

MARKET ANALYSIS

Worldwide Big Data Technology and Services 2012–2016 Forecast

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IDC OPINION

Big Data represents a fast-growing multibillion-dollar worldwide opportunity. It is the topic on executive agendas and a driver of technology and services investment. It presents some of the most attractive job opportunities for people with the right technology, analytics, communication, and industry domain expertise. At the same time, the Big Data market is in early stages of development, with hype often drowning out real business and technology issues that early adopters are struggling with and addressing. IDC's ongoing study of the uses and market for Big Data technology and services demonstrates that each use case requires different combinations of software, hardware, and services to be most effective. Such combinations are also further customized to suit the industry the business is part of and the value that it is seeking to derive from the analyzed data. The widespread adoption of Big Data technologies outside of high-performance computing (HPC) is continuing at a rapid pace. Findings in this Big Data technology and services market forecast include:

- ☑ IDC expects the Big Data technology and services market to grow from \$6 billion in 2011 to \$23.8 billion in 2016. This represents a compound annual growth rate (CAGR) of 31.7% 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 and via an on-premises or cloud delivery model.
- ☑ The Big Data technology and services demand and supply factor continues to evolve rapidly, necessitating a frequent review of market sizing methodology and forecast assumptions, in addition to competitive market assessment.

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IN THIS STUDY

This study examines the Big Data technology and services market for the period 2011–2016. Worldwide market sizing is provided for 2011, and a five-year growth forecast for this market is shown for 2012–2016. The Big Data market is an aggregation of the storage, server, networking, software, and services market segments, each with several subsegments. Starting with this forecast, IDC is including a percentage of public cloud and infrastructure-as-a-service provider revenue that IDC believes makes up for the Big Data component running in that infrastructure.

Methodology

Big Data Definition

The intelligent economy produces a constant stream of data that is being monitored and analyzed. 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. However, this document sizes and forecasts the technology and services for managing, analyzing, and accessing Big Data, not the data itself.

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

Big Data Market Sizing Criteria

Following IDC's 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 dynamically adaptable infrastructure:

- ❑ Note: In this document, IDC modified its definition of Big Data specifically for the infrastructure. It moved away from restricting the requirement for scale-out infrastructure, instead replacing it with dynamically adaptable as the critical qualifier. We made this adjustment after interviewing vendors and users that have deployed qualifying Big Data workloads on non-scale-out infrastructure.

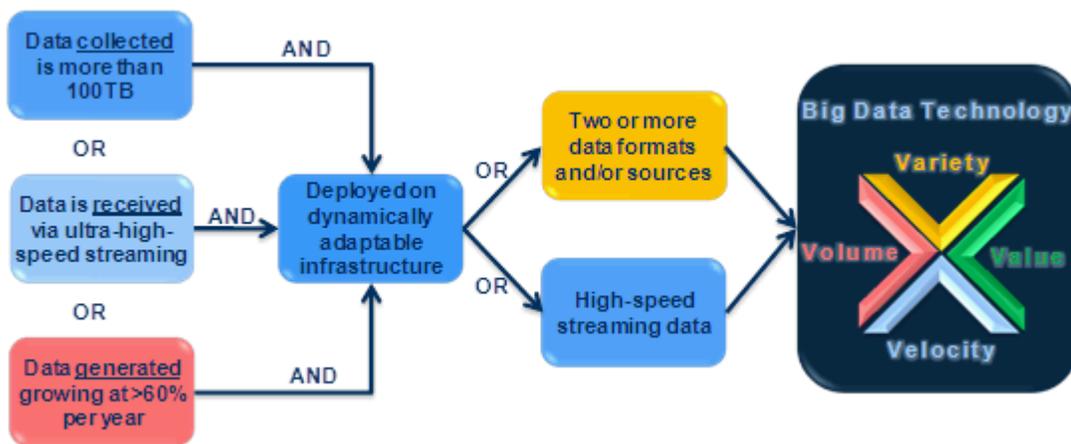
☒ Step 3 evaluates two scenarios:

- ❑ Deployments that include two or more data types or data sources
- ❑ Deployments that include high-speed data sources such as clickstream tracking or monitoring of machine-generated data

IDC's definition for Big Data, the market sizing criteria, and the three steps for evaluating use cases are depicted in Figure 1.

