

MARKET ANALYSIS

Worldwide Big Data Technology and Services 2012–2015 Forecast

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IDC OPINION

The challenges of data management and analytics in the intelligent economy are likely to overwhelm organizations that are not conversant with Big Data technologies. IDC's year-long study of the uses and market for Big Data technology has demonstrated that each use case requires different combinations of software, hardware, and services to be most effective. The widespread adoption of Big Data technologies outside of high-performance computing (HPC) has only begun, but emerging trends suggest the development of a fast-growing market that is expected to accelerate rapidly. Findings include:

- ☑ IDC expects the Big Data technology and services market to grow from \$3.2 billion in 2010 to \$16.9 billion in 2015. This represents a compound annual growth rate (CAGR) of 39.4% or about seven times that of the overall information and communication technology (ICT) market.
- ☑ Opportunities for vendors will exist at all levels of the Big Data technology stack including infrastructure, software, and services.
- ☑ Organizations that have begun to embrace Big Data technology and approaches are demonstrating that they can gain competitive advantage by being able to take action based on timely, relevant, complete, and accurate information, rather than guesswork.

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IN THIS STUDY

This study examines the Big Data technology and services market for the period from 2010 to 2015. Worldwide market sizing is provided for 2010, and a five-year growth forecast for this market is shown for 2011–2015. The Big Data market is an aggregation of storage, server, networking, software, and services market segments, each with several subsegments.

Methodology

Big Data Definition

The intelligent economy produces a constant stream of data that is being monitored and analyzed. IDC estimates that in 2011, the amount of information created and replicated surpassed 1.8ZB (1.6 trillion gigabytes). Social interactions, mobile devices, facilities, equipment, R&D, simulations, and physical infrastructure all contribute to the flow. In aggregate, this is what is called Big Data.

IDC defines Big Data technologies as a new generation of technologies and architectures designed to extract value economically from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and/or analysis.

For a more detailed discussion of the four Vs — volume, variety, velocity, and value — of the Big Data definition, see *IDC's Worldwide Big Data Taxonomy, 2011* (IDC #231099, October 2011).

Most Big Data market analysts, vendors, and users agree on another often-quoted part of the definition of Big Data — data sets that grow so large or so fast that they are difficult to handle using traditional technology. However, this definition neglects to specify "large," "fast," or "traditional."

In 2011, IDC initiated an interdisciplinary internal special interest group consisting of analysts from the software, servers, storage, networking, and services groups. What followed were several months of primary and secondary research, extensive discussions with technology vendors and buyers, and ongoing debates among analysts. The results of the analysis have led us to the market sizing criteria detailed in the sections that follow.

Big Data Market Sizing Criteria

Following the IDC Big Data definition, we created criteria to determine whether a use case and associated technology and services should be included in the Big Data market sizing. The criteria and the three steps for evaluating use cases are depicted in Figure 1.

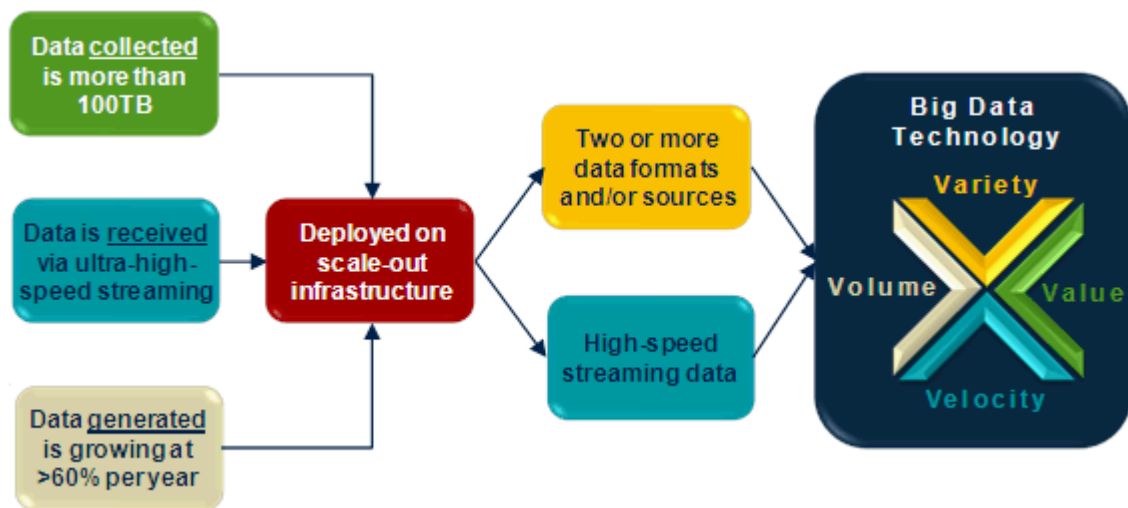
☒ Step 1 evaluates three scenarios:

- ☐ Deployments where the data collected is over 100TB (We're using data *collected*, not *stored*, to account for the use of in-memory technology where data may not be stored on a disk.)

- ❑ Deployments of ultra-high-speed messaging technology for real-time, streaming data capture and monitoring (This scenario represents Big Data in motion [as opposed to Big Data at rest]).
- ❑ Deployments where the data sets may not be very large today but are growing very rapidly at a rate of 60% or more annually
- ☒ Step 2 evaluates whether for each of the three scenarios of Step 1, technology is deployed on scale-out infrastructure.
- ☒ Step 3 evaluates two scenarios:
 - ❑ Deployments that include two or more data types or data sources
 - ❑ Deployments that include high-speed data sources such as click-stream tracking or monitoring of machine-generated data

FIGURE 1

IDC's Big Data Technology and Services Market Sizing Criteria



Source: IDC, 2012

For example, very large data stores (regardless of technology [i.e., could be relational or nonrelational]) that are currently over 100TB, that are deployed on scale-out architecture, that incorporate data from two or more sources and/or of two or more formats, or where data is collected at a fast rate are included in the Big Data market sizing. Also included are data stores that are less than 100TB but that are growing at 60% or more annually, that are deployed on scale-out infrastructure and incorporate data from two or more sources and/or of two or more formats, or where data is collected at a fast rate.

