IDC FutureScape

IDC FutureScape: Worldwide Big Data and Analytics 2016 Predictions

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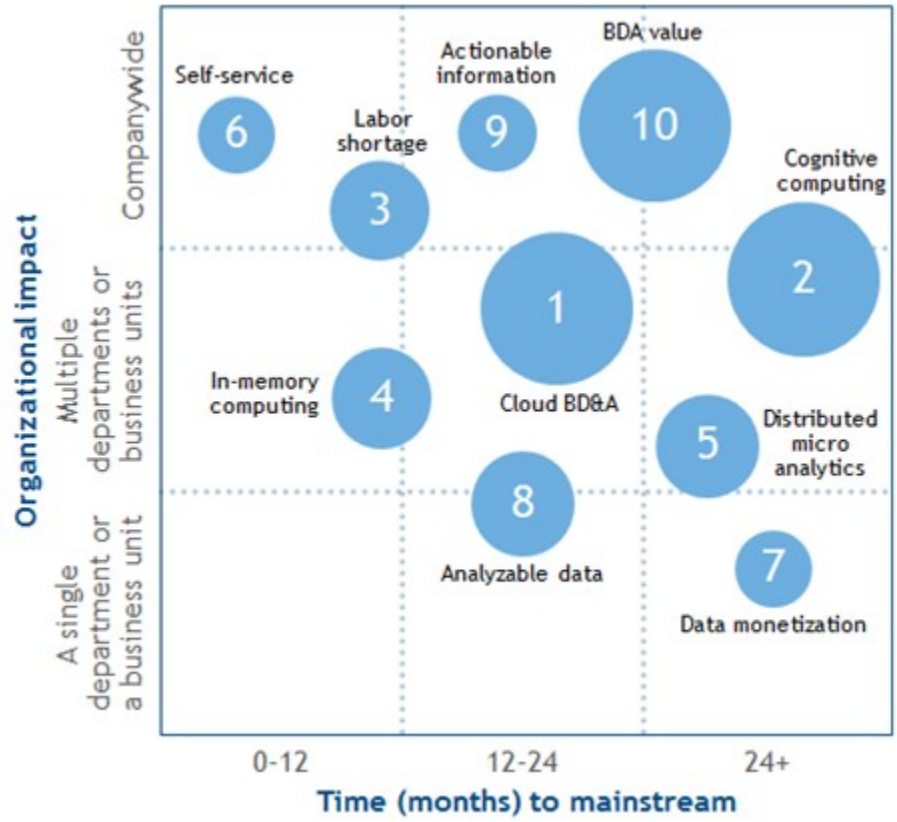
IDC FUTURESCAPE FIGURE

FIGURE 1

IDC FutureScape: Worldwide Big Data and Analytics 2016 Top 10 Predictions



Note: The size of the bubble indicates complexity/cost to address.

Source: IDC, 2015

November 2015, IDC #259835

Figure 1 presents IDC's big data and analytics top 10 predictions in terms of their likely impact across the enterprise and the time it will take for the predictions to reach mainstream. By mainstream, IDC means the broad middle of the bell curve of adoption (i.e., the 40–60% of enterprises that are neither the first movers and early adopters nor the last to act). Each bubble's size provides a rough indicator of the complexity and/or cost an enterprise will incur in acting on the prediction.

IDC OPINION

The following 10 predictions represent the expected trends with greatest potential impact on big data and analytics (BDA) initiatives:

- Through 2020, spending on cloud-based BDA technology will grow 4.5x faster than spending for on-premises solutions; open source technology will represent the core of this new architecture.
- By 2020, 50% of all business analytics software will incorporate prescriptive analytics built on cognitive computing functionality.
- Shortage of skilled staff will persist and extend from data scientists to architects and experts in data management; big data-related professional services will have a 23% CAGR by 2020.
- By 2020, 90% of databases (relational and nonrelational) will be based on memory-optimized technology.
- By 2020, distributed micro analytics and data manipulation will be part of all big data and analytics deployments.
- Through 2020, spending on self-service visual discovery and data preparation market will grow 2.5x faster than traditional IT-controlled tools for similar functionality.
- By 2020, data monetization efforts will result in enterprises pursuing digital transformation initiatives increasing the marketplace's consumption of their own data by 100-fold or more.
- By 2020, the high-value data — part of the Digital Universe (see "EMC Digital Universe Study with Research and Analysis by IDC, 2014" available at **www.emc.com/leadership/digital-universe/index.htm**) — that is worth analyzing to achieve actionable intelligence will double.
- By 2020, 60% of information delivered to decision makers will be considered by them always actionable, doubling the rate from the current (2015) level.
- By 2020, organizations able to analyze all relevant data and deliver actionable information will achieve an extra $430 billion in productivity benefits over their less analytically oriented peers.

