FORECAST UPDATE

Worldwide Technical Computing Server 2014–2018 Forecast Update

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IDC OPINION

This document presents IDC's new forecast for the high-performance computing (HPC) technical server market. 2014 has become a difficult year for the technical computing server market with growing softness at the very high end combined with a major vendor change. 2013 started the high-end slowdown, after three years of record-breaking growth. In this document, we are adjusting our 2014 forecasts in a major way – from a 10% growth rate to an approximately 2% decline in overall revenue for the year. The global economic turmoil that hit technical computing hard starting in late 2008 was reversed by a strong 2009–2012 performance. In 2012, worldwide factory revenue for the high-performance computing technical server market increased by 7.7% year over year to reach a record $11.1 billion, up from $10.3 billion in 2011. Then in 2013, the high end of the market slowed down and saw a minor decline. Forecasting for the post-crisis era is both exciting and challenging at the same time, so we plan to create forecast updates each quarter until the market returns to a more stable growth trend. This new IDC HPC forecast still predicts a healthy overall worldwide long-term compound annual growth rate (CAGR) of 6.4% out to 2018 and 4.3% annual growth in HPC system units shipped. Note that HPC units shipped are projected to grow more slowly because of the increase in average system purchase prices. All four competitive segments are projected to show growth starting in 2015. In this document, we present our latest five-year forecast for the technical computing server space covering the 2014–2018 period. This Forecast Update covers these areas:

- A brief overview on the market
- Detailed assumptions for our five-year forecast
- New forecasts for technical computing server revenue, unit shipments, and average selling prices (ASPs) for each of the four competitive segments IDC tracks
- Guidance for vendors

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IN THIS FORECAST UPDATE

This IDC Forecast Update presents an overview of IDC's forecast for the technical computing server market for the 2014–2018 period. The data in this document is based on IDC's segmentation of the technical computing server 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

2010, 2011, and 2012 were strong recovery years for the HPC technical computing market, with 10%, 8%, and 8% year-on-year growth rates, respectively. Then 2013 and now 2014 showed a market slowdown. According to Earl Joseph, IDC HPC program vice president, "We are now forecasting a slight decline for 2014, followed by a 6.4% CAGR for the HPC market from 2014 to 2018, and expect the HPC server market to reach $14.1 billion by 2018."

Methodology

The forecasts in this document 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 (ASP) 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 commercial (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

The overall HPC market recently suffered two consecutive years of decline in 2013 and 2014 (projected) because of a slowdown at the very high end of the market, combined with the split up of IBM x86 servers to Lenovo. For 2014, IDC is now projecting a decline of approximately 2%. IDC is projecting growth for the 2015–2018 period in the 6.4% a year range.

FUTURE OUTLOOK

Forecast and Assumptions

Table 1 summarizes the top 3 assumptions that directly impact this forecast. HPC today is not as insulated as it used to be from the macroeconomic condition because of the cluster penetration and the resulting downstream adoption of commodity technologies. While government labs and universities remain as the major users of HPC, clusters built on commodity components have helped expand the HPC adoption significantly since 2003. Today, HPC has become indispensible for many industrial organizations to stay competitive. The broadening of the user base also makes the HPC market more prone to macroeconomic changes and therefore to resemble the dynamics of the general server market.

Starting in 2009 and continuing to 2012, there was a major shift in the market toward larger systems, with supercomputers showing the strongest growth. The lower end of the HPC market started to show growth in 2013 but still hasn't recovered from the previous high points.

The positive market results for 2009–2012 in HPC demonstrate three successive years of growth, indicating that the HPC market has emerged from the recession and overall HPC spending is back to a healthy growth mode. Unfortunately, 2013 and 2014 reversed this growth trend. Table 2 presents key forecast assumptions behind the forecast. Four major aspects of the market were reviewed in the assumption. They are:

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

We expect the government, homeland security, and academia spaces to remain bright spots during the forecast period. These sectors usually get their procurement funding from the government; therefore, their purchasing behavior is somewhat different from that of other sectors. These sectors are less impacted by changes in economic climate compared with other sectors. We expect that supercomputers and very large supercomputers will continue as the bright spots over the next five years. As the petascale/exascale race around the world becomes fiercer, we expect to see more nations announcing their petascale/exascale plans and more of such systems being rolled out in the forecast years. Many of these large-scale systems will end up in the government and academic sites, although we saw that industry installed some starting in 2012 and continue the trend in 2013. We

anticipate that over the next few years, nations will invest significantly in software and applications that can efficiently utilize the petascale HPC systems.

