



Market Analysis

Worldwide Broader HPC 2014-2018 Forecast: Servers, Storage, Software, Middleware, and Services

Chirag Dekate, Ph.D.
Steve Conway

Earl C. Joseph, Ph.D.

IDC OPINION

This study shows IDC's tracking of the broader high-performance computing (HPC) market, including and extending beyond the compute server, and provides five-year forecasts for each category. The base HPC compute server market is projected to grow at a 7.4% CAGR from 2013 to 2018, from \$10.3 billion in 2013 to reach \$14.7 billion in 2018. The broader HPC market is projected to grow from \$20.26 billion in 2013 to \$29.29 billion by 2018. The broader HPC market that IDC tracks includes (in addition to servers):

- Storage
- Application software
- Middleware
- Repair and maintenance services

IN THIS STUDY

This study presents an overview of IDC's forecast for the broader HPC market for 2014-2018. The data in this study is based on IDC's segmentation of the broader HPC market, which is as follows:

- **Supercomputers.** Systems purchased to support technical applications and sold for \$500,000+
- **Technical divisional servers.** Systems purchased to support technical applications and sold for \$250,000-499,999
- **Technical departmental servers.** Systems purchased to support technical applications and sold for \$100,000-249,999
- **Technical workgroup servers.** Systems purchased to support technical applications and sold for <\$100,000

Definitions

In the context of HPC, IDC uses the following definitions:

- A **compute server**, synonymous with an HPC system, includes processors, cabinets, power supplies, "scratch disk," special hardware, special paint jobs, in-built storage, and anything else required for the device to be able to power up and operate as an independent system. A compute server does not include application software or services.
- **Storage** refers to devices, including disks, tape, and SSDs, that are used to record electronic data for later retrieval. Storage does not include scratch disk space that may be built into compute servers.
- **Middleware** refers to the software stack at work between user applications and the operating system. In response to changing HPC demands and new environments, this stack has played an increasingly important and diverse role. From their intermediate position, middleware programs perform a wide variety of crucial linking, mediating, and control functions.
- **Applications** are software programs designed to perform specific tasks that employ end users' data and directly benefit the work of end users.
- **Services** refer to repair and maintenance services and do not include professional services.

Methodology

The forecasts in this study are based on a number of information sources including IDC's technical computing systems quarterly census database, vendor results for the historical years, discussions with vendors and users on future business directions and expectations, end-user studies, and in-depth interviews with users.

The forecasts were developed based on IDC's technical computing systems forecast model, which targets compute servers. This model considers competitive segments (supercomputers, technical divisional servers, technical departmental servers, and technical workgroup servers) forecasting

shipments, revenue, and average selling price by industry/application segment. The forecasts include estimates for second-tier and new-entrant vendors selling into the HPC market space.

The forecasts provided in this study include only server systems used in technical applications. Note that systems sold into nontechnical applications and desktop technical computers are not included in this study.

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

SITUATION OVERVIEW

In 2012, worldwide factory revenue for the high-performance computing technical server market increased by 7.7% to a record \$11.1 billion, up from \$10.3 billion in 2011. 2012 was an exceptional year, with several extremely large-scale systems being deployed and accepted. As we anticipated, in 2013, the HPC market experienced a correction, resulting in a revenue drop of 7.2% to \$10.3 billion.

While 2013 results showed a decline in revenue, this is not indicative of a broader trend but rather a one-time correction from record highs in 2012, which was an exceptional year. IDC is projecting continued growth for the next five years (at a 7.4% CAGR).

The broader HPC market made up of storage, servers, application software, middleware, and services is projected to grow from \$20.26 billion in 2013 to \$29.29 billion by 2018.

The Historic Size of the Broader HPC Market Segments

Table 1 shows revenue for the broader HPC ecosystem categories for the historical year 2013. Server revenue made up half of total HPC market spending, while storage and applications accounted for 19% and 16.3%, respectively, and nearly 15% was spent for middleware (5.5%) and services (8.3%). Software as a whole accounted for 21.8% of total HPC spending (note that this excludes software that is bundled within the servers).

