Business Analytics Using Big Data – A Short Time to Value

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Introduction

We are three Hampton Roads small businesses teamed to bring high quality analytics to meet your *information technology* needs. As IBM partners we have been trained by the best and have access to the world's most advanced *information technology* capabilities. We can rapidly zero in on your biggest needs and offer improved capabilities in weeks rather than months or years.

Adler Technology International (ATI) specializes in architecture and design with avant-garde thinking and functional results. Our industry-leading solution architects bring passion and enthusiasm to every project. From original user concepts to completed solutions, we have you covered. Our leadership team delivers on the promise to provide solutions that are open and user friendly. We pride ourselves on delivering excellence for our clients. We apply sound principles of design using open standard tools to deliver solutions that make sense. We look forward to working with you on your next project regardless of the size or scope.

EMB Information Technologies (EMBIT) specializes in management consulting, systems engineering, and the lifecycle management of information technology projects. Our leadership consists of retired military officers with extensive experience in command and control, testing, modeling and simulation, and agile development. We supported a major Air Force program with advanced engineering techniques to rapidly architect and integrate commercial off the shelf systems for airborne mission control. We have extensive experience in applying advanced technology to numerous information technology problems and have worked closely with IBM on multi-level security and big data applications. We implemented the first Federal Engineering Environment in IBM SoftLayer Federal Information Security Management Act (FISMA) secure cloud.

Geo-San, Inc. (GSI) is an Information Technology Hub zone small business service company located in Hampton, Virginia. GSI has a long history of dealing with NASA requirements and NASA contractors. As a volunteer Bruce Hoogstraten is heavily involved in a large credit union board of directors and presents nationally at conferences for board development.

Our Approach

We employ an Architecture-Centric Engineering[1] methodology that is guided by business drivers such as business concept of operations and key business scenarios. This allows us to rapidly develop effective solutions to meet business needs. Using our approach we help guide users to express their true requirements using scenarios as engineering abstractions and behavioral models that adapt the use of scenario threads. These actions expand the understanding of the problem through static models,

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[1] *Behavioral Models and Improved Quality in Architecture-Centric Engineering*, 3/30/2011, Peggy Brouse, Ph.D., Christopher P. Jacobson, Ph.D.

dynamic models and behavioral models that have the additional benefit of helping users to visualize the complex system and permitting them to better specify the behavior requirements. Figure 1 illustrates the Architecture-Centric Engineering methodology with business modeling on the down stroke and agile systems engineering on the up stroke.
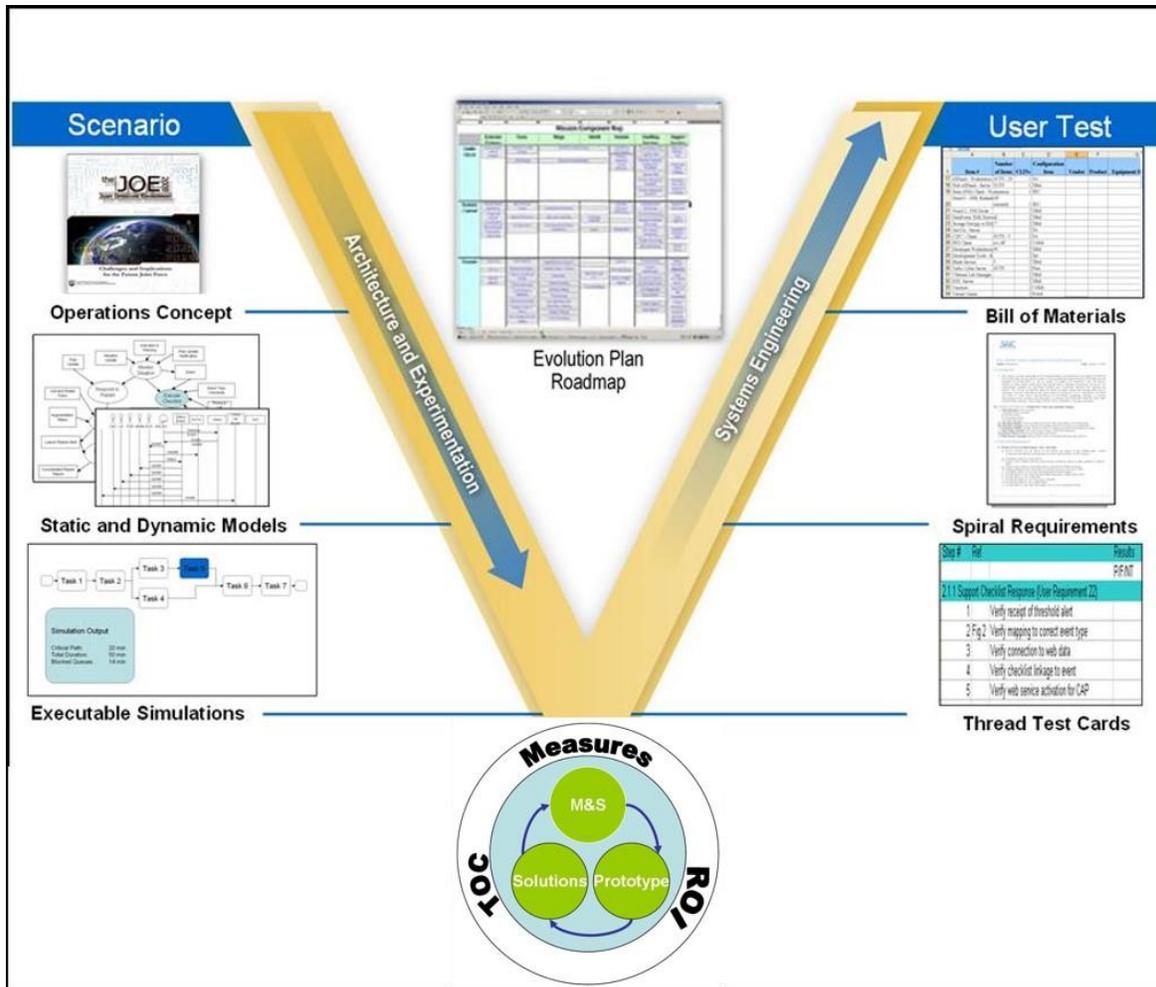
Figure 1. Architecture Centric Engineering Adaptive V Diagram