IN THIS STUDY

In this study, the global team of IDC analysts presents the top 10 predictions affecting the big data and analytics initiatives. Each BDA prediction is assessed on the basis of its complexity, organizational impact, and time frame to expected mainstream adoption. This study offers IDC analysts' collective advice to IT and business decision makers to consider in their planning for BDA initiatives. The study also describes the key drivers affecting IT and business decision makers as they develop or revise their long-term BDA strategy and create plans for 2016 resource allocation.

SITUATION OVERVIEW

Several external factors have a direct impact on the decisions made by IT and business leaders as they develop or revise their organization's BDA strategy and plans for specific BDA projects. They come from business, social, economic, technological, environmental, legal, and political realms. IDC has identified six drivers that represent significant forces affecting the future of BDA initiatives within the enterprise. Note that although we call these six factor drivers, in some cases, they can be inhibitors.

Summary of Key Drivers

Collectively, these drivers lead to the 10 predictions discussed in this study:

- **DX:** Accelerating business disruption from digital transformation
- **Cloud life:** The merging of real life with digital identity
- **Options abundance:** Cloud x open source x value-added intellectual property
- **Promise of predictability:** The desire to "analyze the future"
- **Demand for self-service:** From data preparation to visualization
- **Talent quest:** High demand for next-generation business/IT skills – scarce supply

More information on each of the drivers can be found in the Key Drivers section of this study as well as in *Critical External Drivers Shaping Global IT and Business Planning: IDC FutureScape, 2016* (IDC #258644, September 2015).

IDC FutureScape Predictions

The sections that follow discusses the 10 predictions that represent the expected trends with greatest potential impact on BDA initiatives. They are the results of one or more drivers described in this study. Each prediction is described and assessed on the basis of its complexity, organizational impact, and time frame to expected mainstream adoption. It is followed by guidance to be considered by IT and business leaders involved in BDA initiatives.

Prediction 1: Through 2020, Spending on Cloud-Based BDA Technology Will Grow 4.5x Faster Than Spending for On-Premises Solutions

The adoption of BDA technology in the cloud has lagged behind other enterprise technologies, such as those for CRM or collaboration. However, the adoption of cloud business intelligence and analytics tools as well as data management and integration technology began to accelerate in 2014. 2015 saw an influx of cloud BDA solutions from all of the large IT vendors. With the supply constraint lifted, and a strong demand from across the market (unless prohibited by policy or regulations), IDC has raised expectations for growth in the adoption of cloud BDA solutions from 3x to 4.5x faster than on-premises deployments.

Associated Drivers

- **Options abundance:** Cloud x open source x value-added intellectual property
- **Promise of predictability:** The desire to "analyze the future"

IT Impact

- Complexity of managing on- and off-premises data and technology is going to increase and number of internal and external data sources and types will continue to increase.

- Security and privacy policies and regulations need to be well understand and weighed against potential benefits and risks.

Guidance

- Understand the core components of the particular cloud service. Although cloud-based services obscure the technology components details from the end user, it is important for organizations to understand the core components of such services. Many of the current and emerging BDA platforms are based on or have major components that are based on open source technology. Engage with your preferred cloud service provider to assess their commitment to open source and the value-add they provide with their commercial solutions. While doing so, assess the feasibility of migration from any given cloud solution providers to mitigate the risk of vendor lock-in.
- Focus on data integration, including data preparation, requirements of hybrid cloud deployments. Despite the rapid growth in cloud deployments, the vast majority of solution remain on-premises. Build a business glossary and map data being managed and moved to its elements. Otherwise, the complexity will become overwhelming.

Prediction 2: By 2020, 50% of All Business Analytics Software Will Incorporate Prescriptive Analytics Built On Cognitive Computing Functionality

Cognitive systems will be the next major disruption in the world of technology and will significantly impact businesses, healthcare, work, society, and our economies in general. Cognitive systems will cause significant changes in the way that people get advice, make purchases, and do their daily work.