TABLE 1**Worldwide Broader HPC Ecosystem Revenue by Category, 2013**

	Revenue (\$M)	Share (%)
Server	10,298.8	50.8
Storage	3,841.1	19.0
Middleware	1,122.1	5.5
Applications	3,305.2	16.3
Services	1,690.5	8.3
Total	20,257.7	100.0

Source: IDC, 2014

FUTURE OUTLOOK**Forecast and Assumptions****Assumptions**

Table 2 summarizes the top 3 assumptions that directly impact this forecast. All the indicators in the macroeconomic category (see Table 3) suggest that the global economic recovery will help improve HPC spending, just as it will for other IT sectors. HPC today is not as insulated as it used to be from the mainstream IT market because of increased penetration into the HPC market of mainstream commodity technologies on the one hand and the growing adoption into the mainstream market of clusters, grids, Linux, and other HPC technologies on the other. Today, HPC has become indispensable for the competitiveness of many industrial organizations. The broadening of the user base also makes the HPC market more prone to macroeconomic changes and therefore causes HPC market dynamics to resemble the dynamics of the general server market.

Starting in 2010, there has been a major shift in the market toward larger systems, with the supercomputers segment showing the strongest growth. The lower end of the HPC market recovered momentum significantly in 2013 but still hasn't returned to prerecession revenue levels. In 2013, the *divisional* segment grew 11.4% year over year to reach \$1.4 billion, or 13.2% of the total HPC server revenue for 2013. The *departmental* segment expanded 12.9% to \$3.4 billion, or 32.7% of total HPC server revenue in 2013. The *workgroup* segment, for HPC systems sold for <\$100,000, showed the

strongest growth, expanding 27.1% over 2012 to \$1.6 billion and representing 15.4% of all HPC server revenue in 2013.

Growth in the worldwide HPC market in 2012 was exceptionally strong and was driven by strong growth in Japan, EMEA, and North America. In 2012, the K system in Japan alone accounted for more than half a billion dollars. These unusual levels of high-profile and high-value sales were not repeated in 2013, resulting in a tepid year in HPC as expected. However, this correction in the HPC market will set the stage for further sustained growth in 2014 and beyond. We expect 2014 will return to a positive growth track, with the positive trend continuing at least until 2018. IDC projects the overall HPC server market will reach \$14.7 billion in 2018.

Table 3 presents our key forecast assumptions. Four major aspects of the market are reviewed in the assumption:

- Macroeconomic trends
- Overall HPC market trends
- HPC buyer segment trends
- HPC technology trends

We expect the government, homeland security, and academic spaces to remain bright spots during the forecast period. These sectors usually get all or some of their procurement funding from the government; therefore, their purchasing behavior is somewhat different from that of industrial sectors. Generally speaking, these sectors are less impacted by the change of economic climate compared with industrial sectors. We expect that supercomputers and very large supercomputers will continue as the bright spots over the next five years. As the exascale race around the world becomes fiercer, we expect to see more nations announcing their exascale plans and more multi-petascale systems being rolled out in the forecast years. Many of these large-scale systems will end up in government and at large academic HPC centers. Over the next few years, we anticipate that nations will also invest more money in software and applications that can efficiently utilize the petascale HPC systems.

The HPC recovery in industrial sectors will be more dependent on overall economic trends. Industries will demonstrate different growth rates. IDC expects that within the industrial sector, the oil and gas and manufacturing segments will grow at especially healthy rates from 2014 to 2018. As the global economy grows, the demand for oil will also pick up, which in turn will drive up sales for HPC servers that can run large-scale seismic analysis and reservoir simulations.

IDC expects that for the rest of the industrial sectors, spending in HPC will increase at more moderate rates as companies expand their HPC investments to remain competitive.