IDC expects that among the entire industrial sector, the oil and gas, finance, and DCC/gaming segments will grow at a very healthy rate 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 systems that can run large-scale seismic analysis and reservoir simulations. On the DCC side, we are seeing an increased demand for systems capable of running large-scale, sophisticated games as well as 3D movies. IDC expects that for the rest of industrial sectors, there will be an increased spending in HPC at a more moderate rate (i.e., the growth rate in these sectors will be close to that for other IT spending, as companies slowly resume their discretionary budget).

TABLE 1

Top 3 Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
High-end slowdown	The very high end of the HPC market has stalled for almost two years, after a major growth cycle. IDC expects that 2014 will not have a December surprise, and so 2014 will be on par with or slightly lower than 2013 (flat to a -4% decline). Growth at the high end in 2015 will depend on the global exascale race and loosening of government HPC budgets in a time of overall slow economic growth. High-end HPC server revenue is also paced by the timing of new generations of base processors (CPUs).	The high end of the HPC technical server market has been the growth driver since 2009, and the impact of the change in the top 10, or even the top 5, systems has a major impact on the overall market growth rates. In 2012, the top 5 HPC sales represented over 10% of HPC server revenue. The gap between users anticipating exascale performance and what most mainstream HPC users seek may widen, creating a disconnect between the two sectors.	IDC is expecting more softness at the high end for at least six months and possibly another full year.	This is a top driver of the HPC server market growth rate. While the lower 90% of the HPC market is back to a moderate growth rate, the very large sales continue to have a major impact. High-end HPC developers will need to address new application areas — especially HPDA — to meet the changing demands of both public and private users.

TABLE 1

Top 3 Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
Vendor transition	The sale of IBM's x86 server business to Lenovo has caused some IBM clients to delay purchases, while the uncertainty about the ability of government agencies in the United States and a few other nations to purchase high-end x86 server from Lenovo remains unresolved. In addition, the global competition for the IBM installed base has delayed purchases. These issues should settle down by mid-2015, but by then multiple vendors will capture some business from IBM and from accounts intended for Lenovo. Another important factor is vendor Intel "moving up the food chain" to compete in the market for interconnect fabrics and perhaps beyond. Intel has already assumed a more prominent role in multiple large HPC system procurements.	The IBM-Lenovo deal caused major purchase delays in 2014, helping to slow the overall HPC server market in 2014. It may cause a sales spike in 1Q15 or 2Q15 as buyers' purchases catch up with the delays. Intel's expanding role is already being felt in the HPC marketplace and is likely to assume high significance during the forecast period.	China's Lenovo and a growing host of Taiwanese and Chinese white-box suppliers could create significant turmoil in the overall server market (not just HPC) by driving down margins for the established, primarily U.S., server supplier base, ultimately restricting the U.S. suppliers' ability to offer servers designed to compete at the highest level of performance.	IDC expects that the global HPC server market landscape will be transformed over the next three to five years with notable gains coming from both foreign-branded and white-box vendors, as well as a shuffling of market share within the U.S. vendor pool.

TABLE 1

Top 3 Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Significance	Changes to This Assumption That Could Affect Current Forecast	Comments
HPC leadership	The European Commission adopted an ambitious plan to double HPC funding through 2020, but the extent to which the plan is realized remains to be seen. China is becoming a much larger player in both having a top HPC vendor and becoming a major purchaser of large HPC servers. Lenovo could capture a significant share of the HPC market in China in the next few years, bolstering China's efforts to become a commercial HPC powerhouse. The United States is still the largest market for HPC servers, but its high-end plans are uncertain. Russia and India announced plans for increasing funding for HPC, but they may be too strapped for cash to realize the vision. The wild card is how the United States will respond to this increased competition.	Competition in the global high-end HPC market continues to heat up, especially as the race moves away from primarily hardware capabilities to innovative system design and associated software for a growing HPC and HPDA application base. The supercomputer segment took a step back in 2013 after the major growth spurt in preceding years. In 2013, supercomputers accounted for slightly less than half of all HPC server revenue.	A top high-end HPC system can cost well over $100 million and in one case more than $500 million. The deployment or non-deployment of one or two of these systems can significantly impact the yearly market. However, leadership at the highest end of HPC does not necessarily transfer to the HPC sector writ large.	We expect that more countries will enter the race for HPC leadership, and this could create a number of new players at the very high end of the HPC market. It is unclear if this will drive additional growth in the high end or simply present the same size pie to a growing number of suppliers. Ultimately, the race to exascale and beyond will be determined as much by the ability and willingness of competing nations to spend money as by technology advances. This in turn will depend on how vital nations see HPC for their scientific and economic standing.