Associated Drivers

- **Talent quest:** High demand for next-generation business/IT skills – scarce supply
- **Promise of predictability:** The desire to "analyze the future"

IT Impact

- Consumer expectations will enter the enterprise IT realm. Current personal services such as Apple Siri, Microsoft Cortana, and Google Now will raise expectations for employees to seek access to similar services in the enterprise.
- The use of cognitive computing systems will uncover new insights but also shed light on data in ways that may expose new data privacy and access issues.
- Involvement in the training of cognitive systems will require involvement of both content experts and IT, who will need to collaborate more closely.

Guidance

- Ensure that IT has a seat at the table when projects to train and curate content needed to train cognitive computing systems are launched.
- Initial distrust of prescriptive solution will have to be overcome with the introduction of new information governance and transparency policies and procedures.

Prediction 3: Shortage of Skilled Staff Will Extend from Data Scientists to Architects and Experts in Data Management; Big Data-Related Professional Services Will Have a CAGR of 23% Through 2020

Having BDA skills means more than employing a few data scientists. Top data architects are just as rare as great data scientists. The full analytics life cycle requires skills in BDA strategy development and project management, data preparation, management, business analysis, advanced analytics, analytic application development, hardware infrastructure deployment and management, vendor

management, performance measurement, and last but not least governance. Few organizations will be able to hire all the sufficient, high-quality staff needed to achieve desired outcomes from BDA projects. Also, the rise in automation and prescriptive functionality resulting from cognitive computing does not mean that human decision makers will relinquish accountability for ethical or legal missteps as a result of BDA efforts.

Associated Drivers

- **Talent quest:** High demand for next-generation business/IT skills — scarce supply
- **Demand for self-service:** From data preparation to visualization

IT Impact

- Business process changes will affect IT's role and impact on the organizations. There will be a need for ever closer collaboration with line-of-business colleagues.
- Unfulfilled end-user expectations will further sour the already tense relationship between business and IT at many organizations. Having the right data architecture and data and preparation skills will go a long way in ensuring the fulfillment of end-user BDA expectations.

Guidance

- Take a team approach to BDA projects. Develop competency centers with a mix of cross-functional and domain-specific skills representation. It's not only about analysis of data. Don't ignore technology skills for deploying and optimizing the big data infrastructure.
- Consider external service providers. Focus on business process enhancement or changes as an organization takes on the digital journey. Digital can't be achieve by simply adopting analytics and new technologies. Business processes need to be changed to get the desired results. Therefore, business consulting services also become critical.

Prediction 4: By 2020, 90% of Databases (Relational and Nonrelational) Will Be Based on Memory-Optimized Technology

Over the next five years, the favorable cost of memory coupled with the increase in processing power and decrease in maintenance costs will drive the adoption of memory-optimized or in-memory databases. The speed and agility of this generation of databases will replace all that came before them (since 1970s). They will enable pervasive adoption of real-time, streaming analytics — most companies will require new consulting services to respond to real-time information.

Associated Drivers

- **Options abundance:** Cloud x open source x value-added intellectual property
- **Demand for self-service:** From data preparation to visualization

IT Impact

- Memory-optimized information management technology will enable pervasive adoption of real-time, streaming analytics and the need for IT to incorporate results of this type of analytics into operational applications.
- This trend will also enable a new breed of analytic-transactional applications that embed analytics within the transactional applications and where transaction processing references analytics.

Guidance

- The new data architecture will require significant enhancements to existing applications or development of new applications that can take advantage of the new memory-based database platform.
- IT will need to ensure that data and technology are available to support the real-time information access and analysis capability.

Prediction 5: By 2020, Distributed Micro Analytics and Data Manipulation Will Be Part of All Big Data and Analytics Deployments

Distributed services focused on specific steps or individual operations in the analytics life cycle are already being brought to market. The adoption of these services for Hadoop, Spark, Graph databases, streaming data analysis, machine learning, data transformation, natural language processing, data visualization, and other functions and procedures will be broadly adopted as assembling blocks for customizable analytic applications. The distributed nature of these services will also able on-device analytics and information management in use cases like Internet of Things (IoT) and robotics.

Associated Drivers

- **Options abundance:** Cloud x open source x value-added intellectual property
- **Promise of predictability:** The desire to "analyze the future"

IT Impact

- Distributed micro analytics and data manipulation services will change how analytic applications are developed. IT will need to adjust their practices accordingly to take advantage of most appropriate services to provide their organization with tailored capabilities.
- The management of these components will initially be complicated due to the involvement of services from multiple vendors. IT will have to guide their organization's decision about which applications can tolerate such complexity.