TABLE 2

Top 3 Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Economy	<p>The global economy was sluggish in 2013, with volatility in emerging markets and weaker growth in mature economies. The U.S. government shutdown dragged on the GDP in the fourth quarter, and the recoveries in Europe and Japan appeared to lose some steam. China recorded its slowest rate of growth in 14 years. 2014 will see stronger growth in mature economies including the United States, but emerging markets are vulnerable to capital flight and will be volatile again.</p>	<p>A down economy affects business and consumer confidence, the availability of credit and private investment, and internal funding. A global recession would cause businesses to delay IT upgrades and some new projects; a rising economy does the opposite. A crisis (perhaps triggered by more volatility in emerging markets) could create a chain of events that would drive tech spending much lower in the near term.</p>	<p>Macroeconomic forecasts for 2014 and 2015 have not improved that much, with users being cautious in their spending. Downside risk factors include the deterioration of the sovereign debt crisis in Europe, the impact of inflation in emerging markets (especially energy and food prices), high unemployment, lingering weakness in real estate in advanced economies, and political instability in the Middle East. The upside would be a faster-than-expected drop in unemployment, with the private sector making up for cuts in public sector jobs, as well as a stronger-than-expected rebound of investment in advanced economies.</p>	<p>The world economy is unstable right now. Any increased slowdown in one geographic region can ripple through to other regions.</p>

TABLE 2

Top 3 Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Crisis duration/ potential relapse	2013 was a bump in the road for the global economy, with growth weaker than forecast, but the long-term recovery remains on course and in line with expectations. There are still downside risks that could trigger a relapse: debt in Europe, a hard landing in China, and capital flight from emerging economies. The long-term period of "weaker growth" still appears to be the baseline scenario.	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. As businesses came to believe the risks were receding, they loosened their purse strings. However, this was dampened by a sense that the crisis has given way to a period of long-term weaker growth. A return of "crisis mode," perhaps triggered by events in emerging markets, could yet plunge the global economy back to square one. While the risk of relapse lingers, business confidence will remain inhibited to some degree.	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 worst is over, and they are beginning to 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 cause a ripple effect throughout the worldwide economy.	IDC considers the signals still mixed as to how long the slowdown will continue.

TABLE 2

Top 3 Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Hardware	Capital spending on IT equipment was weak in 2013, but this has helped create a certain level of pent-up demand for infrastructure investment. The slowdown in emerging markets has also contributed to lower overall growth, and a rebound is likely if those economies continue to stabilize. We expect capital spending to accelerate in 2014 as businesses look to "fix the roof while the sun is shining."	Hardware spending, about 40% of total IT spending, also drives downstream spending in software and services.	The upside would be a continued strong willingness by businesses to invest in infrastructure, the buildout of cloud services, and consumer enthusiasm for new devices including smartphones and tablets; the downside would be tied to an economic picture worse than that assumed, perhaps triggered by events in Ukraine.	Different parts of the world will recover from the recession at different rates. There will be some emerging countries that will have stronger-than-average growth rates.