FIGURE 1

IDC's Big Data Technology and Services Market Sizing Criteria



Source: IDC, 2012

Market Sizing Changes and Exclusions

The following changes were made to the Big Data market sizing and forecast presented in this document as compared with the market sizing and forecast presented in *Worldwide Big Data Technology and Services 2012–2015 Forecast* (IDC #233485, March 2012). These changes include:

- ☒ A change has been effected in the criteria related to infrastructure requirements. We moved away from restricting the requirement for scale-out infrastructure, instead replacing it with dynamically adaptable as the critical qualifier. We made this adjustment after interviewing vendors and users that have deployed qualifying Big Data workloads on non-scale-out infrastructure.

- ☒ The impact of changing the definition for infrastructure that would qualify as "dynamically adaptable" instead of "scale out" has a greater effect on storage and networking than it has on servers. This is because, traditionally, storage solutions have been scale up (controller-based designs) with node-based scale out being a fairly new category. By changing the attribute from scale out to dynamically adaptable, an entire set of scale-up storage solutions that were excluded are included in the segmentation. However, this impact is minimal in the case of servers where x86-based servers are by design meant to be used in a commoditized scale-out fashion.
- ☒ Cloud infrastructure services revenue has been added to the infrastructure segment of the market. In *Worldwide Big Data Technology and Services 2012–2015 Forecast* (IDC #233485, March 2012), we noted "that the current IDC Big Data market sizing and forecast excludes cloud infrastructure services purchased by enterprises and used for Big Data deployments." While we acknowledged that a portion of the market runs Big Data workloads on a public cloud infrastructure such as those from Amazon, Rackspace, and others, we were unprepared to estimate the size of this market segment in early 2012.
- ☒ The Big Data software segment has been refined because of the addition of a portion of the content management software market.
- ☒ Under the Big Data software segment, we now report three subsegments — Big Data organization and management, Big Data analytics and discovery, and Big Data applications.
- ☒ Big Data services spending numbers for 2010 and 2011 have been revised. The key factor behind the revision is the addition of a number Big Data–related services that were not included in the previous forecast. These new Big Data services include application management services, network consulting and integration services, storage services, and security services. In addition, as we continuously improve our coverage of services lines, we have realized that the Big Data market was bigger than we initially thought for the IT consulting and systems integration services lines, and we have revised the 2010 and 2011 numbers for IT consulting and systems integration Big Data services spending numbers as a result of our improved coverage.
- ☒ Minor changes to historical and forecast data are because of additional market intelligence, including some changes to the market-specific and macroeconomic assumptions.

Exclusions and Future Forecasts

Because of the rapidly developing nature of this market, IDC will continue to review the methodology, forecast assumptions, and vendor revenue on an ongoing basis. We expect to release the next Big Data market sizing and forecast in mid-2013.

The current Big Data market sizing and forecast excludes systems software components such as security and systems performance management.

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

SITUATION OVERVIEW

The Big Data Market in 2012

In 2012, the Big Data market is expected to reach \$8.1 billion. Further, each market segment is composed of several segments that make up the Big Data technology, software, and services stack. In each segment, only the portion of revenue that can be attributed to Big Data uses contributes to the total Big Data market size. The market segments include infrastructure, software, and services.

Infrastructure

- ☒ 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. Datacenters owned by enterprises and cloud service providers are counted.)
- ☒ Cloud infrastructure services that combine server, storage, and networking services, which are delivered through public cloud offerings

Software

- ☒ Data organization and management software, including parallel and distributed file systems with global namespace, highly scalable (size and structure) relational databases, key-value pair (KVP) data stores, content management systems, graph databases, 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, data mining, text mining and other text analytics, rich media analysis, data visualization, and other related tools
- ☒ Applications software including business process or industry-specific applications such as for Web clickstream analysis, fraud detection, logistics optimization, and others

Services

- ☒ Business consulting, business process outsourcing, IT project-based services, network consulting and integration services, IT outsourcing, storage services, security services, software and hardware support, and training services related to Big Data implementations

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 2012–2016

IDC's estimate of the growth of the Big Data market through 2016 is presented in Table 1. The worldwide CAGR for the market through the five-year period is expected to be 31.7%.

