Market Analysis

Worldwide Technical Computing Server 2014–2018 Forecast

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IDC OPINION

The worldwide high-performance computing (HPC) technical server market showed strong growth in 2010, 2011, and 2012. 2010 posted a 10% growth rate to reach $9.5 billion in HPC server revenue. 2011 showed a continued strong growth of 8.4% to push the market to a new high point of $10.3 billion in technical server sales. 2012 was an exceptional year, with many large supercomputers being deployed, resulting in 7.7% growth to reach a new record high of $11.1 billion. In 2013, the HPC market experienced a correction from the 2012 high by declining 7.2% to the prior $10.3 billion level. IDC's new HPC forecast predicts a healthy revenue increase in 2014, with a 7.4% compound annual growth rate (CAGR) out to 2018 in worldwide HPC revenue and 7.0% growth in HPC server units shipped. In this IDC document, we present our latest five-year forecast for the technical computing server space, covering the 2014-2018 period. The forecast document covers these areas:

- A brief overview of the market during 2013
- Detailed assumptions for our five-year forecast
- 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

May 2014, IDC #248779

IN THIS STUDY

This study presents an overview of IDC's forecast for the technical computing server market for 2013–2018 (2014–2018 data is forecast). The data in this study 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

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 non-technical 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, the 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).

FUTURE OUTLOOK

Forecast and Assumptions

Table 1 summarizes the top 3 assumptions that directly impact this forecast. All the indicators in the macroeconomic category (see Table 2) 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 indispensible 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 accounted for more than half a billion dollars alone. 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 2 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 turns 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 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
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.	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.	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.	The world economy is unstable right now. Any increased slowdown in one geographic region can ripple through to other regions.

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
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.

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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
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 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	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.	↓	★★★★☆

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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 2

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

Market Force	IDC Assumption	Impact	Accelerator/ Inhibitor/ Neutral	Certainty of Assumption
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. 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.	**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.	↑	★★★☆☆

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
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 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 server spending	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 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	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. 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 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 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 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 economy recovery and with the expanding economies of China and the other 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 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.	**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 2

Key Forecast Assumptions for the Worldwide Technical Computing Server 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

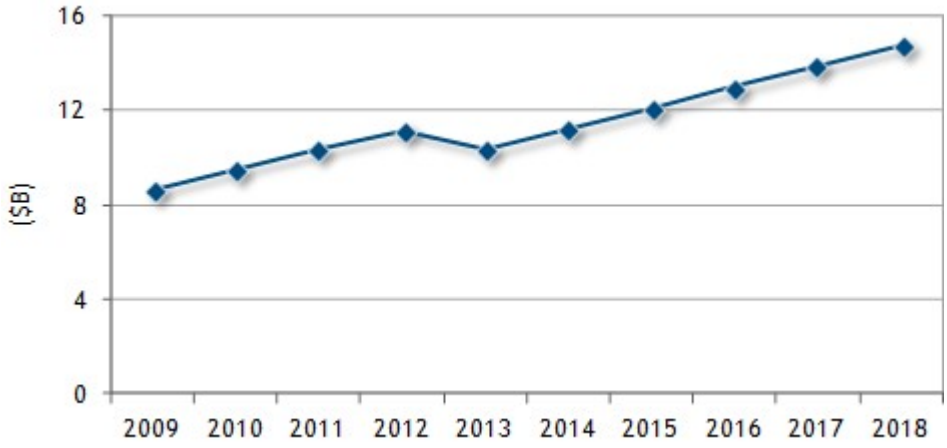
Worldwide Overall HPC Server Market Forecasts

IDC expects that over the next five years (2014-2018), the total HPC server market will expand at a CAGR of 7.4% in revenue to reach $14.7 billion by 2018. System unit shipments will grow at 7.0% annually to total about 174,000 system units by 2018 (see Figures 1-4 and Table 3).