Source: IDC, 2014

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Macroeconomic trends				
Economy	The global economy was sluggish in 2013, with volatility in emerging markets and weaker growth in mature economies. The U.S. government shutdown dragged on the GDP in the fourth quarter, and the recoveries in Europe and Japan appeared to lose some steam. China recorded its slowest rate of growth in 14 years. 2014 will see stronger growth in mature economies including the United States, but emerging markets are vulnerable to capital flight and will be volatile again.	Moderate. A down economy affects business and consumer confidence, the availability of credit and private investment, and internal funding. A global recession would cause businesses to delay IT upgrades and some new projects; a rising economy does the opposite. A crisis (perhaps triggered by more volatility in emerging markets) could create a chain of events that would drive tech spending much lower in the near term.	↔	★★★★☆
Crisis duration/ potential relapse	2013 was a bump in the road for the global economy, with growth weaker than forecast, but the long-term recovery remains on course and in line with expectations. There are still downside risks that could trigger a relapse: debt in Europe, a hard landing in China, and capital flight from emerging economies. The long-term period of "weaker growth" still appears to be the baseline scenario.	Moderate. 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. As businesses came to believe the risks were receding, they loosened their purse strings. However, this was dampened by a sense that the crisis has given way to a period of long-term weaker growth. A return of "crisis mode," perhaps triggered by events in emerging markets, could yet plunge the global economy back to square one. While the risk of relapse lingers, business confidence will remain inhibited to some degree.	↓	★★★★☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Hardware	Capital spending on IT equipment was weak in 2013, but this has helped create a certain level of pent-up demand for infrastructure investment. The slowdown in emerging markets has also contributed to lower overall growth, and a rebound is likely if those economies continue to stabilize. We expect capital spending to accelerate in 2014 as businesses look to "fix the roof while the sun is shining."	High. Hardware spending, about 40% of total IT spending, also drives downstream spending in software and services.	↑	★★★★☆
Profits	Corporate profits have been stable if unspectacular in most countries and are likely to remain so in 2014. Businesses have come to terms with an economy that has settled into a long-term period of subdued growth, and they have positioned themselves accordingly. Profits are unlikely to surprise on the upside or the downside in 2014 and are therefore unlikely to disrupt IT spending plans.	Moderate. If profits are more subdued than expected, this could delay new investments including project-based IT spending. In an upside scenario, if profits begin to accelerate again in 2014, this will drive businesses to tap into their cash reserves.	↔	★★★★☆
Inflation	Inflationary pressures are currently a moderate concern in developed economies but retain the potential to disrupt economic growth in emerging markets because of currency devaluation in countries such as India. In particular, any rise in energy prices could have a severe impact on vulnerable economies. Cost-of-living increases in many countries are still outpacing income growth. In Japan, the government is actively seeking to drive inflation by loosening monetary policies to force a solution to deflation.	High. 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 products and component imports. Currency devaluation raises import prices, pressurizing profit margins at a time when businesses can least afford to pass this inflationary effect on to pessimistic consumers.	↓	★★★★☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Cloud	<p>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. In the short term, this will have a negative impact on some IT vendors, pressuring profit margins and increasing competition while allowing some end users to lower their overall spending on certain solutions. In the long term, however, we believe that cloud will have a positive overall impact on industry growth as more users adopt more advanced computing solutions at a faster rate.</p>	<p>Moderate. 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 benefits may be offset to some extent by cannibalization in the short term, resulting in 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 in the long term. We see cloud adoption as an IT spending driver overall, despite these cannibalization effects in the next two to three years. Many HPC workloads are not easily partitionable to run on today's cloud architectures. As clouds become more capable of supporting HPC jobs, cloud adoption will accelerate.</p>	<p>↑</p>	<p>★★★★☆</p>