TABLE 1

Worldwide Big Data Technology and Services Revenue by Segment, 2010–2016
(\$M)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2011–2016 CAGR (%) |
|----------------------------------|---------|---------|---------|---------|---------|---------|----------|-----------------------|
| Infrastructure | | | | | | | | |
| Servers | 495.0 | 665.0 | 803.0 | 1,032.0 | 1,270.0 | 1,531.0 | 1,914.0 | 23.5 |
| Storage | 379.9 | 672.7 | 1,476.1 | 2,416.5 | 3,376.8 | 4,434.8 | 5,709.5 | 53.4 |
| Networking | 131.0 | 178.0 | 292.0 | 432.0 | 567.0 | 709.0 | 886.0 | 37.8 |
| Cloud infrastructure | 177.2 | 295.8 | 490.3 | 761.5 | 1,164.7 | 1,639.9 | 2,312.4 | 50.9 |
| Subtotal | 1,183.1 | 1,811.5 | 3,061.4 | 4,642.0 | 6,378.5 | 8,314.7 | 10,822.0 | 43.0 |
| Software | | | | | | | | |
| Information management software | 424.3 | 596.2 | 786.7 | 1,042.7 | 1,395.5 | 1,881.3 | 2,482.2 | 33.0 |
| Discovery and analytics software | 571.3 | 731.8 | 895.2 | 1,153.7 | 1,510.5 | 2,030.0 | 2,819.7 | 31.0 |
| Applications software | 149.3 | 197.2 | 254.7 | 315.9 | 399.7 | 523.2 | 703.9 | 29.0 |

TABLE 1

Worldwide Big Data Technology and Services Revenue by Segment, 2010–2016
(\$M)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2011–2016 CAGR (%) |
|----------|---------|---------|---------|----------|----------|----------|----------|-----------------------|
| Subtotal | 1,144.8 | 1,525.3 | 1,936.6 | 2,512.4 | 3,305.7 | 4,434.5 | 6,005.8 | 31.5 |
| Services | 2,175.3 | 2,662.3 | 3,102.2 | 3,820.2 | 4,581.4 | 5,581.9 | 6,936.6 | 21.1 |
| Total | 4,503.2 | 5,999.0 | 8,100.2 | 10,974.6 | 14,265.6 | 18,331.0 | 23,764.4 | 31.7 |

Note: See Table 2 for top 3 assumptions and Table 3 for key forecast assumptions.

Source: IDC, December 2012

The growth of individual segments of the market varies from 21.1% for services to 53.4% 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 application) 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.

Assumptions

The top 3 forecast assumptions for the Big Data market are shown in Table 2.

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

- A shortage of analytics and Big Data technology skills will drive a growing number of buyers toward cloud solutions and appliances.
- The boundary between enterprise Big Data and HPC data-intensive computing will continue to blur, as vendors cross in both directions.
- Vendor M&A activity will kick into high gear in 2014/2015.
- There has been a rapid recognition of the need for new Big Data technologies, such as Hadoop, to coexist with existing data warehousing, search and discovery, and high-end modeling and simulation technology.
- Big Data solutions for machine-generated data will begin to gain greater mindshare in the outer years of the forecast.

- ☒ To address skills shortage, there will be greater focus on automation across the information management and analytic life cycle, and more companies will look to outsource analytic services, not just technology.
- ☒ A growing number of vendors will provide not only technology but also analytic services and content. Data-as-a-service solutions will expand rapidly.
- ☒ Commercial use of artificial intelligence will widen as biometric, audio, video, and image recognition software; Big Data analytics; and commercialized HPC infrastructure will combine to create intelligent sense-and-respond systems.
- ☒ Big Data analytics technology deployments using real-time monitoring and analysis techniques will change the way the public views privacy. A new generation of consumers will increasingly give up their rights to privacy to commercial entities in exchange for more personalized services. Existing legislation will not be able to keep pace with technological advances, and a new generation of legislators will find the issue less pressing.
- ☒ Intelligent question and answer systems will be present across consumer industries, operating within call centers, in retail stores, in cars, and so forth.

Table 3 includes a broader set of key forecast assumptions underlying IDC's forecast of the Big Data technology and services market.

TABLE 2

Top 3 Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Significance | Changes to This Assumption That Could Affect Current Forecast | Comments |
|---------------------|--|--|--|---|
| Economy | The global economy will be subdued in 2013, with weaker growth than previously anticipated. Mature economies will struggle to maintain momentum, with the global economy increasingly reliant on emerging markets. Much of Europe was in recession during 2012, and the recovery in 2013 will be gradual. The U.S. economy is fragile and faces downside risks from the "fiscal cliff," with growth in 2013 unlikely to surpass 2%. Japan has lost momentum after the post-earthquake reconstruction drove a return to growth in 2012. The downside risks are still elevated in Europe, and the "fiscal cliff" has added even more uncertainty to the short-term outlook. Business confidence is volatile. | 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. A crisis (likely triggered by events in Europe) could create a level of impact similar to the financial crisis of 2008. | 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. | The economy is going to impact the various Big Data technology and services market segments in different ways. Many variables are in effect, including licensing contracts, delivery models, and budget to invest in upgrades or new solutions. |
| Big Data technology | 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. | IT vendors will continue to overinvest in products that address Big Data market demands. | A decrease in R&D spending and slowdown in venture capital funding could have an adverse effect on the supply of Big Data technology. | 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. |