Exclusions and Future Forecasts

Note that the current IDC Big Data market sizing and forecast excludes cloud infrastructure services purchased by enterprises and used for Big Data deployments. However, Big Data applications that are cloud based such as sentiment analysis of social media are included.

Because of the rapidly developing nature of this market, IDC will be reviewing the methodology, forecast assumptions, and vendor revenue on an ongoing basis, with the initial expectation of releasing an updated market sizing and forecast in mid-2012.

Note: All numbers in this document are not exact due to rounding.

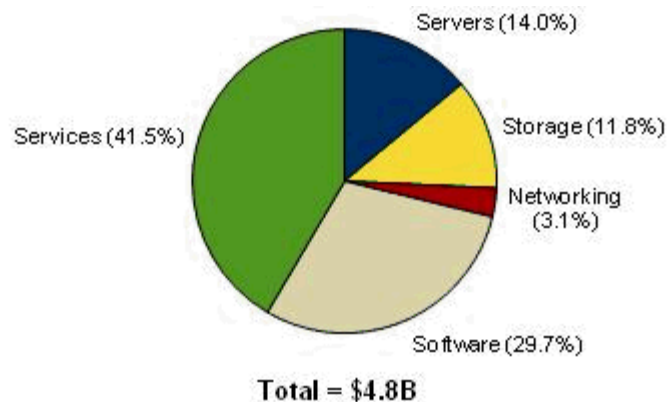
SITUATION OVERVIEW

The Big Data Market Today

In 2011, the Big Data technology and service market was \$4.8 billion. Figure 2 depicts the distribution of the market by segment.

FIGURE 2

Worldwide Big Data Technology and Services Revenue Share by Segment, 2011



Source: IDC, 2012

Further, each market segment is composed of several segments that make up the Big Data technology stack, as shown in Figure 3. In each segment, only the portion of revenue that can be attributed to Big Data uses contributes to the \$4.8 billion market size.

FIGURE 3

Big Data Technology Stack



Source: IDC, 2012

Infrastructure includes the Big Data portions of:

- ☒ External storage systems purchases by enterprises and cloud service providers and direct purchases of HDDs by select large cloud service providers (It also includes supporting storage software for device, data replication, and data protection of Big Data storage assets. Internal storage installed directly on servers is included in the server segment, not the storage segment of the market sizing.)
- ☒ Server revenue (including internal storage, memory, network cards) and supporting system software as well as spending for self-built servers by large cloud service providers
- ☒ Datacenter networking infrastructure used in support of Big Data server and storage infrastructure (Specifically, this forecast models spending based on IDC's research into the following markets: Ethernet switches, Fibre Channel switches, InfiniBand switches, and application delivery.)

Software includes the Big Data portions of:

- ☒ Data organization and management software, including parallel and distributed file systems with global namespace, highly scalable (size and structure) relational database, key-value pair (KVP) data store, graph database, XML databases, object-oriented databases, dynamic application data stores and caches, data integration, event-driven middleware, and others
- ☒ Analytics and discovery software, including search engines used for Big Data applications, data mining, text mining, rich media analysis, data visualization, and others

- ☒ Decision support and automation software including business process or industry-specific applications such as for Web clickstream analysis, fraud detection, logistics optimization, and others

Services includes business consulting, business process outsourcing, plus IT project-based services, IT outsourcing, and IT support, and training services related to Big Data implementations.

Big Data technology use cases receiving the most attention in the media tend to focus on online media and social networking companies. However, the cases we have observed from IDC clients and secondary sources point to a broad adoption across industries, geographies, and business processes.

Big Data Use Cases

Figure 4 depicts a sample of these use cases. Three dimensions on which to evaluate such use cases — activity, business process, and industry — are discussed in the sections that follow.

FIGURE 4

Big Data Technology and Services Sample Use Cases



Source: IDC, 2012

Activity

Not all applications of Big Data technologies are for analysis of data. Some are used for deploying Web sites for social media or gaming applications, and others are used for large content stores that provide information access to massive amounts of documents. Examples include:

- ☒ Analytics (e.g., data mining, multi-dimensional analysis, data visualization)
- ☒ Operations (e.g., running a Web site, processing online orders)
- ☒ Information access (e.g., search-based access to information, normalization, and access across content and data sources)

Business Process

Big Data technologies are being deployed in support of processes within commercial, nonprofit, or government organizations. The challenges and problems organizations face are not Big Data challenges but rather business or organizational challenges that are impacted by Big Data. Big Data technology deployment cases can be found across business processes such as:

- ☒ Customer relationship management (sales, marketing, customer service, etc.)
- ☒ Supply chain and operations
- ☒ Administration (focused on finance and accounting, human resources, legal, etc.)
- ☒ Research and development
- ☒ Information technology management
- ☒ Risk management

Industry

In addition to cross-industry process such as finance, marketing, and information technology management, there are a multitude of industry-specific applications. A short sample of these includes:

- ☒ Logistics optimization in the transportation industry
- ☒ Price optimization in the retail industry
- ☒ Intellectual property management in the media and entertainment industry
- ☒ Natural resource exploration in the oil and gas industry
- ☒ Warranty management in the manufacturing industry
- ☒ Crime prevention and investigation in local law enforcement

- ☒ Predictive damage assessments in the insurance industry
- ☒ Fraud detection in the banking industry
- ☒ Patient treatment and fraud detection in the healthcare industry

FUTURE OUTLOOK

Forecast and Assumptions

The Big Data market is emerging at a rapid pace and incorporating technology and services from a wide range of existing and new market segments. Although there are multiple scenarios that could unfold and many demand and supply variables remain in flux, we expect the market to exhibit strong growth over the next five years.