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Demographics	The aging of the workforce in the developed world and the growth of the workforce in lower-cost geographies will affect both the supply of and the demand for IT. These may be long-term trends, but they are already manifesting in the globalization of the workforce and the slow ICT market growth in places such as Western Europe. The center of ICT supply will migrate toward Asia and Eastern Europe but, in general, will also diversify. IDC also expects renewed FDI and VC funding for emerging markets such as China and India. ICT consumption will migrate to large population geographies as the center of gravity for IT shifts from the PC to the mobile phone.	High. Many sites report great difficulty in finding enough people with the right qualifications, especially algorithm developers parallel programmers, system administrators, and individuals whose knowledge spans the science and the technology.	↓	★★★★☆
Application availability	ISVs lag in developing multithreaded applications to take advantage of multicore processors.	Moderate. This will accelerate the Linux adoption trend.	↑	★★★★☆
Overall HPC market trends				
Economic impacts on HPC	The recovery of the global economy will continue to have a positive impact on overall IT markets, IT server spending, and HPC server spending.	High. HPC server sales will continue to grow following the decline in 2013, after the positive momentum in 2010, 2011, and 2012. Pent-up demand at the low end should fuel growth as the global economy rebounds. IDC forecasts growth for all HPC competitive segments.	↑	★★★★☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
High-end HPC supercomputer sector	The high-end "supercomputer" segment will stay a bright spot as the petascale/exascale race intensifies across the globe. Funding will likely increase for large-scale HPC procurements. 2012 was an exceptionally strong year for the supercomputer sector, and as we predicted, 2013 saw a substantial decline from that historical high. We believe the supercomputer segment will continue to grow at a robust, more moderate rate.	Moderate. This "lumpy" segment will remain subject to major swings on a quarter-to-quarter basis because of the relatively small number of large transactions that occur in this segment. Annual swings can also happen, especially if one or more anticipated fourth-quarter large sales slip into the following year or, conversely, if one or more large sales are accepted in the fourth quarter instead of the following first quarter.	↑	★★★★☆
Mainstream midrange HPC market	The midrange HPC market revenue profile will see healthy growth in the forecast period as macroeconomic conditions improve.	Moderate. 1Q13 showed the first sign of strong recovery, with a healthy increase in HPC server spending. 2013 results increased our belief that the midrange HPC segment is back on a growth track.	↑	★★★★☆
Mainstream low-end HPC market	The low-end HPC market resumed revenue growth in 2013. As macroeconomic condition improves during the forecast period, discretionary budgets will slowly come back and the low-end market will expand again at a healthy rate.	High. We expect the CAGR during the forecast period to be very robust as the improving economy taps demand pent up during the most difficult period of the recession and as more small and medium-sized organizations appreciate the value of HPC.	↑	★★★★☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
HPC buyer segment trends				
HPC sales in government and academic sectors	Government and university HPC purchasing will remain a bright spot in HPC during the recovery period. Government stimulus funding will flow into specific areas for the development of certain technologies and applications. Some of these funds will be used to purchase HPC systems. There is uncertainty in funding levels for HPC in many areas of the world as governments evaluate trade-offs with other national priorities. Government buyers will increasingly demand ROI arguments to augment established rationales based on scientific advancement and national security.	Moderate. Government and university HPC purchases have longer sales cycles, and budgets change more slowly, so the impact will not be consistent from quarter to quarter. One or two very large system sales can affect revenue for a given year (e.g., the \$500 million for RIKEN in 2012 made the year exceptionally strong at the high end. No sale of that size occurred in 2013).	↑	★★★★☆
National security and homeland defense	National security and homeland defense operations will continue to develop additional requirements for HPC systems. New applications areas for HPC may be developed based on database and pattern-matching requirements.	Moderate. Requirements will lead to increased demand through the forecast period.	↑	★★★★☆
Energy sectors	The worldwide demand for oil has picked up with the economic recovery and with the expanding economies of BRIC countries. As a result, the cost of energy will continue to go up. This increased demand will help spur sales for systems for seismic analysis and reservoir modeling, along with HPC systems for alternative energy sources.	High. R&D for alternative energy sources, nuclear, coal, and oil and gas are expected to be strong growth segments.	↑	★★★★☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Gaming, digital content, and entertainment sectors	The use of HPC to create better large-scale games, digital content, animations, and more interesting videos/movies is expected to grow at a healthy rate.	Moderate. This will lead to an increase in demand for technical servers.	↑	★★★★☆☆
Automotive segment	The crisis in the auto industry put some HPC procurements on hold starting in early 2008. Because of the auto industry recovery in 2012 and 2013, we are seeing renewed momentum as automakers strive to compete globally for renewed consumer demand.	Moderate. The automotive industry is creating strategies for employing HPC to a greater extent during the continuing recovery.	↑	★★★★☆☆
Worldwide finance segment	As the economic recession subsides, IDC foresees increased investment in HPC, especially to support new high frequency trading (HFT) algorithms. HPDA applications will cause strong growth.	High. Many new HPC procurements will be used for running new algorithms faster and more accurately.	↑	★★★★☆☆
HPC technology trends				
Petascale/exascale initiatives	Petascale/exascale initiatives around the world will continue to increase momentum in IDC's supercomputer segment. Despite the current uncertainty surrounding exascale development in the United States, the United States is expected to compete strongly with European and Asian exascale initiatives.	High. A number of nations are in the race to develop petascale and exascale systems, some of which are already \$100 million per system. This will stimulate global revenue expenditures at the high end of the HPC market.	↑	★★★★☆☆