HPC server growth will be helped by the continuing "petascale/exascale race" for high-end leadership. In 2009, the most difficult year of the global economic downturn, the supercomputer segment for HPC systems priced at $500,000+ grew 35%, while the uppermost subsegment for systems priced at $3+ million expanded by an impressive 65%. This strong growth continued in 2011, with the supercomputer segment growing at 25.7% to reach $4.4 billion. In 2012, the HPC market continued its shift toward the higher end, with the supercomputer segment registering year-on-year growth of 29% and revenue of $5.7 billion. The supercomputers segment declined 29.4% year over year to $4.0 billion in 2013, correcting from the spectacular 2012 level and accounting for 38.8% of total HPC server revenue.

FIGURE 1

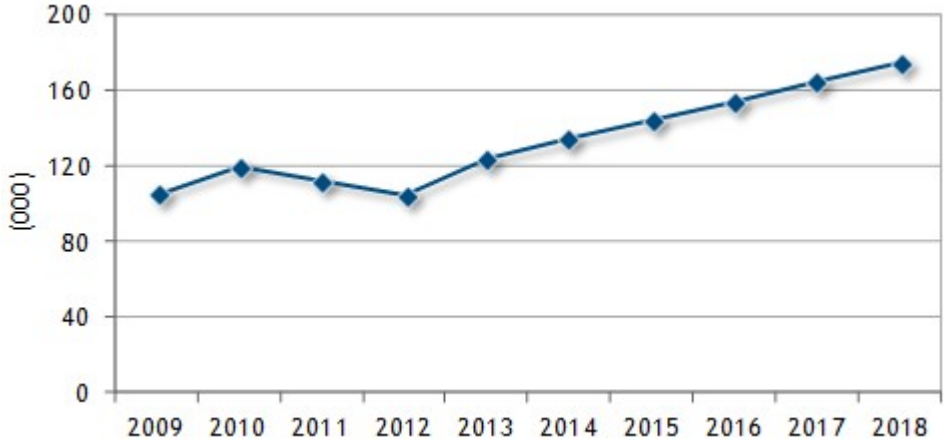
Worldwide Technical Computing Server Revenue, 2009-2018



Source: IDC, 2014

FIGURE 2

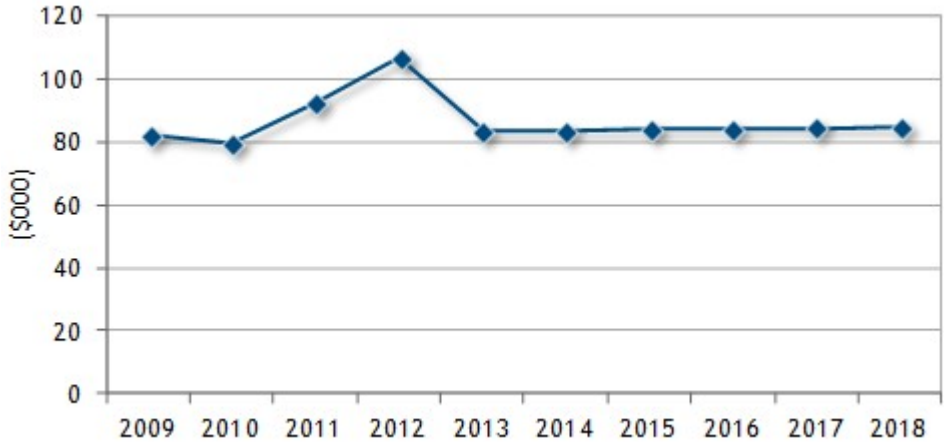
Worldwide Technical Computing Server Shipments, 2009–2018



