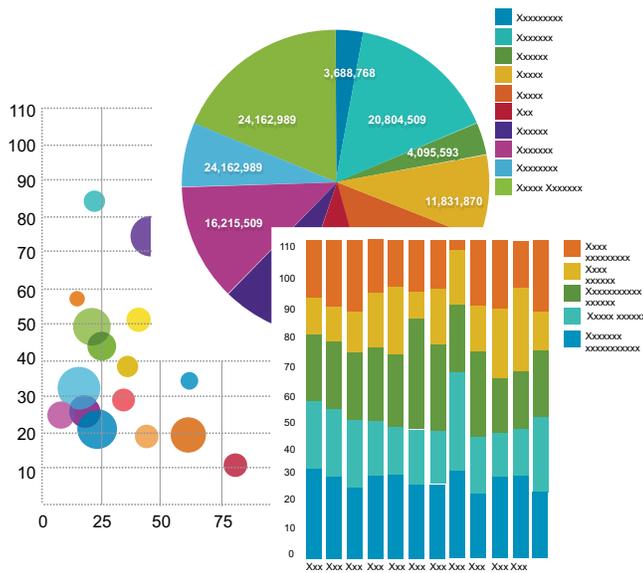


Figure 1: IBM Big Data Analytics solutions deliver stunning visualizations that allow federal agencies to both better understand and garner insights from big data

Big Data Analytics in Action

Understanding the value of robust big data analytics can be a challenge. It is helpful to review a set of potential uses for utilizing analytics to see how they might be applied to a particular agency's mission. Each of the following use cases is drawn from real-world experiences IBM has had with federal agencies. These do not expose the limits of big data analytics, just its potential. Many, many more applications are possible.

Fraud Analytics

With greater and greater focus on reduced spending across federal agencies, more emphasis is being put on reducing fraud in spending. Given the vast number of transactions across the U.S. agencies, effectively tackling fraud cannot be left to manual methods.

Using visualization and advanced analytics, federal customers can spot outliers in spending patterns. These "oddball" transactions can then be investigated for fraudulent activity. Investigators can focus precious time on statistically likely incidents rather than relying purely on experience.



Inspection Analytics

Many federal agencies are tasked with inspecting private industry facilities for health and safety violations. This work runs the gamut from food processing to energy production to environmental quality. Agencies have limited time and funds but are demanded to improve their results.

Advanced analytics can deliver a two-fold improvement. First, it can help optimize scheduling of inspectors so they spend more time delivering value and less time travelling. Second, inspection analytics can give agencies insights into which sites hold likely violations thereby improving inspection effectiveness.



Insider Threat Detection

Recent years have revealed that that agency and service branch insiders may pose a greater threat than outside agents. Agencies are now turning inward to ensure the nation remains safe and that agency information remains confidential. Insider threat efforts today tend to focus on “yesterday’s attack”. To truly protect against insider threats, agencies and service branches must shift to a new paradigm.

Advanced analytics delivers the ability to “baseline” employee behavior within various network systems. By establishing normal behavior patterns, agencies can be alerted to outliers and focus security resources in order to stop leaks and other violations before they succeed.



Predictive Maintenance

Agencies and service branches often maintain billions of dollars worth of working assets. From buildings to vehicles to defense systems, keeping assets running is central to mission performance. With shrinking budgets and growing mission mandates, the need to reduce maintenance costs while continuing to deliver on mission is critical. Today’s equipment provides the big data needed to accomplish this task.

Whether working with equipment sensor data or text-based maintenance logs, advanced analytics provides for robust predictive maintenance capabilities. By understanding which equipment is likely to fail and why, maintenance organizations can both reduce maintenance costs and increase equipment up time.



Social Media Analytics

The explosion of social media creates a big opportunity for agencies across the federal government. This vast store of public big data can give agencies and service branches insight into how they are performing their mission. Rather than relying on manual information gathering techniques, social media analytics can give key insights into mission performance. Interested in how a new policy is being received? Social media analytics can not only tell your agency how the public feels but it can also point to key influencers that are driving online conversations. Social media analytics is not just about public opinion, it can also deliver key insights into areas such as public health, public safety, criminal activity, military theater insights, and much more.



Figure 2: Social Media Analytics can provide key insights into agency performance from the millions of public conversations present in social media. Social media insights can improve policy implementations and provide actionable intelligence to a variety of mission activities.

Big Data Directed Discovery

It is difficult to know what insights an agency's big data can deliver. Too often, agencies must rely on data scientists to discover key relationships within data stores. However, data scientists are often ill-equipped to know whether a particular data relationship is meaningful to an agency's mission. There are also too few data scientists today to meet the mission demands of agencies across the federal government.