TABLE 3

Key Forecast Assumptions for the Worldwide Broader HPC Market, 2014-2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Coprocessors	x86 base processors will remain dominant during the forecast period. Coprocessors and accelerators, especially NVIDIA GPGPUs and Intel Xeon Phi, will see increased traction in the 2014–2016 period. Low-power processors, such as ARM and Atom, will begin finding their place in the HPC ecosystem.	High. Coprocessors and accelerators are rapidly gaining momentum in the HPC community today, and mainstream adoption is largely dependent on programming models and application readiness.	↑	★★★★★
High-performance data analysis (Big Data needing HPC)	Data-intensive computing has long been a part of HPC, but newer analytical methods using Hadoop and other methods (e.g., graph analytics) will grow the Big Data market in HPC. In addition, the data explosion in HPC will drive larger system and storage purchases. In the long term, Big Data will shift HPC architectures away from their current extreme compute centrism.	High. We expect most buyers to purchase the same systems for traditional HPC and newer Big Data uses, but the new methods will increase average system sizes. More commercial firms will migrate to HPC for the first time to handle advanced analytics.	↑	★★★★☆
HPC leadership	Europe has already committed a major increase in funding for HPC. China and Japan will compete heavily for global leadership and will increase funding during the forecast period. Russia is increasing funding for HPC. We also expect South Korea to increase funding, and HPC is growing in Brazil and Latin America in general. The wild card is how the United States will respond to this increased competition.	High. Governments around the world are increasingly recognizing the importance of HPC not only for scientific advances but also for industrial innovation and economic competitiveness.	↑	★★★★★

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

Source: IDC, 2014

Growth Rates for the Broader HPC Market

Table 4 displays IDC's forecast broken out by these key HPC budget categories: server hardware, storage, middleware, application software, and repair services. IDC expects total spending across these categories will increase during the 2013-2018 period at a healthy 7.6% CAGR to reach \$29.29 billion in 2018, or about double the \$14.7 billion forecast for the server category alone.

In addition:

- IDC forecasts that HPC server revenue will grow at a 7.4% CAGR to reach \$14.7 billion in 2018, or about half of the \$29.29 billion total for all HPC budget categories. Server hardware will remain the largest spending category and one of the faster-growing segments.
- IDC forecasts that storage revenue will expand at a strong 9.0% CAGR to reach about \$5.9 billion in 2018, or about 20% of all HPC expenditures (versus 19% in 2013). Storage revenue has been growing faster than server revenue for several years, and IDC expects this trend will continue as HPC sites contend with the data explosion, which is even more pronounced in many HPC environments than in their enterprise counterparts.
- Middleware revenue will grow at a healthy rate (7.2% CAGR) to exceed \$1.5 billion in 2018, or about 5.4% of all HPC expenditures. Growth could be larger if dedicated HPC cloud computing environments, especially public and hybrid clouds, and data-intensive computing ("Big Data") ramp up faster than expected and present larger opportunities for middleware vendors.
- IDC expects that application software revenue will increase at a healthy 8.0% CAGR to reach \$4.9 billion in 2018, or 16.6% of overall HPC spending. Because high-end government and university centers rely less on paid ISV applications than do industrial/commercial sites, the global petascale/exascale race will not as heavily benefit ISVs. Harder to predict is the extent to which ISVs will succeed in the difficult task of creating software licensing models that are more attuned to contemporary highly parallel, multicore, heterogeneous HPC systems.
- Services revenue should continue to grow at a moderate rate (5.8% CAGR) to reach \$2.2 billion in 2018, or about 7.6% of overall HPC expenditures.