TABLE 2

Top 3 Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Significance | Changes to This Assumption That Could Affect Current Forecast | Comments |
|------------------------------|---|--|---|---|
| Big Data skills availability | The availability and 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. | 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. | If training and education efforts 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 appliances and cloud-based Big Data solutions will also alleviate some of the skills availability issues. | 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 the higher-education industry to incorporating more analytics and Big Data technology studies in their curriculum. |

Source: IDC, December 2012

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|-----------------------|--|---|---------------------------------------|----------------------------|
| Macroeconomics | | | | |
| Economy | The global economy will be subdued in 2013, with weaker growth than previously anticipated. Mature economies will struggle to maintain momentum, with the global economy increasingly reliant on emerging markets. Much of Europe was in recession during 2012, and the recovery in 2013 will be gradual. The U.S. economy is fragile and faces downside risks from the "fiscal cliff," with growth in 2013 unlikely to surpass 2%. Japan has lost momentum after the post-earthquake reconstruction drove a return to growth in 2012. The downside risks are still elevated in Europe, and the "fiscal cliff" has added even more uncertainty to the short-term outlook. Business confidence is volatile. | 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. A crisis (likely triggered by events in Europe) could create a level of impact similar to the financial crisis of 2008. | ↓ | ★★★★☆☆ |

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Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------------------|---|--|---|----------------------------|
| Fiscal stimulus packages | <p>The positive benefits of stimulus spending gradually waned during 2011, leaving the economy fragile again in 2012. Governments in many economies have found it more difficult to enact stimulus measures in the past 12 months than they did in 2009. Tighter fiscal policies in most economies will continue to have a contractionary effect on private demand and economic activity in the short term. Austerity programs in Europe, the flip side to stimulus spending, are now impacting business and consumer confidence. With the global economy weakened and exports to Europe especially slow, China moved to enact another round of stimulus measures to counterbalance the impact of weaker exports. Other governments have less flexibility. Uncertainty around the U.S. "fiscal cliff" and postelection posturing makes the U.S. economic policy a wild card for 2013, but major stimulus spending is unlikely in any event.</p> | <p>Low. The stimulus packages and bailouts that followed the financial crisis have waned, and enacting another round of stimulus will be more difficult if Europe lurches into a severe recession. There is little or no appetite for additional stimulus measures in the United States, where merely avoiding the so-called fiscal cliff will be regarded as good news. We believe the GDP forecasts have accounted for the most likely government actions, including China's stimulus measures in the face of slowing demand from Europe.</p> |  | <p>★★★★☆</p> |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|---------------------------------------|--|---|---------------------------------------|----------------------------|
| Crisis duration/ potential relapse | <p>In 2012, many countries in Europe entered double-dip recession as the debt crisis (a consequence of the financial crisis) lingered and continued to threaten the European single currency. There are still numerous risk factors that might impact vulnerable markets, and the probability of relapse has fluctuated over the past 12 months as austerity measures continue to bite. Even if the downside scenarios are avoided (an unraveling of the euro), the strong momentum of the recovery has been firmly halted, giving way to weak business and consumer confidence. While we don't yet assume a double-dip global recession in our forecasts, the risk is still elevated.</p> | <p>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 risks are receding, they may loosen their purse strings for more long-term projects. However, this would be dampened by any 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. While the risk of relapse lingers, business confidence will remain inhibited to some degree.</p> | <p>↓</p> | <p>★★★★☆☆</p> |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------|--|--|---------------------------------------|----------------------------|
| Oil prices | Oil prices will remain relatively high but volatile in 2013, 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. | ↔ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------|--|--|---------------------------------------|----------------------------|
| Profits | Corporate profits softened in 2012, although mild growth is still anticipated in 2012 overall. Expectations are now weaker than they were six months ago, especially in the United States and Europe. On the plus side, many businesses are still sitting on large amounts of cash after two strong years of profitability. 2013 will also see a mild recovery in many European countries as the economy emerges from the double-dip recession. On the downside, U.S. profits are now expected to be even weaker in 2013 than in 2012. Wafer-thin profit margins might trigger another period of retrenchment. | 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). Weaker profits in the United States in 2013 might inhibit spending, but recovering profits in Europe should enable a mild IT rebound. In the upside scenario, if profits begin to surge again, this will drive businesses to tap into their cash reserves. | ↓ | ★★★★☆☆ |
| Geopolitics | Political instability in the Middle East is still a wild card to monitor, although some stability returned in the first half of 2012. An obvious risk is any effect on oil supply and prices related to conflict in Iran. Our baseline assumption is currently that 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. | ↔ | ★★★★☆☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------|---|--|---------------------------------------|----------------------------|
| Inflation | Inflationary pressures, though now downgraded to a moderate concern, remain dangerous (especially for developing economies and economies that might exit the eurozone). Oil and energy prices could be the biggest wild card in the short term and could be a significant headwind in vulnerable European economies. The devaluation of the euro is also raising import prices for European companies, pressurizing profit margins at a time when businesses can least afford to pass this inflationary effect on to pessimistic consumers. | Moderate. Low inflation keeps interest rates low and leads to more capital spending, including spending on ICT. High inflation can dampen investment and can also raise the cost of IT product and component imports. | ↔ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|-------------------------------|---|---|---------------------------------------|----------------------------|
| 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. In the United States, unemployment surprisingly fell below 8% in the third quarter of 2012, but most economists remain unconvinced that this foreshadows major job gains in 2013. Unemployment will continue to rise in some countries in Europe in 2013, 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. | ↓ | ★★★★☆ |
| 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 that the impact on the growth of the global economy will be contained. | 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, which report a positive impact on foreign earnings. A weaker domestic currency can also, however, raise the cost of imports. | ↔ | ★★★★☆☆ |