Our cutting edge agile development process focuses on satisfying the customer through early and continuous delivery of software and the ability to make changes throughout the development cycle. Because we do this in weeks rather than months or years, you receive products and updates faster and at a lower cost. We recently completed the systems engineering and modeling of a major Air Force command and control system that incorporated proscriptive analytics to fuse geospatial data for a common depiction of the environment. We completed the systems engineering and assisted in the development of a working prototype in six weeks.

The Need for Business Analytics

Have you ever observed that you, "are drowning in data but starved for information" or asked, "now that we have all this data, what do we do with it?" Organizations are working hard to determine what to do with their available data that is currently not used. This is where analytics using big data comes into play. Big data is a grand term that is difficult to comprehend but organizations understand that business analytics is becoming a business imperative.

Applying the right level of analytics depends on the problems or use cases your organization wants to address. The following are four types of analytics, each with different big data solution sets that organizations can apply to their business needs:

1. *Descriptive Analytics* or business intelligence is the ability to transform raw data into useful information by reporting on what happened and what is currently happening. This type of analysis is normally done on data at rest.

2. *Predictive Analytics* is forward-looking analysis of current and historical data (normally data at rest) that provides an organization the ability to predict what is likely to happen and why it's likely to happen.

3. *Prescriptive Analytics* goes beyond descriptive and predictive analytics to identify the best course of action for a given situation. Prescriptive analytics looks at both data at rest and data in motion. Additionally, by continually taking in new information, predictions and prescriptions are continually refined.

4. *Cognitive Analytics* extends prescriptive analytics by learning and interacting naturally with people to do what either humans or machines could not do on their own. IBM's Watson and Apple's Siri are two prime examples of cognitive analytics.

Defining Big Data

Big data is typically defined by four Vs: volume, variety, velocity and veracity. We believe there is a fifth V, and that is value. The volume of data is continually increasing in every organization. Data storage that was once measured in gigabytes (GB) is now measured in terabytes (TB) and petabytes (PB). Handling this increase in data volume is a definite big data trait. The variety of data is also on the rise. Organizations need to make sense out of volumes of structured, semi-structured and unstructured data in the course of decision making. Velocity is the rate at which data can be processed and made available for decisions. Traditionally, organizations have analyzed data at rest to predict or forecast outcomes. However, big data allows for "adaptive" analysis of not only data at rest but also data in motion. Veracity refers to the quality or trustworthiness of the data. Big data tools can transform data into

trustworthy information while discarding noise.[2]   Through analytics, the big data capabilities provide value to an organization by making good use of its information resources. This could help you in numerous areas such as security, fraud detection, regulatory compliance, marketing, customer dynamics, customer spending habits, IT performance, etc.

Getting Started

Many organizations are developing strategies to implement big data initiatives. Beyond learning about big data technologies and determining which problems big data analytics can address, organization are sometimes unsure of the next steps in implementing some form of big data technology. They encounter real problems with data that is unstructured, in diverse locations, and in different formats. There are data security issues, such as protecting personally identifiable information (PII), safeguarding sensitive information, or keeping trade secrets from leaking into the wrong hands. Additionally some organizations have a bad impression of big data because of early hype, over promises, and false starts.

Using our Architecture-Centric Engineering methodology, we can assist you in gaining a clear expectation of what your organization needs to meet your requirements. This approach will keep your big data project from turning into a huge science experiment with disappointing results. Through our analysis of your requirements we help you develop a strategy and implement the necessary big data infrastructure that provides immediate value and uses incremental building blocks to get to your desired end point

Initial Use Cases

Our team has developed use cases to address the problems associated with data formats, data security and business analytics. We tested solutions that address these problems and developed the architecture and computational strategy needed to meet various organizational needs.

Traditional approaches called for moving the data to a central location, such as a data warehouse, before it could be discovered and used. We are using big data platforms that have the ability to discover data in place within an organization's information enterprise as well as from sources outside the organization. These tools bring the analytics to the data rather than moving the data to the analytics thus allowing for faster, more accurate processing without degrading system performance, or changing the structure of the original system. We applied cognitive computing capabilities to the data that act as a "data scientist in a box." This capability allows managers to rapidly conduct their own analysis without requiring extensive technical support or setup.

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[2] Harness the Power of Big Data, Paul C. Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, David Corrigan, James Giles, 2013, pages 9 – 15

These big data tools support the indexing, searching and navigation of a diverse set of data sources that contain structured, semi-structured and unstructured data, effectively creating a virtual data layer. This virtual data layer complements rather than replaces existing data warehouses and requires minimum transformation of data formats.

These tools also incorporate the security information into the index for each data source, thereby complying with the underlying data security profile, such as PII, already in place. This ensures that users receive only the information that is authorized.

What We Offer

We offer systems development tailored to your needs. No job is too big or too small. We work in the cloud and offer cloud based big data analytics services. Our team has the expertise and experience to help you take the necessary steps on your journey to business analytics using big data. We are prepared to present a free demonstration of our business analytics and big data capabilities upon request.