Source: IDC, 2014

FIGURE 3

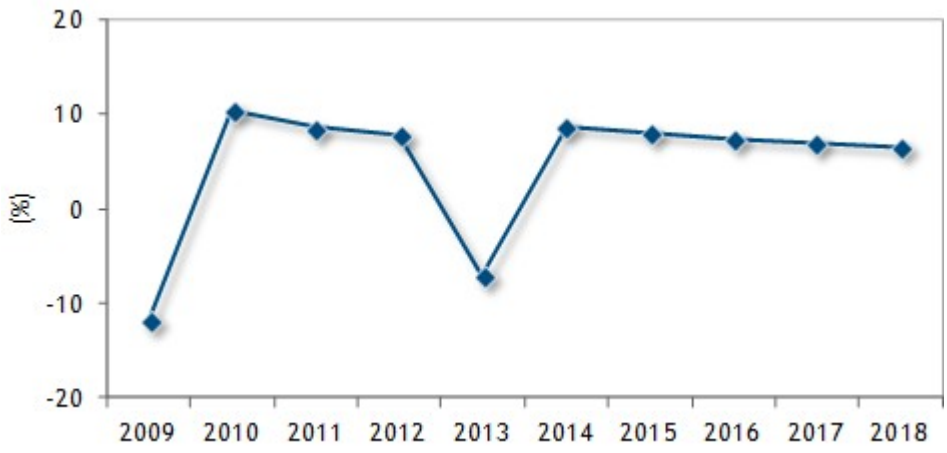
Worldwide Technical Computing Server Average Selling Price, 2009–2018



Source: IDC, 2014

FIGURE 4

Worldwide Technical Computing Server Revenue Year-over-Year Growth, 2009–2018



Source: IDC, 2014

TABLE 3

Worldwide Technical Computing Server Revenue, Shipments, and Average Selling Price, 2009-2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
Revenue ($M)	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
Shipments	105,054	119,844	111,551	104,148	123,982	134,030	144,078	154,126	164,174	174,222	7.0
ASP ($000)	82	79	92	107	83	83	84	84	84	84	0.3

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

Source: IDC, 2014

Forecasts by Competitive Segment

Tables 4–6 present HPC revenue, unit shipments, and ASP forecast 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 9.9% for the next five years as this segment continues its robust recovery from being hit hard during the recession. Workgroup growth will be followed closely by the supercomputer segment, where we project a 7.2% CAGR for the forecast period. The departmental segment is projected to grow at a 6.7% rate, and the divisional segment has a projected growth rate of 6.4% going out to 2018.

As noted previously, supercomputer segment growth has been helped by the continuing "petascale/exascale race" at the high end. At the other end of the market, IDC expects growth in the workgroup segment for systems priced below $100,000 to continue benefiting from the resumption of orders that were postponed or canceled during the economic downturn. Workgroup orders typically have a much shorter sales cycle than higher price point orders and can more readily be postponed or canceled. SMB and SME adoption rates of HPC technologies are likely to have an impact on the departmental and workgroup segments. This growth is spurred by increased computational capacity and memory density coupled with complementary software frameworks. To sustain this growth, additional investments will be needed to enable greater ease of use of software and hardware technologies across these segments that attract many users who are newer to HPC.

TABLE 4

Worldwide Technical Computing Server Revenue by Competitive Segment, 2009–2018 ($M)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
Supercomputer	3,342.1	3,475.6	4,370.2	5,655.0	3,994.7	4,328.2	4,661.6	4,995.0	5,328.4	5,661.8	7.2
Divisional	1,078.6	1,268.7	1,236.7	1,216.2	1,355.1	1,453.1	1,551.1	1,649.1	1,747.1	1,845.1	6.4
Departmental	2,882.7	3,342.7	3,467.3	2,979.2	3,363.3	3,622.1	3,880.9	4,139.7	4,398.6	4,657.4	6.7
Workgroup	1,310.8	1,411.3	1,225.9	1,247.4	1,585.7	1,777.6	1,969.6	2,161.5	2,353.5	2,545.4	9.9
Total	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

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, 2009–2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
Supercomputer	2,067	2,560	2,908	2,400	1,484	1,492	1,499	1,507	1,514	1,522	0.5
Divisional	3,596	3,914	3,724	3,663	4,271	4,570	4,869	5,168	5,466	5,765	6.2
Departmental	17,963	20,382	20,625	16,981	20,246	22,149	24,052	25,955	27,858	29,762	8.0
Workgroup	81,428	92,988	84,294	81,104	97,981	105,819	113,658	121,496	129,335	137,173	7.0
Total	105,054	119,844	111,551	104,148	123,982	134,030	144,078	154,126	164,174	174,222	7.0