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Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|----------------------------------|--|--|---------------------------------------|----------------------------|
| 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 IDC called "dynamic IT" for years. It entails shared access to virtualized resources over the Internet. IDC estimates that cloud services spending will continue to grow at double-digit rates for the next few years, gradually accounting for a larger proportion of all IT spending. | 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. The short-term benefits may be offset to some extent in the long term by shorter service engagements, price model disruption, and some hardware commoditization, but a strong economy would see most organizations shift resources to new IT development and adoption areas. | ↑ | ★★★★☆ |
| Software industry transformation | The software industry is still 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) and even funded (advertising based). The disruption to pricing and delivery models, in particular, will be significant in 2012 and for the next few years. This transformation will take a decade to play out but 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. | ↔ | ★★★★☆ |

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Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| 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. These other devices range from smartphones and networked entertainment devices to automobiles, building automation systems, smart meters and thermostats, medical electronics, and industrial controllers, not to mention RFID tags and sensors. Communicating client devices will proliferate at 5–10 times the rate of PCs installed. Devices will both converge (smartphones with more functionality) and diverge (single-use devices, such as RFID readers and industry-specific devices). | 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 | 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. | High. IT vendors will continue to overinvest in products that address Big Data market demands. | ↑ | ★★★★★ |
| Labor supply | | | | |
| Big Data skills availability | The availability and 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. | High. 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. | ↑ | ★★★★★ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|------------------------|---|--|---------------------------------------|----------------------------|
| IT talent | IT employment, now at more than 35 million, continues to grow by a factor of 1.3 worldwide. This is a constraint in an industry growing by a factor of 1.1 in terms of 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 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. | ↔ | ★★★★★ |
| Distribution of talent | The swing to emerging geographies is evident. The number of scientists and engineers in the United States and Western Europe is falling compared with the number of scientists and engineers in China and India, while growth in the number of IT-related employees in those countries is three times the world average. | Moderate. The migration will increase the overhead costs of finding, recruiting, and managing talent from global pools. It should, however, also lower costs and may even lead to more innovation. | ↔ | ★★★★☆ |
| 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 2012, buoyed by a returning trend of successful exit strategies. 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 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|-------------------------------|--|---|---------------------------------------|----------------------------|
| Market characteristics | | | | |
| Hardware | Hardware markets outpaced expectations in 2011 while not keeping pace with the previous year's growth. Strong trends in particular have continued in the demand for storage, smartphones, and tablets. The PC market endured a difficult 2011 in the face of weak business confidence and some cannibalization from tablets, but the imminent launch of Windows 8 will provide the stimulus for a recovery in late 2012 and in 2013. Overall hardware spending was steady in the first half of 2012, with strong trends in storage and enterprise networks, but is clearly vulnerable to any deterioration in the economic outlook if businesses rush to cut capital spending again. | Moderate. Hardware spending, about 40% of total IT spending, drives spending as well in software and services. | ↑ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------|--|---|---------------------------------------|----------------------------|
| Software | Software spending has rebounded strongly over the past two years and was largely ahead of expectations in 2011 and in the first half of 2012. There is some evidence that software spending is becoming a substitute for some labor costs. While hardware growth has gradually softened in the past six months, momentum has shifted to software investments. Even in Europe, software spending was ahead of expectations in many countries in the first half of 2012. Businesses seem willing to continue with software investments, even while looking to cut back on other areas of their overall spending. | Moderate. Software spending, about 20% of total IT spending, can drive spending in hardware and IT and in business services. | ↑ | ★★★★☆ |
| Services | Services markets were steady if unspectacular in 2011, with growth of around 3% worldwide. Government austerity programs in Europe included the suspension of some major IT services contracts, however, and there are also signs of weaker project-based spending from the financial services industry. On the other hand, demand from emerging economies is still robust, and overall growth is expected to be steady in 2012 (assuming no major collapse in macroeconomic growth), with some improvement in 2013 when growth will reach 4%. | 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. | ↔ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|--------------|--|--|---------------------------------------|----------------------------|
| Telecom | The telecom industry in its size and utility is somewhat insulated from sudden economic swings, or at least it has significant inertia. Service provider revenue has picked up in the past 24 months, driven by the adoption of smartphones and related mobile data charges. Mobile data revenue will continue to drive growth in 2012 and 2013, with overall telecom services revenue expected to increase by 4% in 2013. | Moderate. The IT industry has already factored telecom industry spending into its internal forecasts; the key is the pace at which convergence takes place. Mobile services will continue to drive mobile devices and software, and vice versa. | ↔ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| 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> | ↑ | ★★★★☆ |