Guidance

- Be prepared to change the development team's structure and practices to ready it for a more agile and faster development cycle that consists of assembly of fit-for-purpose components available as both cloud and on-premises services.
- Understand the inventory of micro analytics and data manipulation services available in the market, the relationship among vendor providing such services, and the underlying core component (some open source).

Prediction 6: Through 2020, Spending on Self-Service Visual Discovery and Data Preparation Market Will Grow 2.5x Faster Than Traditional IT-Controlled Tools for Similar Functionality

Through 2015, self-service in the context of BDA has been mostly associated with visual discovery. Latest demand and supply trends point to a greater recognition that self-service analytics can't exist without self-service data acquisition and preparation. Although some organizations will grapple with the expansion of self-service to the full analytics life cycle, the overall adoption of these technologies will grow significantly faster than the IT-controlled technology that does not support self-service by managers, business users, and analysts.

Associated Drivers

- **Options abundance:** Cloud x open source x value-added intellectual property

- **Demand for self-service:** From data preparation to visualization

IT Impact

- Responding to the demand for self-service BDA technology will necessitate a reassessment of current centralized IT practices.
- IT will need to recognize the full range of different BDA needs and ensure that the full technology stack or services are available to address the self-service needs of user group.

Guidance

- Because of the unpredictable nature of self-service data preparation and analysis, IT will have to incorporate more analytics into the underlying BDA platform to ensure workload requirements are met with minimal ongoing maintenance costs.
- IT should focus on data governance, security, training, and vendor management and not attempt to prescribe all the needed end-user technologies.

Prediction 7: By 2020, Data Monetization Efforts Will Result in Enterprises Pursuing Digital Transformation Initiatives Increasing the Marketplace's Consumption of Their Own Data by 100-Fold or More

Organizations are learning to monetize their information by using advanced analytics techniques and processes to locate, identify, curate, and enhance data from the Web, Internet of Things, geolocation, commercial transactions, and many other places/services. The ability to do so will grow rapidly as data develops in many cases into a unit of measure, a store of value, and a medium of exchange.

Associated Drivers

- **Cloud life:** The merging of real life with digital identity
- **Options abundance:** Cloud x open source x value-added intellectual property

IT Impact

- Packaging and pricing methods for licensing data to third parties will need to be developed that are germane to the type of data and industry being served.
- Securing, masking, and cleansing data will be required to prepare it for sale.

Guidance

- IT will need to participate in data governance and privacy committees.
- IT will need to support systems focused on making data and value-added content available to external parties.

Prediction 8: By 2020, the High-Value Data — Part of the Digital Universe — That Is Worth Analyzing to Achieve Actionable Intelligence Will Double

The adoption of the new generation of text, audio, video, image, and sensor data analytics technology as well as applications of machine learning will radically improve the ability of technology and people to separate signal from noise. Such applications in manufacturing, energy, healthcare, government, and retail will expand across all industries. Digital Universe: See "EMC Digital Universe Study with Research and Analysis by IDC, 2014" available at **www.emc.com/leadership/digital-universe/index.htm.**

Associated Drivers

- **Cloud life:** The merging of real life with digital identity

- **DX:** Accelerating business disruption from digital transformation

IT Impact

- IT groups will have to become knowledgeable in data management and analytics technology that addresses many forms of unstructured content.
- The use of rich media analytics will have a significant impact on BDA infrastructure (storage and compute) investment.

Guidance

- Image, video, and audio analytics technology and vendors providing these solutions need to be considered as part of the broader BDA technology portfolio.
- Data architecture will need to consider rich media data as yet another critical data set. The skills to do so will need to be developed.

Prediction 9: By 2020, 60% of Information Delivered to Decision Makers Will Be Considered by Them Always Actionable, Doubling the Rate from the Current (2015) Level

Advances in and adoption of predictive analytics, cognitive computing, and analytic-transactional data platforms and applications (enabled by in-memory computing) will ensure that actionable information is delivered to decision makers including executives, managers, front-line employees, and increasingly automated systems.

Associated Drivers

- **Promise of predictability:** The desire to "analyze the future"
- **Demand for self-service:** From data preparation to visualization

IT Impact

- Current data delivery methods and practices that rely mostly on reports and dashboards fail to delivery actionable information to most internal users. This negatively impacts IT's value proposition and relationship with business users.
- The definition of actionable incorporates factors about data such as timely, trusted, high quality, complete, and granular. IT role has to expand to encapsulate processes and technology to ensure high level of all of these factors.