Worldwide Big Data Technology and Services Market Forecast, 2010–2015

IDC's estimate of the growth of the Big Data market through 2015 is presented in Table 1. The worldwide CAGR for the market through the five-year period is expected to be 39.4%. However, the growth of individual segments of the market varies from 27.3% for servers to 61.4% for storage.

The high CAGR for storage compared with other infrastructure components is attributable to the current dual use of storage in Big Data environments. The most well-known use case today is the use of low-cost/high-capacity HDDs and DAS systems as a shared-nothing cache for servers in Hadoop (and similar applications) grids. This "brute force" use case is a major driver of storage demand today, although future solutions may moderate the use of such an approach. Compensating for such a change is the growing demand for storage systems functioning as archival storage systems that are installed to enable sustained reanalysis of data for months or years.

Table 2 displays the current and expected penetration rates of Big Data technology and services as a percentage of the respective total market segments. For example, in 2011, Big Data server market size represents 1.2% of total worldwide server market size. By 2015, this penetration rate is expected to increase to 2.9%.

TABLE 1

Worldwide Big Data Technology and Services Revenue by Segment,
2010–2015 (\$M)

	2010	2011	2012	2013	2014	2015	2010–2015 CAGR (%)
Servers	495.0	665.0	802.8	1,031.6	1,270.2	1,657.2	27.3
Storage	317.5	560.3	1,224.1	1,968.1	2,719.1	3,479.2	61.4
Networking	106.0	146.0	242.0	368.0	485.0	620.0	42.4
Software	1,062.3	1,415.4	1,851.0	2,476.8	3,367.9	4,625.9	34.2
Services	1,236.3	1,979.0	2,721.8	3,883.3	5,098.5	6,537.8	39.5
Total	3,217.1	4,765.7	6,841.7	9,727.8	12,940.7	16,920.0	39.4

Note: See Table 3 for top 3 assumptions and Table 4 for key forecast assumptions.

Source: IDC, March 2012

TABLE 2

Worldwide Big Data Technology and Services Penetration Rates by Segment,
2010–2015 (%)

	2010	2011	2012	2013	2014	2015
Servers	0.9	1.2	1.5	1.8	2.3	2.9
Storage	0.9	1.4	2.9	4.4	5.6	6.8
Networking	1.1	1.5	2.3	3.2	4.0	4.8
Software	0.5	0.6	0.8	1.0	1.2	1.6
Services	0.2	0.2	0.3	0.4	0.5	0.6

Note: See Table 3 for top 3 assumptions and Table 4 for key forecast assumptions

Source: IDC, March 2012

Forecast Assumptions

The top 3 forecast assumptions for the Big Data market are shown in Table 3.

TABLE 3**Top 3 Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Economy	The global economy will be broadly stable but tepid in 2012, with the crisis in Western Europe casting a shadow. Worldwide GDP growth will be around 2.5%, weighed down by Europe. Short-term prospects for the U.S. economy have improved a little since CY 4Q11, and Japan will continue its recovery from the earthquake and tsunami. In Western Europe, the economy will flatline at 0% because of weak business and consumer confidence and the impact of austerity measures. Some countries in Europe have already entered a recession, and more countries could follow. Emerging markets have so far remained relatively resilient, but a downside scenario (unraveling of the European single currency) could derail momentum in all regions.	Strong correlation between the economy and IT expenditures will impact IT budgets. A down economy affects business and consumer confidence, the availability of credit and private investment, and internal funding. A recession would cause businesses to delay IT upgrades and some new projects; a rising economy does the opposite.	If the economy falters during the forecast period in mature economies, it will impact future forecasts. Significant shifts in the economy during the forecast period will prompt a review of market forecasts.	At this time, key unknowns are the impact of Japan's recovery from natural disasters, unrest in the Middle East, and the stability of the European economy.

TABLE 3**Top 3 Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Big data technology	IT vendors will continue to overinvest in products that address Big Data market demands.	Lack of a supply of appropriate technology will inhibit market growth, while improvements to existing technology and development of new technology will enable more buyers to take advantage of Big Data technology and services.	A decrease in R&D spending and slowdown in venture capital funding could have an adverse effect on the supply of Big Data technology. Shortage of skilled labor may inhibit availability of Big Data services.	The speed with which some of the new Big Data technologies will be transformed into enterprise-ready solutions that address not only scalability, but also performance, integration, security, and governance requirements will impact adoption.
Big Data skills availability	Big Data technology and analytics training and education efforts by private companies, government agencies (in certain countries), and universities will accelerate to alleviate some of the labor shortage.	The availability and the skill level of Big Data IT and analytics talent have a direct impact on the Big Data market. In the long run, the optimization of the slow-growth labor pool argues for cloud computing.	If training and education efforts by private companies, government agencies (in certain countries), and universities proceed at the current pace, they will likely alleviate some of the labor shortage. Otherwise, labor shortage will remain a major growth inhibitor. The pace of adoption of cloud-based Big Data solutions will also affect the current forecast.	Unknowns include the extent to which organizations will be willing to seek external services, including cloud services, for their Big Data efforts and the commitment of higher-education industry to incorporating more analytics and Big Data technology studies in their curriculum.