Source: IDC, 2014

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Top 3 assumptions				
High-end slowdown	The very high end of the HPC market has stalled for almost two years, after a major growth cycle. IDC expects that 2014 will not have a December surprise, and so 2014 will be on par with or slightly lower than 2013 (flat to a -4% decline). Growth at the high end in 2015 will depend on the global exascale race and loosening of government HPC budgets in a time of overall slow economic growth. High-end HPC server revenue is also paced by the timing of new generations of base processors (CPUs).	**High.** This has already caused an overall market slowdown and will likely constrain growth in 2015 to under 7%. We expect that by late 2016, the very high end will move back into a high growth mode.	↓	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Vendor transition	The sale of IBM's x86 server business to Lenovo has caused some IBM clients to delay purchases, while the uncertainty about the ability of government agencies in the United States and a few other nations to purchase high-end x86 server from Lenovo remains unresolved. In addition, the global competition for the IBM installed base has delayed purchases. These issues should settle down by mid-2015, but by then multiple vendors will capture some business from IBM and from accounts intended for Lenovo. Another important factor is vendor Intel "moving up the food chain" to compete in the market for interconnect fabrics and perhaps beyond. Intel has already assumed a more prominent role in multiple large HPC system procurements.	**High.** The negative impacts may last through early 2015, but then we expect to see a return to growth for the IBM installed base.	↑	★★★☆☆