TABLE 4**Worldwide Broader HPC Ecosystem Revenue by Category, 2009-2018 (\$M)**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
Server	8,614.1	9,498.3	10,300.1	11,097.7	10,298.8	11,181.0	12,063.1	12,945.3	13,827.5	14,709.7	7.4
Storage	3,015.0	3,467.8	3,664.5	4,058.9	3,841.1	4,279.4	4,693.8	5,037.0	5,531.0	5,898.6	9.0
Middleware	1,102.6	1,197.6	1,198.3	1,254.2	1,122.1	1,181.5	1,284.7	1,385.2	1,486.5	1,587.2	7.2
Applications	2,963.3	3,296.9	3,370.0	3,610.7	3,305.2	3,562.0	3,860.2	4,207.2	4,528.5	4,854.2	8.0
Services	1,653.9	1,800.4	1,800.6	1,887.5	1,690.5	1,782.5	1,850.3	1,985.6	2,101.8	2,235.9	5.8
Total	17,348.9	19,261.0	20,333.4	21,909.1	20,257.7	21,986.3	23,752.2	25,560.4	27,475.3	29,285.6	7.6

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

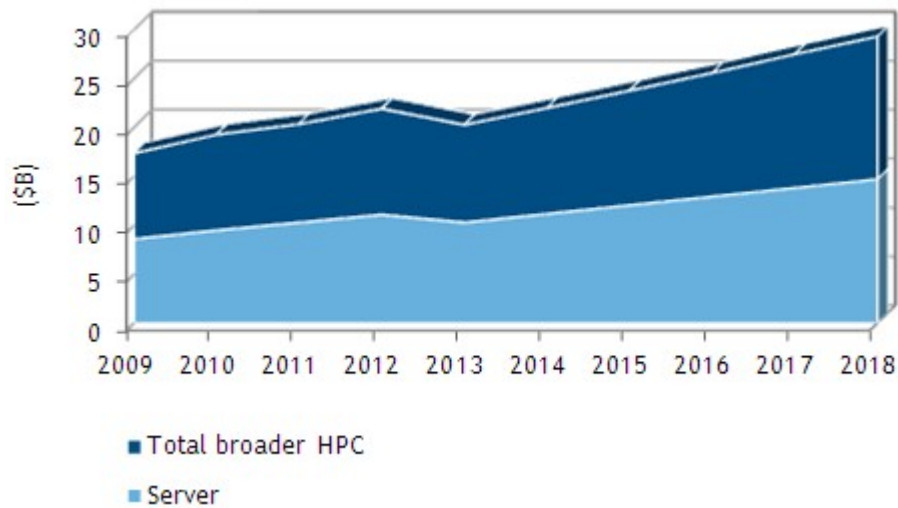
Source: IDC, 2014

Growth Trends

Figure 1 graphically displays the key information contained in Table 4, illustrating that the forecast server growth rate (7.4%) slightly lags behind the forecast growth rate for the broader HPC market that also includes the other categories (7.6%).

FIGURE 1

Worldwide Broader HPC Ecosystem Server and Total HPC Revenue, 2009-2018



Source: IDC, 2014

ESSENTIAL GUIDANCE

The broader HPC market, which includes technical servers, storage, middleware (HPC management software), applications software, and repair services, has bounced back from the global economic recession and is on a healthy growth path. IDC predicts that the market will expand at a 7.6% CAGR to reach \$29.29 billion in 2018 compared with \$20.26 billion in 2013. This represents a net revenue gain of 44.6% during the five-year forecast period.

Servers, the largest revenue category, will continue to represent about half of the broader market and will account for \$14.7 billion in 2018. Storage will continue to be the fastest-growing category, with a 9.0% CAGR that yields \$5.9 billion in 2018 revenue. The software categories of middleware and applications will experience healthy growth and will together generate about \$6.4 billion by 2018. Service will grow at a slightly more moderate rate (5.8% CAGR) to reach \$2.2 billion in 2018.