Source: IDC, March 2012

Additional key trends and forecast assumptions that will impact the Big Data market in the foreseeable future include:

- ☒ By 2020, when the ICT industry reaches \$5 trillion, it will be \$1.7 trillion larger than it is today. At least 80% of the industry's growth will be driven by 3rd-platform technologies (mobile broadband, social business, cloud services, and Big Data and analytics), an explosion of new solutions built on the new platform, and rapidly expanding consumption of all of the above in emerging markets. The ICT market winners of 2020 will be determined by the investments being made in 2012.

- ☒ The "digital universe" will grow to 2.7ZB in 2012, up 48% from 2011 and rocketing toward nearly 8ZB by 2015.
- ☒ Information overload and the high cost of finding the right information are significant issues for many organizations and present an opportunity that can be addressed with Big Data technology.
- ☒ Within 24 months, the number of intelligent communicating devices on the network will outnumber traditional IT devices. Near-field communication (NFC) will gain traction as a last-mile connection. Microblogging technology will allow people to follow objects and services.
- ☒ The foundation for the intelligent economy will be laid in 2012 with acceleration of efforts to develop smart cities, smart healthcare, smart government, and smart energy.
- ☒ Major IT vendors will increasingly offer both database solutions and configurations supporting Big Data, including Hadoop (and other MapReduce architectures) plus graph databases and Big Analytics. This will come by evolving their own products as well as by acquisition. Already over half a billion in venture capital has been invested in new Big Data technology vendors. The preferred exit strategy for most of these investors will be acquisition by large IT companies. Over the next five years, areas of acquisition will include visual discovery, predictive analytics, and open source-based data management and analytic solutions (including those based on Hadoop and NoSQL databases).
- ☒ The segment of the Big Data market that is based on open source technologies will develop along the lines established by the development of the Linux ecosystem, where much of the revenue will be accrued by hardware and applications and application development and deployment software vendors. There are a large number of open source projects offering Big Data technology that does largely the same thing. Within a few years, most of these will be relegated to the category of obscure technologies for specialized practitioners as commercial vendors take over the Big Data market. Others will become casualties of large IT vendors' entry into the market either through their own R&D or acquisitions.
- ☒ Big Data appliances that include integrated software and hardware will expand rapidly, partly as a response to alleviate the deficit in expert IT skills associated with optimizing hardware and software to work together for Big Data workloads. These Big Data appliances will be deployed both on-premises and in the cloud.
- ☒ Buyers of Big Data technology will include not only end users but also service providers that will in turn provide value-added services — often industry-specific services — to end users.
- ☒ Vendors that dominate the database discussion for large enterprises, such as Oracle, IBM, and Microsoft, will continue to do so, extending their reach to include Big Data initiatives. Expect small open source technology owners and distributors to get swallowed up in the process. There is room for some new

competitors to emerge, but as is often the case, these will tend to cater to niche cases or will be acquired eventually by one of the large IT vendors.

- ☒ Unified information access platforms will emerge to knit together information silos across the enterprise, no matter the format or the content. They will be complex because of this variety and will need to account for all the disparate security, archiving, and access features of each source repository, to say nothing of multiple schemas and mismatched terminology. These platforms combine elements of database, business intelligence, and search technologies. They are capable of indexing and integrating large volumes of unstructured, semistructured, and structured information into a unified environment for information gathering, analysis, and decision support.
- ☒ Advanced analytics will gain in prominence, which will increase the number of analytic applications that incorporate predictive models. One of the inhibitors of growth for standalone advanced analytics tools is the insufficient number of analysts with appropriate skills. Technology vendors, buyers, and universities are aware of this shortage, and they have already begun to address it. There are already a growing number of academic programs focused on advanced analytics. While extremely important, this change in the education system will take years if not decades to develop. In the mean time, vendors are beginning to address the challenge and the opportunity to focus their R&D efforts on prebuilt analytic applications that incorporate advanced analytics. Analytic service providers are another emerging set of key players in the Big Data market.
- ☒ Some organizations will discover that Big Data solutions create new opportunities to launch additional lines of business that are focused on selling information as well as analytic services based on the data.
- ☒ These new techniques require a different expertise that is not widely available. Today there is a shortage of trained Big Data technology experts (in addition to a shortage of analytics experts). This will inhibit adoption and use of Big Data technologies, and it will also encourage vendors to deliver these technologies as cloud-based solutions. Vendors that can develop easy-to-use tools for nonexperts will have a ready market. The labor shortage will be a market inhibitor for the foreseeable future.
- ☒ Big Data services will be provided by large systems integrators and consulting firms as well as a long tail of smaller regional and local specialty firms. The Big Data services opportunities will span a broad range of IT, analytics, and business process-related professional services.
- ☒ IT managers will take a proactive approach to planning their network architecture in support of Big Data projects. As a result, the network will serve as the central unifying foundation that enables the interconnectivity between existing investments and newer Big Data projects.

Table 4 includes a broader set of key forecast assumptions underlying IDC's forecast of the Big Data market.

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Macroeconomics				
Economy	<p>The global economy will be broadly stable but tepid in 2012, with the crisis in Western Europe casting a shadow. Worldwide GDP growth will be around 2.5%, weighed down by Europe. Short-term prospects for the U.S. economy have improved a little since CY 4Q11, and Japan will continue its recovery from the earthquake and tsunami. In Western Europe, the economy will flatline at 0% because of weak business and consumer confidence and the impact of austerity measures. Some countries in Europe have already entered a recession, and more countries could follow. Emerging markets have so far remained relatively resilient, but a downside scenario (unraveling of the European single currency) could derail momentum in all regions.</p>	<p>High. A down economy affects business and consumer confidence, the availability of credit and private investment, and internal funding. A recession would cause businesses to delay IT upgrades and some new projects; a rising economy does the opposite.</p>	↔	★★★★☆☆