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Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
HPC leadership	The European Commission adopted an ambitious plan to double HPC funding through 2020, but the extent to which the plan is realized remains to be seen. China is becoming a much larger player in both having a top HPC vendor and becoming a major purchaser of large HPC servers. Lenovo could capture a significant share of the HPC market in China in the next few years, bolstering China's efforts to become a commercial HPC powerhouse. The United States is still the largest market for HPC servers, but its high-end plans are uncertain. Russia and India announced plans for increasing funding for HPC, but they may be too strapped for cash to realize the vision. The wild card is how the United States will respond to this increased competition.	**High.** HPC end-user funding in Europe and the United States for very large, leadership-class supercomputers is projected to be slow for another 6 to 18 months.	↓	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Macroeconomic trends				
Economy	IDC assumes that the global economy will be broadly stable but tepid in 2014. Worldwide GDP growth will be around 2.5%, weighed down by Europe. Short-term prospects for the U.S. economy have improved a little since CY 4Q11, and emerging markets have so far remained relatively resilient, but a downside scenario (unraveling of the European single currency) could derail momentum in all regions.	**Moderate.** 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.	↔	★★★☆☆
Exchange rates	There is still some risk of volatility and political tensions around exchange rate manipulation, and the downside scenario in Europe could create massive instability if the European single currency unravels. For now, however, we assume that exchange rates will remain sufficiently stable and that the impact on the growth of the global economy will be minimal.	**Moderate.** A stable or steadily falling dollar makes it easier for vendors to manage supply lines and stabilizes the prices of imports and exports. A weaker domestic currency can boost international firms reporting a positive impact on foreign earnings.	↔	★★☆☆☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Wild cards	We don't predict a future wild card (which by definition is an unpredictable event with the potential to disrupt our forecasts), but the stability of the European currency union represents a wild card that may have a significant impact on forecasts. The economy and the IT market in Europe will be flat or even negative as a result, and the spillover effects of a European currency crisis could be severe for everyone.	**Moderate.** Wild-card events such as a collapse of the eurozone or conflict in Iran have the potential to significantly impact global growth. Even emerging markets could be vulnerable to a major crisis. The HDD shortage, a good example of a wild card that couldn't have been foreseen, had a negative impact on PC volumes.	↓	★★★☆☆
Cloud services	Cloud is a new paradigm of computing that will shape broader IT spending over the next several decades — the logical evolution of what we called "dynamic IT" for years. It entails shared access to virtualized resources over the Internet. Private and public cloud computing is ramping up in HPC.	**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. There may be some negative impact on other areas of IT spending (e.g., traditional service revenue).	↑	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Software industry transformation	The software industry is going through a major transformation, from basic architecture (service-oriented architecture [SOA]) and the way software is written (composite applications) to the way software is delivered (software as a service [SaaS]) and even funded (advertising based). IDC assumes that this transformation will take at least a decade but that it will, when done, allow for much faster and more dynamic delivery of software functionality. In the short term, traditional software makers will struggle with the transition from fixed place computing (predominately PCs and in-house servers) to the mobile/cloud ecosystem as it becomes the major driver of new software development and revenue.	**Moderate.** The new software creation and delivery models should allow for a significant increase in the ability to deliver and integrate new software functionality to ICT systems, especially to a spate of new users in both the developed and the developing world, including SMEs and even the individual. This should increase overall spending even as it lowers costs.	↑	★★★★☆
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 through 2018 for all HPC competitive segments.	↑	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
High-end HPC supercomputer sector	Funding will likely increase for large-scale HPC procurements in 2016–2018. 2012 was an exceptionally strong year for the supercomputer sector, but year-over-year growth of nearly 30% is unsustainable, as shown by the recent slowdown. 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.	**High.** 1Q13 showed the first sign of strong recovery, with a healthy increase in HPC server spending. Both 2013 and 2014 results increased our belief that midrange HPC segment is back on a growth track.	↑	★★★★☆
Mainstream low-end HPC market	The low-end HPC market resumed revenue growth in 2013. During the forecast period, as macroeconomic condition improves, 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 near 10% as the improving economy taps demand pent up during the most difficult period of the recession.	↑	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server 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 likely remain a bright spot during the recovery period, although there is uncertainty in funding levels for HPC in many areas of the world as governments evaluate trade-offs with other national priorities.	**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 $550 million for RIKEN in 2012 made the year exceptionally strong at the high end).	↑	★★★★☆
National security and homeland defense	National security and homeland defense operations will continue to develop additional requirements for HPC systems, especially in HPDA applications. New applications areas for HPDA may be based on database and pattern matching requirements.	**Moderate.** Requirements will lead to increased demand through the forecast period.	↑	★★★☆☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
Energy sectors	We are in an unusual period when energy demand and supply (e.g., fracking) are both increasing. In the United States, gasoline prices have dropped for the moment, but it is difficult to predict how the interaction of growing supply and growing demand will affect the bottom lines of oil and gas (O&G) companies in the long run. As long as energy prices don't go into a sustained depression, IDC expects O&G majors to continue their current competition to acquire the world's largest private sector supercomputers for seismic analysis and reservoir modeling, along with HPC systems for alternative energy research.	**High.** R&D for alternative energy sources, nuclear, coal, and in oil/gas is expected to be a strong growth segment, as long as energy prices remain reasonably strong.	↑	★★★★☆
Bio-life sciences	Perhaps no field has stronger potential for benefiting from HPDA than bioscience. HPDA applications already in motion in this varied field range from advanced research — notably in genomics, proteomics, epidemiology, and systems biology — to commercial initiatives to develop new drugs and medical treatments, agricultural pesticides, and other bioproducts.	**High.** IDC expects global initiatives to improve healthcare quality while controlling costs to drive strong growth in this sector.	↑	★★★★☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server 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. Not long ago, U.S. companies in this sector used HPC as a way to compete against nations with lower labor costs. Increasingly, HPC has become a great equalizer as companies in more nations have learned to exploit it in this sector.	**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	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.	↑	★★★☆☆

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
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, IDC expects the United States 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 already cost $100 million per system. This will stimulate global revenue expenditures at the high end of the HPC market.	↑	★★★★☆
Coprocessors	IDC expects x86 base processors to remain dominant during this 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. The OpenPower Foundation is starting to gain some market presence as well.	**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. In addition, ISV support will be critical for the growth potential of these components in the overall HPC sector.	↑	★★★★★

TABLE 2

Key Forecast Assumptions for the Worldwide Technical Computing Server Market, 2014–2018

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
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 (i.e., the HPDA market). In addition, the data explosion in HPC will drive larger system and storage purchases. In the long term, HPDA will shift HPC architectures away from their current extreme compute centrism. There is some uncertainty as to how much of these new applications will be run in cloud-based datacenters.	**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. However, a new wave of commercial firms are adopting HPC to tackle fraud and other daunting analytics challenges. Over a longer period, HPC in the cloud could significantly alter the trajectory of this sector should it prove technically capable and economically justifiable.	↑	★★★★☆

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

Source: IDC, 2014

Worldwide Overall HPC Server Market Forecasts

As shown in Table 3 and Figures 1-3, IDC expects that over the next five years (2014-2018) the total HPC server market will expand at a CAGR of 6.4% in revenue to reach $14.1 billion by 2018. System unit shipments are projected to grow at 4.3% annually to total of 153,240 system units by 2018. IDC still expects that HPC server growth will be helped by the continuing "petascale/exascale race" for high-end leadership.

