

UNLOCKING YOUR DATA POTENTIAL TO ENHANCE DECISION MAKING AND NATIONAL SECURITY

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AN URGENT DATA AND ANALYTICS CHALLENGE

Defense and intelligence organizations have long sought to take full advantage of one of their most valuable resources – the vast amount of data they collect on a daily basis. They want to be able to use that data to make more insightful, forward-looking decisions about readiness, logistics, manpower, intelligence, and a host of other critical defense concerns.

Traditionally, data analysts and decision makers viewed data as a part of a straightforward, linear process to get to an answer. They asked very specific questions designed to return expected results and flowed these results into custom reports. And when the questions or parameters changed, analysts spent valuable time creating new relational databases that addressed an equally limited set of inquiries.

But leaders today are asking different kinds of questions. *“What are the hidden causes and effects at play here?”* *“What is driving the outcomes that I’m seeing, and why is it this outcome?”* Answers to these questions require a recognition of interrelationships among disparate data sources as well as a means for understanding them.

To be effective in the 21st century, defense, intelligence, and national security organizations must be able to capture the full potential of big data and advanced analytics. Yet, while some organizations have made ongoing investments in data collection and analytics, many remain limited to performing lower-level diagnostic analytics. Facing ongoing budget pressures, they are uncertain how to migrate their existing analytic capabilities to the leading edge of predictive and even prescriptive analytics.

With careful planning and solid execution, getting there may be less daunting – and less costly – than many leaders may think. Leaders can begin to maximize the

value of their current data by first freeing it from silos and making it accessible across the organization, and then applying readily available analytic techniques to gain powerful insights. With this new foundation, they can evolve their capabilities and build a culture of analytics to optimize these capabilities. This evolution will do much more than simply enhance agency decision making; it can also demonstrably improve national security outcomes.

BUILDING NEW ANALYTIC CAPABILITIES

To support their missions, the defense and intelligence communities have steadily built new analytic capabilities that empower leaders to digest structured and unstructured data better, faster, and cheaper. They’re using powerful tools to make more dynamic queries that lead to enhanced diagnostic and predictive answers. Importantly, they’re making tools and data easily accessible to everyone in the organization who might need them, including those with no data science expertise. This way, a broad range of professionals can create queries of their own – and find the kinds of insights that can lead to game-changing improvements in operational efficiency and mission success.

Thanks to this pioneering work, and ongoing advances in technology, advanced analytic capabilities are now much more viable – and affordable – for the wider defense and national security community. They are already collecting data from an expanding variety of sources, including signal intelligence, full-motion video, photos, unstructured text, and social media. Now, they can access greater computing power for a lower cost, thereby making new pilot projects less risky. They can adopt open source solutions that make data storage and access more attainable for a wider range of end users – without building new infrastructure or being locked in to

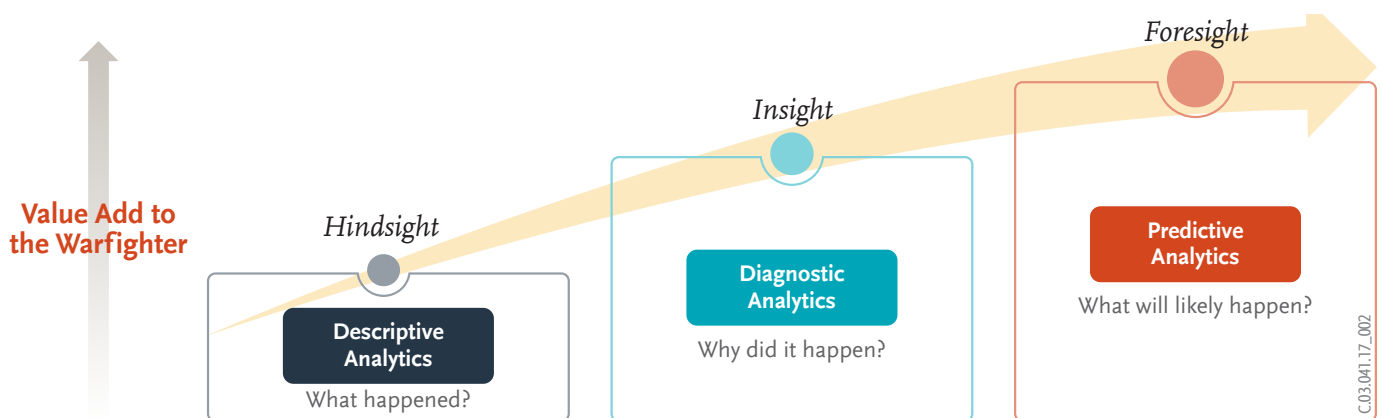
specific vendors. They can adopt automated solutions that reduce the amount of time analysts spend cleaning, tagging, and structuring data. With this foundation, they can then leverage the breakthroughs of leading edge data scientists using machine learning to search for patterns and relationships.