TABLE 4
Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Fiscal stimulus packages	Stimulus spending probably helped many economies avoid a longer, deeper recession after the financial crisis. The positive benefits gradually waned during 2011, however. Tighter fiscal policy in most economies will likely have a contractionary effect on private demand and economic activity in the short term. Austerity programs in Europe are already impacting business and consumer confidence. If the global economy takes a turn for the worse, China and other countries may try to enact another round of stimulus measures, but their impact would be more muted this time around.	Low. The stimulus packages and bailouts seemed to avert disaster after the financial crisis, but the positive benefits have waned, and enacting another round of stimulus will be more difficult if Europe lurches into a severe recession. We believe the GDP forecasts have accounted for the most likely government actions.	↔	★★★★☆
Crisis duration/ potential relapse	The recovery panned out much as expected in 2010, but in 2011, the crisis in Europe raised the possibility of a double-dip recession. There are still numerous risk factors that might impact a vulnerable global economy, and the probability of relapse has fluctuated over the past 12 months. Even if the downside scenarios are avoided, the strong momentum of the 2010 recovery has been stymied, primarily because of the debt crisis in Western Europe and weak job creation in other mature economies. While we don't yet assume a double-dip global recession, the perceived risk is still impacting business and consumer confidence.	High. The long duration of the global recession created pent-up demand for IT products and services, but the recession's severity created a persistent air of caution on the part of buyers. If businesses come to believe the crisis is over, they may loosen their purse strings for more long-term projects. However, this would be dampened by a sense that the crisis has given way to a period of long-term weaker growth. Even worse, a return of "crisis mode" triggered by events in Europe could plunge the global economy back to square one.	↓	★★★★☆

TABLE 4
Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Oil prices	Oil prices will remain high in 2012, with some bumps in the road as a result of fluctuating demand amid supply risk factors. Political instability in oil-producing countries has added to the sense of volatility around energy prices, while soaring demand from emerging economies including China's continues to drive prices. Our baseline assumption is that oil prices will remain within a range that doesn't derail the economic recovery, but high energy costs could certainly exacerbate the negative impact of weaker GDP growth in vulnerable European economies and will also make monetary policy less supportive.	Moderate. While lower oil prices help spur lagging consumer spending, higher prices signal that demand is rising. If prices rise too quickly and spur demands for wage increases and pass through to end users, this can be disruptive for the overall economy.	↔	★★★★☆
Policy	New regulation of financial markets will not require wholesale revamping of IT systems as with Basel II or Sarbanes-Oxley.	Low. Compliance spending seems to be funding itself through better-run business operations and, in fact, is spurring other IT initiatives.	↔	★★★★☆
Profits	Corporate profits have begun to soften in recent months, although positive growth is still anticipated in 2012. Expectations are now weaker than they were in CY 3Q11, especially in the United States and in Europe. On the plus side, many businesses are still sitting on large amounts of cash after two strong years of profitability. On the downside, weakening profits make it less likely that those firms will tap into that cash to invest in new IT projects.	Moderate. IDC expects the traditional two-quarter lag from positive profit growth to investment in ICT to continue. If profits remain relatively subdued, this will keep many businesses in a mode of caution (particularly with regard to long-term commitments). If profits begin to surge again, this will drive some businesses to tap into their cash reserves.	↔	★★★★☆

TABLE 4
Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Geopolitics	Political instability in the Middle East is still a wild card to monitor, although it's too early to tell if this will have a significant impact on the global economy. An obvious risk is any effect on oil supply and prices related to conflict in Iran. Our baseline assumption is that currently the political situation will remain fluid but will not have an adverse impact on global economic growth in the short term.	Moderate. We do not currently assume a major impact on global IT spending from geopolitical events, but the impact within local economies may be more pronounced.	↔	★★★★☆
Inflation	Inflationary pressures, though now downgraded to a moderate concern, remain dangerous (especially for developing economies). Oil and energy prices could be the biggest wild card in the short term and could be a significant headwind in vulnerable European economies.	Moderate. Low inflation keeps interest rates low and leads to more capital spending, including spending on ICT. High inflation can dampen investment.	↔	★★★★☆
Unemployment/ job creation	Unemployment worldwide is still hovering at around 10% (last seen in the 1982 recession), and most regions will see very slow declines in their jobless rates over the next several years. Mature economies are still vulnerable to weakening employment trends in the face of renewed business and consumer pessimism, inflationary pressures, or other headwinds. Unemployment will even rise in some countries in Europe, especially because of public sector job cuts related to austerity measures. Job creation in emerging markets will be stronger as long as the global economy remains stable.	High. More employment drives more need for ICT spending and is a lagging indicator of economic recovery; job creation should be accompanied by a willingness to invest in other areas. The flip side is also true — fewer employees means less IT spending — and is an indicator of weak business confidence. It's also becoming clear that IT spending is, in some cases, a substitution for labor costs.	↓	★★★★★

TABLE 4
Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Exchange rates	There is still some risk of volatility and political tensions around exchange rate manipulation, and the downside scenario in Europe could create massive instability if the European single currency unravels. For now, however, we assume that exchange rates will remain sufficiently stable and that the impact on the growth of the global economy will be minimal. However, a strengthening U.S. dollar will have an adverse impact on United States–based vendors that will report lower annual sales growth in international markets. This could have a negative impact on business and stock market confidence in the United States.	High. A stable or steadily falling dollar makes it easier for vendors to manage supply lines and stabilizes the prices of imports and exports. A weaker domestic currency can boost international firms reporting a positive impact on foreign earnings.	↔	★★★★☆
Global megatrends				
Cloud	Cloud is a new paradigm of computing that will shape IT spending over the next several decades — the logical evolution of what we called "dynamic IT" for years. It entails shared access to virtualized resources over the Internet. IDC estimates that cloud services (public cloud) increased 34% in 2010 to nearly \$22 billion, or about 1.6% of IT spending, and that percentage should increase to 3% by 2014.	High. The key advantage to cloud services should be the ability of IT organizations to shift IT resources from maintenance to new initiatives. This in turn could lead to new business revenue and competitiveness as well as create new opportunities for IT vendors in SMB and emerging markets. There may be some negative impact on other areas of IT spending (e.g., traditional service revenue).	↑	★★★★☆