TABLE 3

Worldwide Technical Computing Server Revenue, Shipment, and Average Selling Price, 2008-2018

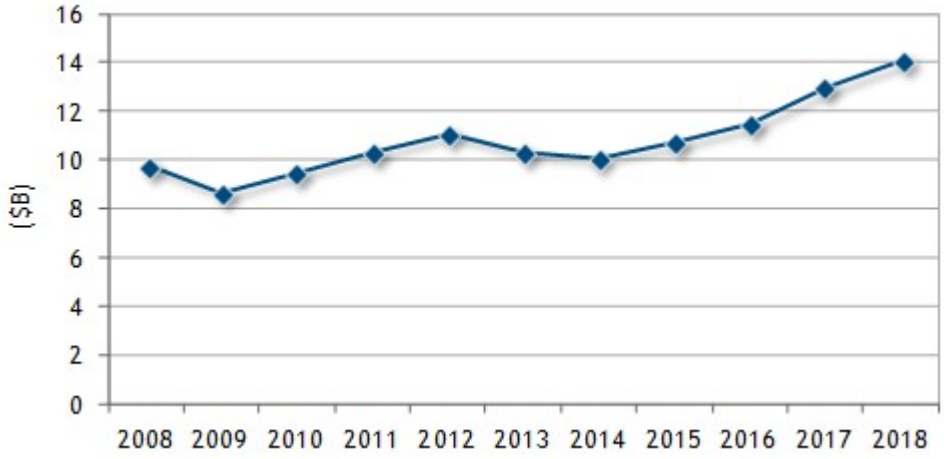
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2014 Growth (%)	2013–2018 CAGR (%)
Revenue ($M)	9,772	8,614	9,498	10,300	11,098	10,299	10,084	10,718	11,467	12,958	14,073	-2.1	6.4
Shipments	174,091	105,054	119,844	111,550	104,148	123,982	118,630	127,747	136,497	145,847	153,240	-4.3	4.3
ASP ($000)	56	82	79	92	107	83	85	84	84	89	92	2.3	2.0

Note: See Table 1 for top 3 assumptions and Table 2 for key forecast assumptions.

Source: IDC, 2014

FIGURE 1

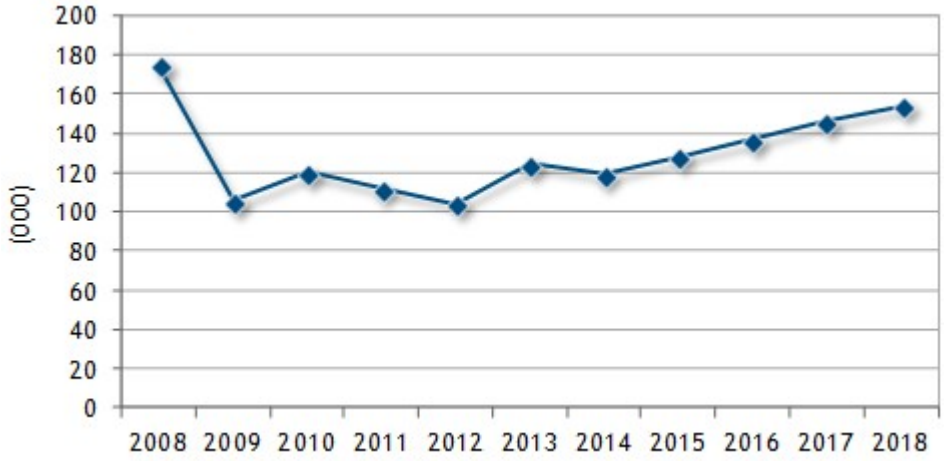
Worldwide Technical Computing Server Revenue, 2008-2018