At the heart of these new approaches is the implementation of a data abstraction layer. One of its key breakthroughs is that instead of storing data in silos – the traditional method – it liberates the data, bringing together and integrating all of the data available to an organization, including from outside sources. Just as important, the entirety of the data is available, all at once, for any inquiry.

“Democratizing” the data this way empowers analysts to address a much broader range of emergent problems. Analysts can view the larger context, see complex patterns and connections in the data, and understand

how various forces impact each other. Tagging this data as it is collected provides access from a number of different starting points. Third-party data visualization tools enable analysts to present data and analysis in clear, compelling formats. The result: higher quality analysis and improved decision making, without the bias inherent in traditional hypothesis-based approaches.

But as early adopters have found, enhancing big data capabilities requires more than simply technology strategy and investment. It takes careful planning and disciplined execution to follow the transformative path from descriptive and lower-level diagnostic analytics (understanding the current situation and associated causes and effects) to predictive (analysis of different future scenarios) and prescriptive (recommending specific actions) analytics. And, sustained success requires a broader approach that considers culture and training.



PREDICTIVE ANALYTICS REPRESENT GAME-CHANGING LEAP OVER CURRENT PRACTICES'

“Democratizing” the data empowers analysts to address a much broader range of emergent problems ... resulting in higher quality analysis and improved decision making, without the bias inherent in traditional hypothesis-based approaches.”

When organizations effectively connect people to data, they enable analysts to work faster and more efficiently, to support broader organizational goals, and to create even greater value by encouraging staff to share their data and ask and answer more sophisticated questions. Supplemented by targeted training, these activities reflect the way analysts today think about their roles, how they view data, and how they respond to working at the leading edge of their field. They showcase the opportunity analysts have to directly impact mission success by protecting people and assets and limit the amount of time spent on more tedious tasks such as data cleansing, tagging and structuring.

A TEMPLATE FOR SUCCESS

The journey from low-level descriptive analytics to diagnostic (and ultimately predictive) analytics is an enterprise-wide undertaking. It's one that parts of the intelligence community have already made, and their experiences have produced a reliable template for other organizations to follow. The ultimate target is an analytic capability that automates many of the processes that consume analyst time and resources; that provides

access to a vast pool of structured and unstructured data; that incorporates flexible query and visualization tools; and that delivers reliable, unbiased recommendations faster than ever before.

To get there, leaders can tap the skills of experts in various domains – data science, technology, operations and others – and work closely with them to understand the possibilities and craft custom solutions that reflect unique missions and expectations. Missions may involve evaluating combat readiness, or monitoring movements of people and equipment, optimizing supply chains or reigning in rising energy costs. Regardless, technical analysts need to understand relational databases and new data-processing techniques – as well as existing work streams and processes – to contextualize output in a way that helps decision making and execution downstream.

With a diverse team of experts in place, leaders can engineer successful transformations by following three essential steps:

1. Assess the Organization's AS IS State.

Ongoing investments have left many organizations with at least some of the assets and tools to support advanced analytics. Leaders can begin to build on these investments by first examining their organization's current mission, analytic capabilities, processes, and culture from multiple viewpoints. What questions are decision-makers asking and what critical information do they need? What performance gaps stand in the way? Are there immediate opportunities to integrate existing tools, or are new tools required? What can be done efficiently with existing data and analytic capability to help the organization function at the stage of advanced diagnostic analytics? Is it possible to address some performance issues by introducing new open source data structuring and visualization tools? These tools can immediately upgrade diagnostic analysis in such areas as readiness planning, logistics planning, workforce management, and military intelligence.