TABLE 3

Key Forecast Assumptions for the Worldwide Big Data Technology and Services Market, 2012–2016

| Market Force | IDC Assumption | Impact | Accelerator/ Inhibitor/ Neutral | Certainty of Assumption |
|------------------|--|--|---------------------------------------|----------------------------|
| Buying sentiment | Buying sentiment, as measured in IDC's <i>FutureScan</i> monthly polls of CIOs and line-of-business managers, has fluctuated in recent months but remains weak by historical standards. In U.S. polls, buyer confidence showed positive momentum until 2Q12, when it began to soften again. Since then, it has barely recovered as businesses remain wary of economic downside risks. CIOs are currently projecting that budgets will increase by around 2% in the next 12 months, which is probably a pessimistic assessment. In the past 12 months, CIOs have consistently underforecast their own IT spending, illustrating that business confidence remains subdued. | Moderate. Buyer sentiment has long-term consequences for the approval of IT projects. | ↓ | ★★★★☆ |

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

Source: IDC, December 2012

Market Context

A five-year forecast was last published for the business analytics software market in *Worldwide Big Data Technology and Services 2012–2015 Forecast* (IDC #233485, March 2012). Table 4 compares the forecast published in that document with the current forecast in terms of worldwide revenue and annual growth rates. Historical data (2010–2011) is also included in Table 4 for comparison purposes; Figures 2 and 3 display the same data in graphical form.

The change in historical revenue is due to the methodology changes outlined in the Methodology in the In This Study section of this document. Changes to forecast growth rates are due to adjustments to assumptions influenced by new market intelligence, ongoing research projects, and economic indicators.

TABLE 4

Worldwide Big Data Technology and Services Revenue, 2010–2016: Comparison of March 2012 and December 2012 Forecasts (\$M)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|------------------------|---------|---------|---------|----------|----------|----------|----------|
| December 2012 forecast | 4,503.2 | 5,999.0 | 8,100.2 | 10,974.6 | 14,265.6 | 18,331.0 | 23,764.4 |
| Growth (%) | NA | 33.2 | 35.0 | 35.5 | 30.0 | 28.5 | 29.6 |
| March 2012 forecast | 3,217.1 | 4,765.7 | 6,841.7 | 9,727.8 | 12,940.7 | 16,920.0 | NA |
| Growth (%) | NA | 48.1 | 43.6 | 42.2 | 33.0 | 30.8 | NA |

Notes:

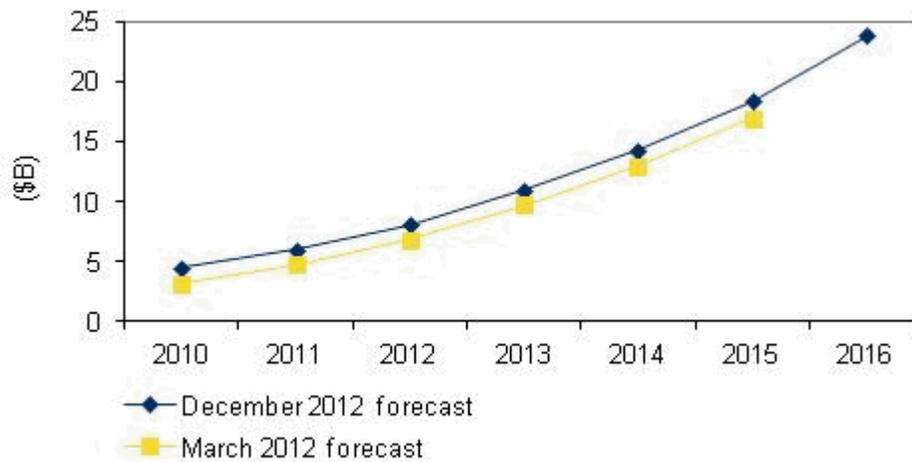
See *Worldwide Big Data Technology and Services 2012–2015 Forecast* (IDC #233485, March, 2012) for prior forecast. Historical market values presented here are as published in prior IDC documents based on the market taxonomies and current U.S. dollar exchange rates existing at the time the data was originally published. For more details, see the Methodology in the Learn More section.

The difference in market size and forecast figures is due to the addition of new market segments and adjustments to forecast assumptions.

Source: IDC, December 2012

FIGURE 2

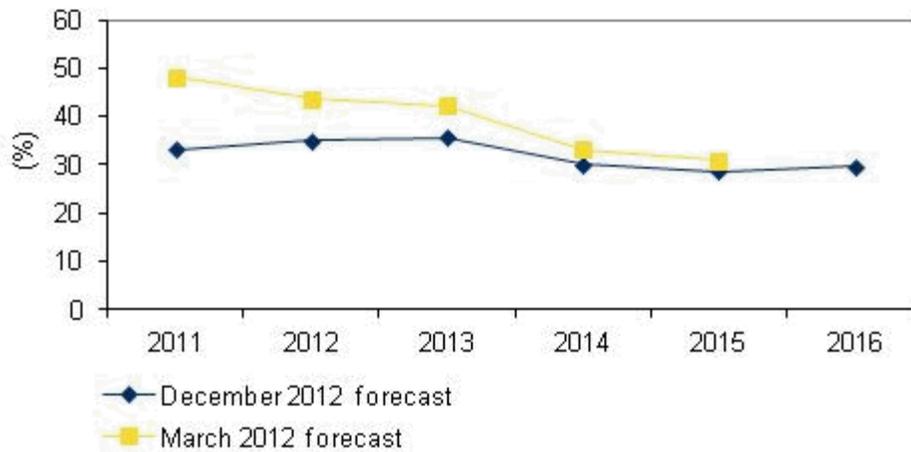
Worldwide Big Data Technology and Services Revenue, 2010–2016: Comparison of March 2012 and December 2012 Forecasts



Source: IDC, December 2012

FIGURE 3

Worldwide Big Data Technology and Services Revenue Growth, 2011–2016: Comparison of March 2012 and December 2012 Forecasts



Source: IDC, December 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 platform and a foundation for the intelligent economy. There is also no question that, despite some Big Data technologies having been available for years, the market is today in very early stages of a long-term trend with great promise. To capitalize on the opportunities, vendors should consider the following guidance:

- Consider the current misconceptions about Big Data use cases. These include:
 - Big Data is all about large volumes of data.
 - Big Data is all about social media data.
 - Big Data is all about technology.
 - Big Data is all about analytics.
- Recognize that for Big Data solutions, one size (technology) does not fit all (requirements). Different workloads, data types, and user types are best served by technology that is purpose built for a specific use case.