Source: IDC, 2014

FIGURE 2

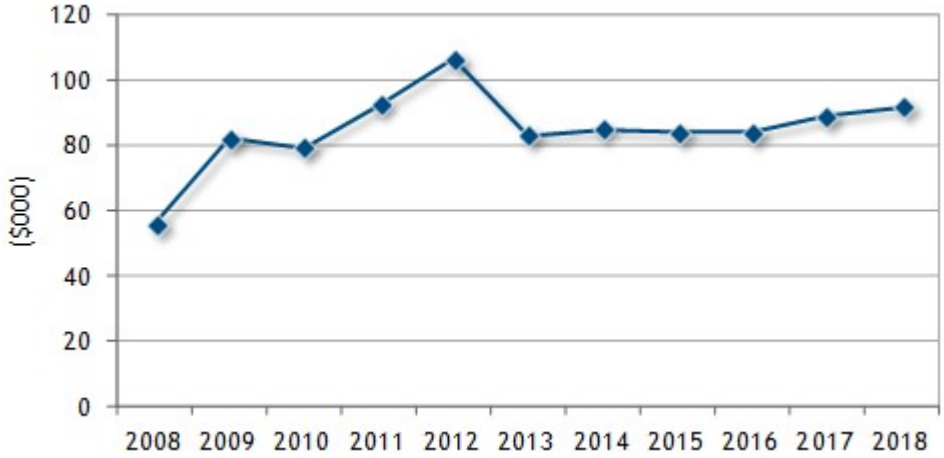
Worldwide Technical Computing Server Shipments, 2008-2018



Source: IDC, 2014

FIGURE 3

Worldwide Technical Computing Server Average Selling Price, 2008–2018



Source: IDC, 2014

Forecasts by Competitive Segments

Tables 4–6 present HPC revenue, shipment, and ASP forecasts by the four competitive segments. From a competitive segment perspective, we expect to see the highest growth in the workgroup segment with a CAGR of 8.3% for the next five years (because of its continued recovery from dropping so much over the 2008 recession), followed closely by the departmental segment where we project a 6.7% CAGR for the forecast period. The divisional segment is projected to grow at a 5.2% rate, and the supercomputer segment is projected to grow at a rate of 5.9% (from a new lower base) going to 2018.

TABLE 4

Worldwide Technical Computing Server Revenue by Competitive Segment, 2008–2018 ($M)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2014 Growth (%)	2013–2018 CAGR (%)
Supercomputer	2,685	3,342	3,476	4,370	5,655	3,995	3,502	3,624	3,830	4,792	5,312	-12.3	5.9
Divisional	1,391	1,079	1,269	1,237	1,216	1,355	1,381	1,458	1,553	1,649	1,742	1.9	5.2
Departmental	3,166	2,883	3,343	3,467	2,979	3,363	3,510	3,784	4,065	4,339	4,661	4.4	6.7
Workgroup	2,530	1,311	1,411	1,226	1,247	1,586	1,692	1,853	2,018	2,178	2,358	6.7	8.3
Total	9,772	8,614	9,498	10,300	11,098	10,299	10,084	10,718	11,467	12,958	14,073	-2.1	6.4

Note: See Table 1 for top 3 assumptions and Table 2 for key forecast assumptions.

Source: IDC, 2014

TABLE 5

Worldwide Technical Computing Server Shipments by Competitive Segment, 2008-2018

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2014 Growth (%)	2013–2018 CAGR (%)
Supercomputer	1,862	2,067	2,560	2,908	2,400	1,484	1,403	1,455	1,440	1,425	1,410	-5.5	-1.0
Divisional	4,029	3,596	3,914	3,724	3,663	4,271	4,106	4,416	4,750	5,109	5,495	-3.9	5.2
Departmental	20,066	17,963	20,382	20,624	16,981	20,246	19,485	20,923	22,467	24,125	25,905	-3.8	5.1
Workgroup	148,134	81,428	92,988	84,294	81,104	97,981	93,636	100,953	107,841	115,188	120,429	-4.4	4.2
Total	174,091	105,054	119,844	111,550	104,148	123,982	118,630	127,747	136,497	145,847	153,240	-4.3	4.3

Note: See Table 1 for top 3 assumptions and Table 2 for key forecast assumptions.

Source: IDC, 2014

TABLE 6

Worldwide Technical Computing Server Average Selling Price by Competitive Segment, 2008–2018 ($000)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2014 Growth (%)	2013–2018 CAGR (%)
Supercomputer	1,442	1,617	1,358	1,503	2,356	2,691	2,495	2,491	2,660	3,363	3,767	-7.3	7.0
Divisional	345	300	324	332	332	317	336	330	327	323	317	6.0	0.0
Departmental	158	160	164	168	175	166	180	181	181	180	180	8.4	1.6
Workgroup	17	16	15	15	15	16	18	18	19	19	20	11.6	3.9
Total	56	82	79	92	107	83	85	84	84	89	92	2.3	2.0

Note: See Table 1 for top 3 assumptions and Table 2 for key forecast assumptions.