LEARN MORE

Related Research

Additional research from IDC in the technical computing hardware program includes the following documents:

- *Summary of IDC's 2014 Research in the Use of HPC by Oil and Gas Organizations* (IDC #247704, March 2014)
- *IBM Sale to Lenovo Opens Opportunity for Other HPC Vendors* (IDC #lcUS24694314, February 2014)
- *IDC's Worldwide High-Performance Computing Predictions 2014* (IDC #WC20140211, February 2014)
- *Seagate Looking for the X Factor in Its Acquisition of Xyratex* (IDC #lcUS24555413, December 2013)
- *Micron Demonstrates Technologies to Address Emerging Challenges in Big Data Applications* (IDC #244843, December 2013)
- *Market Analysis Perspective: Worldwide HPC, 2013 – Directions, Trends, and Customer Requirements* (IDC #244742, December 2013)
- *HPDA Pulse: 2013 Software and Consulting Market Analysis* (IDC #244513, November 2013)
- *HPDA Pulse Results: 2013 Hardware and Storage Market Analysis* (IDC #244493, November 2013)
- *HP FY13: Revenue Declines Abate on Stronger Core Business* (IDC #lcUS24466413, November 2013)
- *Catalyst Supercomputer Heralds Shift to More Balanced Architectures* (IDC #lcUS24437513, November 2013)
- *China Eyes 10,000-Fold Data Reduction for Internet of Things* (IDC #lcUS24392513, October 2013)
- *HPC User Forum, October 2013, Seoul, Korea* (IDC #243786, October 2013)
- *Tools and Techniques for Technical Computing in Life Sciences: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243778, October 2013)
- *Perspectives on Quantum Computing: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243777, October 2013)
- *National and International Initiatives: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243776, October 2013)
- *Issues in High-Performance Computing: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243775, October 2013)
- *High-Performance Data Analysis in the Life Sciences: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243774, October 2013)

- *Chinese Research in Processor Designs for High-Performance Computing and Other Uses* (IDC #243502, October 2013)
- *World's Fastest Supercomputer Set to Reach Customer in October 2013* (IDC #lcUS24300913, September 2013)
- *The Broader HPC Market 2012-2017 Forecast: Servers, Storage, Software, Middleware, and Services* (IDC #242742, August 2013)
- *IDC's Worldwide Technical Server Taxonomy, 2013* (IDC #242725, August 2013)
- *China Regains Top Supercomputer Title* (IDC #lcUS24190613, June 2013)
- *10 Things CIOs Should Know About High-Performance Computing* (IDC #241565, June 2013)
- *Worldwide High-Performance Data Analysis 2013-2017 Forecast* (IDC #241315, June 2013)
- *Top Issues for HPC Sites: HPC User Forum, April 29-May 1, 2013, Tucson, Arizona* (IDC #241463, June 2013)

Synopsis

This IDC study presents an overview of IDC's forecast for the broader HPC market for 2014-2018. 2010, 2011, and 2012 were strong recovery years for the HPC technical computing market, with 10%, 8%, and 8% year-over-year growth rates, respectively. According to the data collected in IDC's Worldwide High-Performance Technical Server QView, factory revenue for the HPC technical server market declined 7.2% to \$10.3 billion for the full year 2013, down from a record \$11.1 billion in 2012. IDC had predicted the decline from the prior year when several extremely large supercomputer sales propelled the high-end supercomputer segment of the market to new heights. The broader HPC market comprising storage, servers, application software, middleware, and services is projected to grow from \$20.26 billion in 2013 to \$29.29 billion by 2018.

According to Earl Joseph, IDC HPC program vice president, "We are now forecasting a 7.4% CAGR for the HPC server market from 2013 to 2018, and we expect the HPC server market to exceed \$14.7 billion by 2018."

About IDC

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

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-insights-community.com
www.idc.com

Copyright Notice

This IDC research document was published as part of an IDC continuous intelligence service, providing written research, analyst interactions, telebriefings, and conferences. Visit www.idc.com to learn more about IDC subscription and consulting services. To view a list of IDC offices worldwide, visit www.idc.com/offices. Please contact the IDC Hotline at 800.343.4952, ext. 7988 (or +1.508.988.7988) or sales@idc.com for information on applying the price of this document toward the purchase of an IDC service or for information on additional copies or Web rights.

Copyright 2014 IDC. Reproduction is forbidden unless authorized. All rights reserved.