TABLE 4
Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Software industry transformation	The software industry is going through a major transformation, from basic architecture (service-oriented architecture [SOA]) and the way software is written (composite applications) to the way software is delivered (software as a service [SaaS]) and even funded (advertising based). IDC assumes that this transformation will take a decade but that it will, when done, allow for much faster and more dynamic delivery of software functionality.	Moderate. The new software creation and delivery models should allow for a quantum increase in the ability to deliver and integrate new software functionality to ICT systems. This should increase overall spending even as it lowers costs.	↑	★★★★☆
Service industry transformation	This is a long, slow process involving the rise of offshore IT services, the increased integration of IT services inside business services, and the advent of new service delivery models. Most firms have developed a multishoring capability and blended pricing model and are now working on ways to standardize on technologies and methodologies, deliver services online or in new form factors, invest in datacenters, and expand into business services. Despite the race to automate service creation and delivery, there is a looming talent shortage.	Low. These trends portend new competitive dynamics in the industry — software and online services competing with traditional IT services — as well as new thresholds for delivery. Online delivery models and operational standardization, from new technologies to remote infrastructure services, will allow faster and more efficient translation of service labor to client deliverables.	↑	★★★★☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
The changing IT domain	The IT domain that was once the care and feeding of mainframes has evolved over the years to include the management of enterprise applications, deployment of software and applications to the workforce, and desktop automation. Now it is evolving again to take on responsibility for the phones, building automation, sensors and RFID, and sometimes even physical security as proprietary systems migrate to TCP/IP networks. Other new applications, such as Web 2.0 and real-time business analytics, are driving IT-based applications to the point of customer or employee contact and becoming mission critical along the way. This could increase the need for IT to be so close to the business units that it becomes part of them rather than merely a service organization.	High. This migration will generate new staffing and skill set demands on IT organizations, which will create challenges but create more ultimate demand for ICT.	↑	★★★★☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Embedded computing, Internet of things	This term refers to the proliferation of client devices and end-user or end-use devices at the network edge. Of 7 billion things connected to the Internet in 2010, 5 billion were not computers. These other devices range from Internet-enabled cell phones and networked entertainment and gaming devices to automobiles, building automation systems, smart meters and thermostats, medical electronics, and industrial controllers. This doesn't even count RFID tags and sensors. IDC assumes that communicating client devices will proliferate at 5–10 times the rate of PCs installed. Devices will both converge (cell phones with more functionality) and diverge (single-use devices such as RFID readers).	High. The addition of billions of devices to the network edge will drive the need for more enterprise systems to deploy, manage, and make use of these devices. It will also shift the prevailing traffic from the center of the network outward to edge inward, which will affect computing and communications architectures.	↑	★★★★☆
Specific market trends				
Big Data technology	IT vendors will continue to overinvest in products that address Big Data market demands.	High. Lack of a supply of appropriate technology will inhibit market growth, while improvements to existing technology and development of new technology will enable more buyers to take advantage of Big Data technology and services.	↑	★★★★★

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Labor supply				
IT talent	During 2010–2014, IT employment, now at 35 million, will grow by a factor of 1.3 worldwide. This is a constraint in an industry that will grow by a factor of 1.1 by spending but by more than 2 by devices managed, 5 by information created, and 8 by networked interactions between customers. IDC views this as a long-term structural constraint. The current recession has tightened that constraint.	High. The availability and the skill level of talent have a direct impact on markets as diverse as network security and outsourcing. The availability may affect some markets or adoption rates, such as the development of SOA, but in general, there will be other, more immediate gating factors. In the long run, the optimization of the slow-growth labor pool argues for cloud computing.	↔	★★★★★
Big Data skills availability	Big Data technology and analytics training and education efforts by private companies, government agencies (in certain countries), and universities will accelerate to alleviate some of the labor shortage.	High. The availability and the skill level of Big Data IT and analytics talent have a direct impact on the Big Data market. In the long run, the optimization of the slow-growth labor pool argues for cloud computing.	↑	★★★★★
Capitalization				
Venture	During the past 12 months, venture capital investments have been relatively stable in spite of economic uncertainty. Current funds still have money in them and were successfully raising new rounds in the first half of 2011, buoyed by a returning trend of successful exit strategies. IDC assumes that venture funding is currently no impediment to innovation or IT investment.	High. There doesn't seem to be a funding limitation to ICT innovation that would alter ICT forecasts.	↔	★★★★☆☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Market characteristics				
Hardware	Hardware markets rebounded to double-digit growth in 2010 — the best year of growth since 1996. Year-on-year comparisons were helped by the poor performance in 2009 but also reflected a very real surge in demand for infrastructure upgrades and improvements. The scale of growth wasn't sustainable, but overall growth in hardware investment in 1H11 was still strong despite economic pressures. However, weak spots emerged in 4Q11, largely because of the HDD shortage and its impact on the PC market. Mobile device shipments have remained strong, though.	Moderate. Hardware spending, about 40% of total IT spending, drives spending as well in software and services.	↔	★★★★☆
Software	Software spending has rebounded strongly over the past two years and was largely ahead of expectations in 2011. There is some evidence that software spending is becoming a substitute for some labor costs. While hardware growth has softened in the past six months, momentum has shifted to software investments.	Moderate. Software spending, about 20% of total IT spending, can drive spending in hardware and IT and in business services.	↑	★★★★☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Services	Services markets returned to positive growth in 2010 but are still weak by historical standards. The tepid economic outlook is keeping some businesses cautious about initiating new projects. Government austerity programs in Europe have already included the suspension of some major IT services contracts. Demand from emerging economies is increasing strongly, however, and overall growth is expected to be steady in 2012, assuming no major collapse in macroeconomic growth.	Moderate. IT services spending can affect the rate of overall solution adoption as well as the migration to cloud computing. IT services account for about 40% of IT spending.	↔	★★★★☆
Telecom	The telecom industry in its size and utility is somewhat insulated from sudden economic swings, or at least it has significant inertia. Annual growth is generally trending downward; the fall is related to market saturation and the long-term impact of depressed capital spending.	Moderate. The IT industry has already factored telecom industry spending into its internal forecasts; the key is the pace at which convergence takes place.	↔	★★★★☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Consumption				
Saturation	<p>The concept of saturation is a tricky one in the context of ICT. Markets that seem saturated (e.g., PC shipments in the United States) can be "unsaturated" by new price thresholds or new form factors (e.g., tablets) that spur faster replacement or bring new users into the market (e.g., seniors). Thus IDC assumes that while all markets have a fixed number of potential adopters (people or companies), there is usually a price, feature, or solution that can drive additional spending. Also, with IT generally less than 3% of an enterprise's expenses (or a country's GDP), there is tremendous opportunity to turn internal spending on staff or business processes into external spending on ICT products and services. IDC assumes that market "saturation" will be a moving target that varies by submarket but, in almost all cases, can be countered.</p>	<p>High. There will be a general increase in the amount of research and marketing devoted to segmentation. There will also be potential organizational disruption as vendors realign to better approach these segments.</p>	<p>↑</p>	★★★★☆