Source: IDC, 2014

Supercomputer Segment (ASP $500,000+)

The supercomputer segment is driving very broad swings in the overall HPC server market these days. It showed strong growth in 2012 at 29%, resulting in $5.7 billion in revenue. It was also very strong in 2011, with over 25% growth, resulting in $4.4 billion in revenue. But things changed in 2013 and 2014, resulting in declines in both years. 2014 is projected to decline by 12%. Going forward to 2018, we project a CAGR of 5.9% for the supercomputer segment for the next five years, and total revenue in this segment is projected to reach $5.3 billion. We expect more petascale or near petascale systems to be built and deployed in the forecast years, and some derivative smaller systems based on the same technologies used on petascale computers will also be rolled out in the outer years. The major area to watch is how many new top 10 systems are installed each year and at what price – this could be the driving factor for the overall market growth rates in many years.

Divisional Segment (ASP $250,000-499,999)

The divisional segment will also see growth over the forecast period. We expect that this segment will growth at a CAGR of 5.2% in revenue for the 2014–2018 period. This segment suffered a 22% decline in 2009 compared with 2008, mainly caused by the reduction of discretionary budget at many organizations during the economic crisis. As the economy recovered in 2010, it reached $1.3 billion and went up and down through 2013. In the following year (2014), we project that the divisional segment will grow by 2% with total revenue of $1.38 billion.

Departmental Segment (ASP $100,000-249,999)

The departmental segment used to be the largest revenue contributor to HPC prior to 2009; then the economic downturn changed that dynamic. In 2009, supercomputers, the high-end segment in HPC generated the most revenue, and the departmental segment was rendered to second place. Revenue in the departmental segment reached $3.5 billion in 2011. In 2012, the departmental segment experienced a 14% decline, resulting in $3 billion in revenue, and then it started growing well in 2013. We are projecting that 2014 will show growth in the 4.4% range. We expect that in the forecast years, the departmental segment will pick up at a relatively strong rate as companies resume their discretionary spending. We expect a CAGR of 6.7% and unit shipments at 5.1% for the departmental segment for 2014–2018. Clusters are the dominant system architecture in this segment, taking over 90% of system deployments. We believe the scalability of the clusters will give them significant advantage as they provide users flexibility and better control with their budget.

Workgroup Segment (ASP <$100,000)

In 2009, the workgroup segment suffered the most among all of the four segments that IDC tracks, with revenue loss at 33% compared with 2008. 2011 showed a major decline of 13%, resulting in $1.2 billion in workgroup HPC server sales. In 2012, the workgroup segment grew by 2%, with revenue of $1.3 billion. For 2014, we are projecting growth of 6.7%. As the low end of the market, this segment will often closely follow discretionary budget trends within an organization. We expect the workgroup segment revenue to grow at a stronger CAGR of 8.3% from 2014 to 2018.

Market Context

Table 7 and Figure 4 compare the previous IDC HPC market forecast (see *Worldwide Technical Computing Server 2014–2018 Forecast,* IDC #248779, May 2014) with this current forecast. The new forecast represents a decrease from IDC's May 2014 forecast for all five years, starting in 2014. This decrease is based on the impact of the slowdown at the very high end, combined with the IBM-Lenovo transition.

TABLE 7

Worldwide Technical Computing Server Revenue, 2008–2018: Comparison of May 2014 and January 2015 Forecasts ($M)