Guidance

- It's critical that BDA projects can be tied to business value and vision to ensure information derived from BDA projects is considered actionable.
- Delivery of actionable information should be viewed across the enterprise – not just to analysts. Today, frontline employees are least supported with actionable information – a shortcoming that should be addressed by integrating analytics with transactional or operational solutions.

Prediction 10: Organizations That Analyze All Relevant Data and Deliver Actionable Information Will Achieve Extra $430 Billion in Productivity Gains Over Their Less Analytically Oriented Peers by 2020

Companies and organizations that are able to take greatest advantage of the data by analyzing all relevant data and ensuring the results of the analysis are actionable will reap greater benefits than their peers or competitors. One of the benefits these more analytically oriented organizations will

achieve is an extra $430 billion in productivity gains over less analytically oriented organizations. This figure does not include the additional benefits derived from increased revenue and decreased costs.

The productivity benefits will be further augmented with benefits to higher revenue and lower costs. Ongoing assessment and quantification of business benefits due to BDA solutions is not a trivial task and not performed by everyone. Twice as many organizations that are more data driven and more analytically oriented than their peers have ongoing business benefit assessment practices. 92% and 84% of organizations, respectively, cited that as a result of recent BDA projects, revenue increased or costs decreased at least as expected (source: IDC's *Big Data and Analytics MaturityScape Benchmark Survey* conducted in mid-2015).

Associated Drivers

- **Cloud life:** The merging of real life with digital identity
- **DX:** Accelerating business disruption from digital transformation

IT Impact

- The performance gap between more analytically oriented and data-driven organizations and their less data-savvy peers will widen. In the commercial sphere, the true competitive advantage will start manifesting itself in financial metrics.
- The success of organizations that achieve outsized benefits will place additional requirements on IT to make BDA solutions more pervasively available and participate in new forms of agile experimentations that continuously evaluate new solutions, including the performance, scalability, and functionality.

Guidance

- IT should play a more active role in measuring the impact of better data and analytics.
- IT should play a more active role in acting as a center of knowledge sharing to ensure BDA best practices are effectively disseminated across the enterprise.

ESSENTIAL GUIDANCE

The big data and analytics technology market encompasses a broad range of technology and services that are deployed to support or automate decision-making processes. IDC summarizes the following guidance for IT and business leaders involved with BDA initiatives:

- **Recognize the range of use cases and deliver in fit-for-purpose technology.** Some users will require information based on descriptive functionality, others will require it to be based on predictive or prescriptive functionality. While there remain many distinct segments of end users, such as data scientists, business analysts, operational employees, and managers (and several subsegments within each of those segments), there is also growing evidence of blended roles. BDA is a "team sport" and organizational structure, behavior, and technology must accommodate this view.
- **Focus on data integration.** The next five years will be all about data integration. Rapid growth in cloud-based BDA solution deployments, availability of greater variety of data, and emergence of an economy based on data monetization will require a sharp focus on integrating, cleansing, securing, and governing of diverse data sets.
- **Respond to the demand for self-service data access and analysis.** Self-service in this context is not only visual discovery, it also has to reach back to self-service data acquisition and

preparation. View self-service as a must-have capability to enable rapid experimentation across business analytics and big data processes.

- **Consider the emerging BDA information management architecture that is expanding from the commonly used relational data warehouse to Hadoop, NoSQL databases, and streaming analytics technology.** The rest of the business analytics software stack has to accommodate this information management platform expansion. Ensure that your team includes not only good data scientists and business analysts but also good data architects and data preparation experts.
- **Enable operationalization of analytics by ensuring results of analysis reach the appropriate operational systems and employees.** Analytics is not an end in itself but rather a step in the process of decision making and execution. BDA solutions need to ensure that actionable information is delivered to the full range of operational or transactional solutions.

KEY DRIVERS

Many external factors have a direct or an indirect impact on the decisions made by IT and business leaders as they work on BDA strategy and plan for specific BDA projects. They come from business, social, economic, technological, environmental, legal, and political realms. IDC has identified six drivers that represent significant forces affecting the future of BDA initiatives within the enterprise. Collectively, these drivers lead to the 10 predictions.

The first two drivers represent the idea of digitization of everything. The increase in the number of data producers – whether people, organizations, or things – is driving greater demand for data capture, management, and analysis technology and services. These drivers relate to the digitization of the enterprise and consumer processes, respectively, and the resulting abundance of data.

DX: Accelerating Business Disruption from Digital Transformation

Digital transformation (DX) experimentation for businesses goes mainstream and creates new business models with a seamless global reach. DX becomes a competitive requirement and the source of a massive wave of new investments in digitalizing business operations, communications, and services.