TABLE 4**Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2015**

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Buying sentiment	Buying sentiment, as measured in IDC's <i>FutureScan</i> monthly poll of CIOs and line-of-business managers, has improved in recent months. In the U.S. poll, buyer confidence has recovered from a lull in mid-2011, with most businesses and CIOs now predicting solid increases in their own IT budgets. In our China poll, businesses are on average still predicting double-digit IT spending increases.	Moderate. Buyer sentiment has long-term consequences for the approval of IT projects.	↔	★★★★☆☆

Legend: ★☆☆☆☆ very low, ★★☆☆☆☆ low, ★★★☆☆ moderate, ★★★★☆ high, ★★★★★ very high

Source: IDC, February 2012

ESSENTIAL GUIDANCE

Big Data technology and services as defined in this study will be the next essential capability. It is emerging as one of the pillars of the 3rd ICT platform and a foundation for the intelligent economy. Vendors and buyers should consider the recommendations made in the sections that follow.

Advice to Big Data Technology Buyers

- ☑ Recognize the value of unified information access and analysis in supporting fact-based decisions by individuals, groups, and systems.
- ☑ Recognize the shortcomings of operating without having the right information at the right time. Use this awareness to help build the business case for addressing those shortcomings.
- ☑ Formulate a Big Data strategy that includes evaluation of decision makers' requirements, decision processes, existing and new technology, and availability and quality of data.
- ☑ The application of Big Data technology will fall into two primary categories: doing more efficiently (including at lower costs) tasks that have been done for years and doing completely new things that were never before possible, driving up

long-term strategic organizational value. Identify opportunities to apply Big Data to both.

- ☒ Beware of the definitional confusion and hyperbolic marketing in the Big Data market today.
- ☒ IT organizations will need to consider a coordinated approach to planning implementations. It is important to develop an IT infrastructure strategy that optimizes the server, storage, and network resources. Well-developed plans for networking support of Big Data projects should address optimizing the network both within a Big Data domain and in the connection to traditional enterprise infrastructure.
- ☒ Consider the breadth of Big Data technologies and the functionality each technology brings to the overall portfolio of tools for collecting, accessing, analyzing, monitoring, and managing data.

Advice to Big Data Technology Vendors

- ☒ Revenue opportunities exist at all levels of the Big Data technology stack as well as in services. Articulate your value proposition by connecting technology capabilities to business problems or opportunities. Big Data technology is not an end in itself. Recognize the value of Big Data to drive employee and customer decisions and actions.
- ☒ Decide if you want to be a niche player or enter the mainstream. If the former, then build a network of consultants and partners to support your technology. If the latter, then build a business case that assumes eventual acquisition.
- ☒ The growth in appliances, cloud, and outsourcing deals for Big Data technology will likely mean that end users will choose new applications and services, based less on the technology itself and more on the business value they deliver. Whether the application is based on a database or is search based, and whether the database is row based or column based, is in-memory or disk based, or uses SQL or NoSQL technologies will become less relevant over time. Thus technology will provide only a short-lived competitive advantage to any vendor. System performance, availability, security, and manageability will all matter greatly. However, how they are achieved will be less of a point for differentiation among vendors.
- ☒ HPC vendors have an edge in Big Data because leading-edge data-intensive computing has been an integral part of HPC for decades. Learn from these vendors and partner with them where appropriate. Most HPC Big Data work involves established methods of analyzing increasingly large data volumes related to numerical modeling and simulation. And because HPC users generally are more technologically risk tolerant than enterprise users, many HPC sites are already investigating or actively using Hadoop and other newer tools.