- ☒ Identify specific decision processes and groups of decision makers. Each will have distinct interactions with the data that will provide insight into what data and what technology is required for each scenario. Specialization will command a premium.
- ☒ Package and price offerings to address specific use cases. There's no such thing as an enterprisewide Big Data product. Large vendors should be ready to offer a range of functionality. Big Data solutions will need to incorporate a range of functionality with discrete, workload-specific products.
- ☒ Expect the unexpected. Plan for dynamically adaptable technology. Although some Big Data workloads will be well defined and highly predictable, many others will require rapidly scalable solutions that depend on high levels of automation.
- ☒ Consider the performance impact of enabling hardware infrastructure. Choices such as whether to use in-memory computing or MPP analytic databases, appliances, or separate components will have a material impact on the success of the customer's business analytics solution.
- ☒ Be prepared for a more consultative role of a trusted advisor. Many end users want more than just to purchase technology. They are looking for advice about what data to track, how to analyze the data, and how to influence action and effect change based on the results of the data analysis. Only 25% of organizations report having a business analytics strategy. It's important for vendors to help end users create such as a strategy as well as have one of their own.
- ☒ Be prepared to encounter new competition from unexpected segments of the market. Retailers, financial services firms, communications providers, and others are entering the market with their own Big Data services that compete with some of the services and technology provided by traditional IT vendors.
- ☒ Revenue opportunities exist at all levels of the Big Data technology stack including cloud infrastructure as well as in services. Vendors should continue to articulate their value proposition by connecting technology capabilities to business problems or opportunities.
- ☒ Big Data analytics services will see a surge in demand as customers find it difficult to source experienced talent for both Big Data and analytics needs. Services vendors should capitalize on this opportunity by bolstering their Big Data services portfolios as customers will increasingly leverage the service providers' infrastructure and expertise (around business analytics tools, cloud, mobility, etc.) as well as their ability to provide industry- and domain-specific solutions.

LEARN MORE

Related Research

- ☒ *IDC Predictions 2013: Big Data — Battle for Dominance in the Intelligent Economy* (Forthcoming)
- ☒ *What's New in Data Warehousing? Amazon Enters the Market with a Low Cost, Scalable Option Called Amazon Redshift* (IDC #lcUS23823012, December 2012)
- ☒ *IDC Predictions 2013: Competing on the 3rd Platform* (IDC #WC20121129, November 2012)
- ☒ *Big Opportunities and Big Challenges: Recommendations for Succeeding in the Multibillion-Dollar Big Data Market* (IDC #237885, November 2012)
- ☒ *IDC Market in a Minute: Big Data* (IDC #237493, October 2012)
- ☒ *It's Much More Than Technology: Big Data and Analytics Adoption Requires Focus on Strategy, Skills, and Process* (IDC #lcUS23693312, September 2012)
- ☒ *Business Strategy: Big Data in Government — Promoters, Players, and Payoff* (IDC Government Insights #GI236597, September 2012)
- ☒ *Business Strategy: The Big Data and Analytics Pillar of 3rd Platform Retail IT* (IDC Retail Insights #GRI236643, August 2012)
- ☒ *Infrastructure for Big Data* (IDC #236447, August 2012)
- ☒ *Perspective: Big Data Technology in Manufacturing? It's on Its Way* (IDC Manufacturing Insights #MI236100, July 2012)
- ☒ *Worldwide Business Analytics Software 2012–2016 Forecast and 2011 Vendor Shares* (IDC #235494, June 2012)
- ☒ *Unified Information Access: The Evolution of Search, Analytics, and Business Intelligence* (IDC #235200, June 2012)
- ☒ *IDC MarketScape: Worldwide Business Analytics IT Consulting and Systems Integration Services 2012 Vendor Analysis* (IDC #234938, May 2012)
- ☒ *IDC MarketScape: Worldwide Business Analytics BPO Services 2012 Vendor Analysis* (IDC #234937, May 2012)
- ☒ *Worldwide Big Data Technology and Services 2012–2015 Forecast* (IDC #233485, March 2012)

Methodology

Historical Market Values and Exchange Rates

Historical market values presented here are as published in prior IDC documents based on the market taxonomies and current U.S. dollar exchange rates existing at the time the data was originally published. For markets other than the United States, these as-published values are therefore based on a different exchange rate each year.

Please refer to IDC's regional research studies containing historical forecasts for multiple countries for more accurate regional growth in local currencies. Note that this discussion applies only to historical values prior to 2011. 2011 and all future years are forecast at a constant exchange rate.

Synopsis

This IDC study examines the Big Data technology and services market for 2012–2016. 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 technology and services market represents a fast-growing, multibillion-dollar worldwide opportunity. The Big Data market is expanding rapidly as large IT companies and start-ups vie for customers and market share," said Dan Vesset, vice president for IDC's Business Analytics and Big Data program. "IDC expects the Big Data technology and services market to grow at a 31.7% compound annual growth rate through 2016."

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