The ability for domain experts to utilize directed discovery techniques is becoming critical. While a strong infrastructure for big data may exist, the ability for business analysts to take advantage of statistical insights without the need of a data scientist is the future. Directed discovery can tell business analysts which data is relevant to key mission questions and they can leverage their domain expertise to determine whether those insights are actionable or require further study. Directed discovery closes the loop on big data by bringing the value directly to domain experts and bypassing the problems posed by the shortage of data scientists today and in the future.

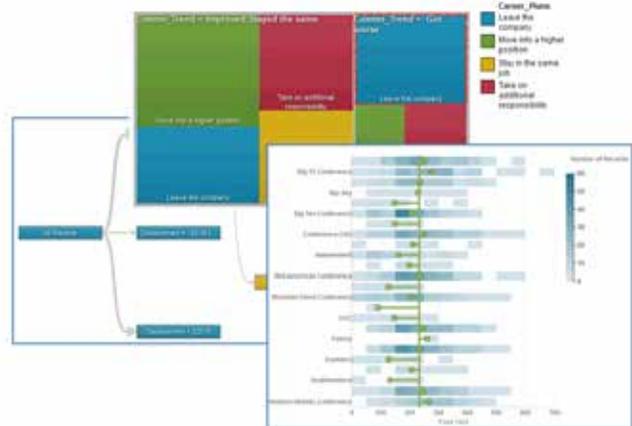


Figure 3: Directed discovery of big data can reveal statistically relevant relationships to key metrics. Placed in the hands of mission specialist, directed discovery can bring significant value to agencies and service branches.

IBM Software Delivers

IBM is a recognized leader in the field of analytics. IBM's business intelligence suite delivers the ability to connect and combine data from sources across the enterprise. IBM delivers reporting and dashboards when and where you want. Stunning visual representations of information help business users find the value they need from big data. The IBM mobile platform provides federal agencies and service branches the ability to deliver insights anywhere you go.

With IBM's advanced analytics platform, complex statistical modeling is simplified. IBM provides a robust and open data platform to leverage big data where you have it. Combined with IBM's business intelligence capability, advanced analytic results are delivered directly to decision-makers. This decision management paradigm leads to more informed choices and better outcomes.

Accelerating time-to-value

IBM's Big Data analytics solutions are designed to deliver value quickly. Rather than spending months or years to reorganize data, IBM analytic solutions can access information and deliver insights right away. Getting value out of software choices is key in today's federal budgeting environment and IBM understands that agencies demand faster returns on investment than in the past. No longer should big data be the purview of IT. Business users need value out of big data today and IBM analytics can help you make sense of your big data.

Value with IBM Big Data Analytics

Within a single analytic platform, IBM's analytics provides a federated data access infrastructure. Within the platform, organizations can gain leverage on their big data sources by providing actionable business intelligence reports along with statistically relevant information. Built on proven technologies, IBM software's analytic solutions deliver a wide variety of capabilities designed to meet today's big data demands. In addition, IBM delivers analytic solutions designed to meet specific organizational needs.

- **IBM Cognos Business Intelligence** — Robust enterprise business intelligence platform with federated data access, extensible visualizations, reports, dashboards and mobile delivery options.
- **IBM SPSS Advance Analytics** — A recognized leader in advanced analytics, SPSS provides both traditional statistical analysis capability along with robust data mining solutions designed to deliver actionable information to decision-makers across an agency.
- **IBM Predictive Maintenance and Quality (PMQ)** — A targeted solution designed to meet the needs of maintenance organizations. PMQ provides predictive capabilities based on maintenance log, sensor and other data to increase asset availability and reduce total cost of ownership.
- **IBM Social Media Analytics** — Leverages the power of social media's big data to deliver insights into emerging trends and sentiment around agency and service branch activities.
- **IBM Analytic Catalyst** — Reduces reliance on data scientists and delivers the power of big data predictive analytics to domain experts. Gives domain experts and decision-makers early insight by directing discovery of big data relationships.

About IBM Business Analytics

IBM Business Analytics software delivers data-driven insights that help organizations work smarter and outperform their peers. This comprehensive portfolio includes solutions for business intelligence, predictive analytics and decision management, performance management, and risk management.

Business Analytics solutions enable organizations to identify and visualize trends and patterns in areas, such as fraud analytics, that can have a profound effect on organizational performance. They can compare scenarios, anticipate potential threats and opportunities, better plan, budget and forecast resources, balance risks against expected returns and work to meet regulatory requirements. By making analytics widely available, organizations can align tactical and strategic decision-making to achieve agency goals. For further information please visit ibm.com/business-analytics

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Produced in the United States of America
January 2014

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