Cloud Life: The Merging of Real Life with Digital Identity

All forms of personal data become available in the cloud, including financial, work, health, location, and family, and are increasingly managed as a single digital entity that people routinely interact with, update, share, and manage as part of everyday life. Business systems use their knowledge about an individual's personal habits and preferences to customize experiences and replace other people as trusted advisors.

Options Abundance: Cloud x Open Source x Value-Added Intellectual Property

BDA solutions are becoming more accessible as options for payment terms and deployed methods expand. Purpose-built tools and applications allow departments to purchase just the functionality they need for a particular use case rather than implement a one-size-fits-all enterprise solution. The technology can be deployed on-premises, but options for subscription and device-based pricing can bring the barrier to entry down. Furthermore, alternative deployment options, such as cloud, allow buyers to skip the step of procuring and standing up new hardware. The wide array of options will help drive adoption of BDA solutions.

Promise of Predictability: The Desire to "Analyze the Future"

Organizations across industries are seeking predictability across all fronts, including customer interaction, cash management, service delivery, and product development and support. Growth in subscription pricing is one manifestation of this trend; another is the demand for a range of applications with predictive functionality. These include applications across all business function from asset maintenance and process optimization to customer interaction and risk management, but they are now also emerging in core business intelligence and data management technology.

Demand for Self-Service: From Data Preparation to Visualization

The majority of analysis is usually delivered in reports or dashboards, which answer predefined questions. Self-service analytics and data discovery tools are moving analytic capabilities into the hands of business users. This is fundamentally changing how organizations interact with data, how they develop new hypothesis and scenarios, and how they react to changes in the market. This driver is beginning to affect not only the "last mile" data visualization and exploration software but also the data acquisition and preparation steps of the full analytics life cycle.

Talent Quest: High Demand for Next-Generation Business/IT Skills — Scarce Supply

The ability to acquire 3rd Platform (BDA, cloud, mobile, social) competency is constrained by a talent pool that is growing too slowly to meet business demand and too concentrated geographically to access for many enterprises. Scarce IT skills are concentrated generationally, requiring leadership to manage distinct demographic workstyles and expectations about career and the future. Jobs optimized for robotic machine intelligence and repetitive work impact a growing segment of the talent pool.

LEARN MORE

Predictions presented in this study are a direct results of in-depth market research performed by the IDC big data and analytics analysts in a range of software, IT services, and IT infrastructure areas. The following list of related research studies provides an in-depth view into the predictions addressed in this IDC FutureScape.

Related Research

- *Worldwide Big Data Technology and Services Forecast, 2015-2019* (IDC #259532, October 2015)
- *Market Analysis Perspective: Worldwide Business Analytics Software, 2015* (IDC #259560, October 2015)
- *Worldwide Storage in Big Data Forecast, 2015-2019* (IDC #259205, October 2015)
- *Market Analysis Perspective: Worldwide Data Management Software, 2015* (IDC #259448, October 2015)
- *Worldwide Cognitive Software Platforms Forecast, 2015-2019: The Emergence of a New Market* (IDC #258781, September 2015)
- *IDC MaturityScape: Big Data and Analytics* (IDC #255138, June 2015)
- *IDC MarketScape: Worldwide Business Analytics Services 2015 Vendor Assessment* (IDC #255276, April 2015)

- *IDC's Worldwide Storage for Big Data and Business Analytics Taxonomy, 2015* (IDC #254025, February 2015)
- *Market Analysis Perspective: Worldwide Technical Computing (HPC) Servers, 2015 – Growth and Change: The Market for High-Performance Computing and High-Performance Data Analysis* (IDC #259211, September 2015)

Synopsis

This IDC study offers IDC analysts' collective advice to IT and business decision makers to consider in their planning for big data and analytics (BDA) initiatives. The study also describes the key drivers affecting IT and business decision makers as they develop or revise their long-term BDA strategy and create plans for 2016 resource allocation. In this study, the global team of IDC analysts presents the top 10 predictions affecting the big data and analytics initiatives. Each BDA prediction is assessed on the basis of its complexity, organizational impact, and time frame to expected mainstream adoption.

"Big data and analytics solutions present a potential for significant business value," says Dan Vesset, program VP, Business Analytics and Big Data. "Organizations that are able to take advantage of the most important trends will be prepared to reap new benefits and overcome challenges provided by big data and analytics solutions."

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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