2. Determine the TO BE State.

Increasingly, Congress, administrators, and other groups expect leaders to make mission-critical decisions based on data and analytics. To meet this demand, leaders can next look around the corner to anticipate what enterprise-wide analytics will be required to support evolving mission requirements. For example, would users/warfighters benefit from a capability that automatically scans full-motion video of objects to detect movement over time, and cue objects that move so analysts can review them along with relevant information from other sources? Or, would personnel leaders charged with ensuring mission readiness make better recruiting, retention, and training recommendations if they based these decisions on data and analysis that factor in such variables as education, career backgrounds, current and future skill sets, demographics, and other current trends?

As a new analytics strategy comes into focus, leaders should also assess the organization's ability to achieve these objectives. Does the culture currently foster the use of data and analytics at a grassroots level? How easy will it be to get buy-in from older, more established workers? How well does the current technology support democratization? Does it enable non-experts to use analytics? Are leaders willing to trust these new outputs? How quickly can an organization move in this direction?

3. Define a MIGRATION STRATEGY to get to the TO BE State.

Armed with these insights, leaders can then develop a comprehensive road map to get there. Organizations are often tempted to make piecemeal improvements in data or analytic capacity to show progress. While that can have a short-term benefit, patchwork tools and activities will be counter-productive over the long-term if investments and resources are not working toward the ultimate target: Meeting the expectation that data and analytics are deployed to their fullest potential across the enterprise.

To keep technology transformation on track, leaders must successfully integrate the right technology, within the right environment, supported by the right training. To optimize technology, leaders can bring together and integrate all the available data – both structured and unstructured – from a broad range of internal and external sources. Then, using a flexible, modular architecture based on open source products and tools, leaders can empower analysts to move quickly between systems and tools to find the kinds of hidden patterns and connections that can be so valuable. Self-service analytics and intuitive interfaces that use natural language processing can make data and tools easily accessible, so even non-data scientists can access data and make inquiries. And new visualization tools can display data in more flexible and informative ways to meet the expectations of leaders and decision makers.

Technology will have the greatest value when supported by a strong culture of analytics. Leaders can build this culture by focusing on elements such as collaboration, experimentation, and buy-in. They can encourage people across the organization to ask different questions and pursue different answers that support more insightful, forward-thinking decisions. They can also set the expectation that data is available and that people throughout the organization must use it to support decision making.

Sustaining and innovating analytic capabilities also requires the right training. Leaders should take a broad view of training and inclusion and involve users across the organization – not just those who know Python or use Tableau. People should understand the organization's journey from diagnostic to predictive analytics. They should learn the value of fully democratized data and be rewarded for sharing rather than controlling data. Users and managers alike should receive foundational data science exposure and analytic training, so they know what data is available and are comfortable working with different database technologies and data sets.

THE POWER OF ANALYTICS IN NATIONAL SECURITY

Highly accurate predictive analytics are no longer aspirational – they are now within reach of every defense organization. Thanks to breakthroughs in data science, predictive analytics are:

- *Technologically feasible.* New approaches, designed expressly for the age of big data, have overcome the obstacles that have long limited analytics. Defense organizations can now bring together and explore their data in profound new ways.
- *Practical.* Defense organizations have already done much of the groundwork, making the bar of entry to predictive analytics relatively low. And, new tools are making it possible for these organizations to ramp up analytic capabilities quickly, and put them directly in the hands of defense analysts and commanders.
- *Cost effective.* Substantially less time and effort are needed for data preparation and analysis, enabling defense organizations to increase their analytic output at lower costs. Organizations can save even more by using advanced analytics to accurately target investments and cuts, and meet schedule and budget requirements.

The technology is here, and here to stay. However, experience has taught us that tools alone don't solve problems, but that tools paired with well trained, motivated people do. Indeed, only the power of people ultimately takes the most advanced technologies to new levels. Backed by data science and advanced analytics, analysts and decision makers can see a more complete picture that begins to reveal probable cause and effect. From there, organizations can move into the realm of foresight, where analysts use computer models to think through any number of possible scenarios and assign each one a probability that events will unfold in a certain way. This move – from hindsight to true insight to foresight – empowers decision makers to act quickly, intelligently, and confidently to achieve their missions and goals.

NOTES

1. *Predictive Analytics Handbook for National Defense*, Booz Allen 2017, <https://www.boozallen.com/d/insight/thought-leadership/predictive-analytics-handbook-for-national-defense.html>

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