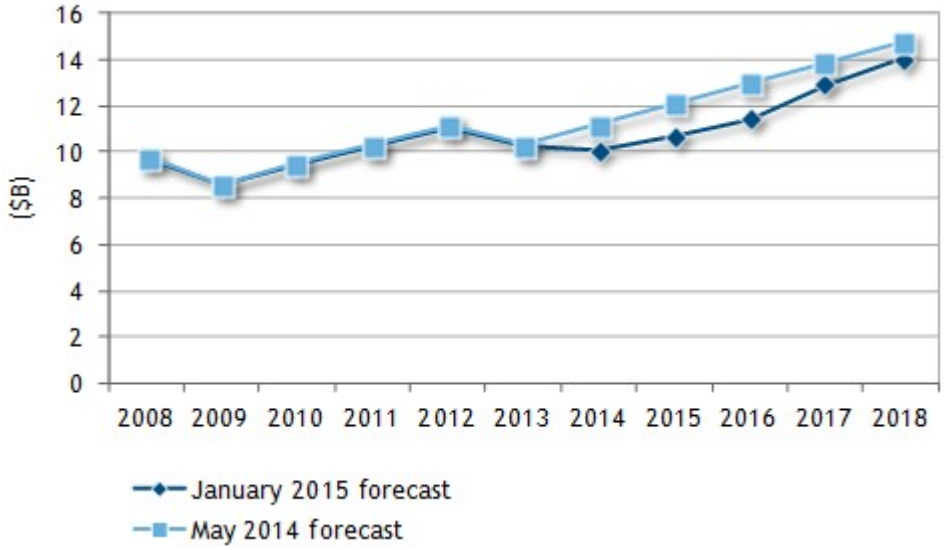
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
January 2015 forecast	9,772	8,614	9,498	10,300	11,098	10,299	10,084	10,718	11,467	12,958	14,073	6.4
May 2014 forecast	9,772	8,614	9,498	10,300	11,098	10,299	11,181	12,063	12,945	13,828	14,710	9.3

Note: See *Worldwide Technical Computing Server 2014-2018 Forecast* (IDC #248779, May 2014) for prior forecast.

Source: IDC, 2014

FIGURE 4

Worldwide Technical Computing Server Revenue, 2008–2018: Comparison of May 2014 and January 2015 Forecasts



Source: IDC, 2014

ESSENTIAL GUIDANCE

After three consecutive years of healthy growth (2009 to 2012), HPC has seen a two-year slowdown, primarily driven by the slowdown at the very high end, combined with the IBM-Lenovo transition. With the changing market dynamics in many different areas, we advise vendors to consider the following:

- Carefully select target markets and then focus on developing differentiated solutions and services for your targeted segments (e.g., Big Data combined with big compute, industry-focused solutions, petascale software solutions).
- HPC ecosystem complexity and capability is increasing due to accelerators and coprocessors, new types of storage like flash, and new I/O and interconnects, among other factors. Vendors will need to focus on developing scalable, heterogeneous solutions to address different workloads requirements.
- Look into new ways to offer HPC solutions. More than ever, users are now rethinking ways to acquire HPC capabilities. Those considerations then become the driver for the development of new ways of delivering HPC such as cloud computing, utility computing, or computing cycle leasing models. We advise vendors that are interested in this space to pay close attention to the evolving user requirements, in particular, their HPC workloads requirements, and design solutions that directly address these needs (e.g., finding ways to adapt existing HPC applications to perform well in clouds and findings ways to make cloud offerings more HPC friendly).

- Look at expansion into new geographic regions such as China, broader Asia, and the other BRIC countries, but spend time studying the unique market dynamics in these regions before committing resources.

LEARN MORE

Related Research

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

- *Experiences with Accelerators and Coprocessors in High-Performance Computing: HPC User Forum, September 15–17, 2014, Seattle, Washington* (IDC #251973, October 2014)
- *Major Global High-Performance Computing Initiatives: HPC User Forum, September 15–17, 2014, Seattle, Washington* (IDC #251971, October 2014)
- *Lenovo Completes Acquisition of IBM's x86 Server Business* (IDC #IcUS25176214, September 2014)
- *Worldwide Broader HPC 2014–2018 Forecast: Servers, Storage, Software, Middleware, and Services* (IDC #248835, June 2014)
- *Worldwide Technical Computing Server 2014–2018 Forecast* (IDC #248779, May 2014)
- *Global HPC Market Dynamics in 2013* (IDC #248137, April 2014)
- *Worldwide HPC Public Cloud Computing 2014–2017 Forecast* (IDC #247846, April 2014)
- *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 #IcUS24694314, February 2014)
- *IDC's Worldwide High-Performance Computing Predictions 2014* (IDC #WC20140211, February 2014)
- *Market Analysis Perspective: Worldwide HPC, 2013 – Directions, Trends, and Customer Requirements* (IDC #244742, December 2013)
- *HPDA Pulse Results: 2013 Hardware and Storage Market Analysis* (IDC #244493, November 2013)
- *HP FY13: Revenue Declines Abate on Stronger Core Business* (IDC #IcUS24466413, November 2013)
- *China Eyes 10,000-Fold Data Reduction for Internet of Things* (IDC #IcUS24392513, October 2013)
- *National and International Initiatives: HPC User Forum, September 2013, Boston, Massachusetts* (IDC #243776, 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)
- *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 #IcUS24190613, 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)

About IDC

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

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