- ☒ Vendors should tout, not hide, their HPC histories. A number of vendors with HPC origins and strong HPC reputations have not capitalized on these assets when attempting to address Big Data markets outside of HPC. We believe this is a serious mistake. It can produce a lose-lose situation, where existing HPC customers wonder whether you're abandoning the HPC market for a new market, while prospects in the new market wonder why you're pursuing them. It is better to position your high-end HPC experience as a strength for meeting the presumably less-difficult, data-intensive challenges in the mainstream market.
- ☒ Useful tools are largely lacking for very large data sets. Tools such as Hadoop and MapReduce can effectively expedite searches through the large, irregular data sets that characterize some of the newer Big Data problems. Scientific users tell IDC that these tools can be great for retrieving and moving through complex data, but they do not allow researchers to take the next step and pose intelligent questions. In addition, the going gets tough when data sets cross the 100TB threshold. Sophisticated tools for data integration and analysis on this scale are largely lacking today. There are opportunities to create tools and applications for Big Data. Vendors that create tools and applications for use at this scale can use them as a lever to seize market leadership positions in the Big Data market.
- ☒ Not all Big Data use cases involve analytics. Analytics may be at the heart of most Big Data opportunities in the enterprise market, but there are also opportunities to support operational workloads and information access applications. Vendors that focus entirely on analytics will miss opportunities in the Big Data market.
- ☒ When evaluating and forming partnership, consider both technologies and go-to-market strategies. Some of the emerging technologies and the vendors behind them will likely end up as components or features of broader information management, access, and analysis platforms of larger vendors. Specialized application and service providers with localized and industry expertise will be critical to expanding the market.

LEARN MORE

Related Research

- ☒ *IDC Predictions 2012: A Big Year for Big Data* (IDC #WC20120105, January 2012)
- ☒ *Managing Big Data: SQL or NoSQL?* (IDC #232706, January 2012)
- ☒ *Exploring the Big Data Market for High-Performance Computing* (IDC #231572, December 2011)
- ☒ *When Worlds Collide: Big Data Is Forcing Close Encounters Between HPC and Enterprise Computing* (article by Steve Conway, IDC, in *Scientific Computing*, November 2011)

- ☒ *IDC's Worldwide Big Data Taxonomy, 2011* (IDC #231099, October 2011)
- ☒ *Worldwide Business Analytics Software 2011–2015 Forecast and 2010 Vendor Shares*(IDC #230022, September 2011)
- ☒ *2011 State of the U.S. Business Analytics Market: an End-User Perspective by Vertical and Company Size* (IDC #228726, June 2011)
- ☒ *Unified Access to Information: Less Seeking, More Finding* (IDC #227780, April 2011)
- ☒ *Big Data: Huge Management Implications with Enormous Returns* (IDC #DR2011_T2_PANEL_RV, March 2011)
- ☒ *The Big Deal About Big Data* (IDC #226904, February 2011)

Appendix: Sample List of Big Data Technology and Services Vendors

☒ Storage:

- ☐ HP, EMC, IBM, Dell, NetApp, Hitachi Ltd., Fujitsu, Oracle, NEC, and so forth

☒ Servers:

- ☐ IBM, HP, Dell, Oracle, Fujitsu, Acer, Cray, Groupe Bull, Hitachi, NEC, SGI, Stratus Technologies, Unisys, Cisco, Lenovo, and so forth

☒ Networking:

- ☐ Cisco, Brocade, HP, Dell, IBM, Alcatel-Lucent, F5 Networks, Citrix, and so forth.

☒ Relational database software:

- ☐ Oracle Exadata, IBM Netezza, IBM Smart Analytics System, Teradata, HP Vertica and Autonomy, SAP Sybase IQ, EMC Greenplum DB and HD, Microsoft SQL Server Parallel Edition, IBM Netezza High Capacity Appliance, Teradata Extreme Performance Appliance, SAP-Sybase IQ, and so forth

☒ Hadoop-based data management and analysis software:

- ☐ Cloudera, MapR, EMC Greenplum HD, Oracle Big Data Appliance, IBM BigInsights, Hstreaming, Platfora, Zettaset, DataStax, Karmashere, Datameer, Hadapt, and so forth

☒ XML databases:

- ☐ MarkLogic, Oracle XML DB, IBM pureXML, Software AG webMethods, Tamino XML Server, TigerLogic, Xyleme, and so forth

☒ Object-oriented databases:

- ☐ Jade Software, Objectivity, Progress Software, Versant, and so forth

☒ Graph databases:

- ☐ Neo Technology, Objectivity, Franz Inc., Sones, Ravel, and so forth

☒ Ultra-high-speed streaming data technologies:

- ☐ IBM InfoSphere Streams, Informatica Ultra Messaging Streaming Edition, TIBCO FTL and BusinessEvents, Progress Software Apama CEP, and so forth

☒ Analytics and discovery software:

- ☐ SAS, IBM, Attivio, HP Autonomy, Skytree, Attivio, Oracle Advanced Analytics, IBM SPSS, Microsoft, Vivisimo, ZyLAB, Sinequa, Revolution Analytics, KXEN, BA Insight, Palantir, Perfect Search, Wolfram Alpha, and so forth

☒ Decision support and automation software including applications:

- ☐ Webtrends, Adobe-Omniture, IBM Coremetrics, FICO, and so forth

☒ Services:

- ☐ Accenture, Deloitte, TCS, HP, Teradata, Mu Sigma, Think Big Analytics, Hortonworks, Hashrocket, KloudData, Trendwise Analytics, and so forth

Synopsis

This IDC study examines Big Data technology and services market for 2010–2015. The study describes IDC's definition of Big Data and the criteria and methodology for sizing the market. Further, the study segments the Big Data market into server, storage, networking, software, and services.

"The Big Data market is expanding rapidly as large IT companies and start-ups vie for customers and market share. For technology buyers, opportunities exist to use Big Data technology to improve operational efficiency and to drive innovation," said Dan Vesset, program vice president for IDC's Business Analytics Solutions. "IDC expects the Big Data technology and services market to grow at a 39.4% compound annual growth rate through 2015."

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