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, 2009–2018 ($000)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2013–2018 CAGR (%)
Supercomputer	1,617	1,358	1,503	2,356	2,691	2,901	3,109	3,315	3,519	3,721	6.7
Divisional	300	324	332	332	317	318	319	319	320	320	0.2
Departmental	160	164	168	175	166	164	161	159	158	156	-1.2
Workgroup	16	15	15	15	16	17	17	18	18	19	2.8
Total	82	79	92	107	83	83	84	84	84	84	0.3

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 showed 29% growth in 2012, resulting in $5.7 billion in revenue. In 2013, the supercomputer segment declined 29.4% year over year to $4.0 billion, accounting for 38.8% of total HPC server revenue. Growth in the high end of the segment is driven mainly by the deployment of large-scale systems to government sites and especially by petascale initiatives around the globe. We project a 7.2% CAGR for the supercomputer segment and that revenue in this segment will reach $5.7 billion in 2018 (the largest contributor to overall HPC market revenue).

The worldwide petascale initiative is getting fiercer as the march to exascale continues. We expect more petascale systems to be built and deployed in the forecast years, and some smaller, derivative systems based on the same technologies used in petascale computers will also be rolled out in the outer years. We expect the high end of the segment to continue its growth throughout the forecast years.

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

The divisional segment will also see growth in the forecast period. We expect this segment to expand at a CAGR of 6.4% for the 2013-2018 period. This segment suffered a 23% decline in 2009 compared with 2008, mainly caused by cautionary spending during the economic downturn. As the economy recovered in 2010, this segment rebounded to $1.3 billion. These budgets are gradually coming back; however, we believe many companies will continue to take a conservative approach to resuming their spending. In 2011, this segment experienced a 3% year-over-year decline, resulting in $1.2 billion in revenue. In the following year (2012), the divisional segment declined by 2% with total revenue of $1.2 billion. But 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. Over the forecast period, we anticipate a continued growth in this segment.

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

The departmental segment used to be the largest revenue contributor to HPC prior to 2009, and then the economy downturn changed that dynamic. In 2009, the high-end supercomputers segment generated the most revenue, and the departmental segment was relegated 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 $3.0 billion in revenue. In 2013, the departmental segment expanded by 12.9% to $3.4 billion, or 32.7% of total 2013 HPC server revenue. In the forecast years, we expect that the departmental segment will continue to grow at a relatively strong rate compared with other segments as even more companies resume their discretionary spending. We expect the CAGR for revenue to be 6.7% and unit shipment growth to be 8.0% for the departmental segment from 2013 to 2018. Clusters are the dominant system architecture in this segment, accounting for over 90% of system deployments. We believe the scalability of clusters gives it an especially significant advantage in the department segment because it provides users with flexibility and better budget control.

Workgroup Segment (<$100,000)

In 2009, the workgroup segment suffered the most among all of the four segments that IDC tracks, with a revenue loss of 33% compared with 2008. 2011 showed a major decline of 13%, resulting in $1.2 billion in workgroup HPC sales. In 2012, the workgroup grew by 2%, with recorded revenue of

$1.2 billion. In 2013, the workgroup segment showed the strongest growth of any segment, expanding 27.1% over 2012 to $1.6 billion and representing 15.4% of all 2013 HPC server revenue. We expect workgroup segment revenue to grow at a CAGR of 9.9% from 2013 to 2018.

Market Context

Comparing the Previous and New HPC Forecasts

Table 7 and Figure 5 compare the previous IDC HPC technical computing server market forecast (see *Worldwide Technical Computing Server 2013-2017 Forecast,* IDC #241154, May 2013) to this new five-year HPC technical computing server market forecast. The new forecast represents a slight decrease from IDC's May 2013 forecast for all five years, starting in 2014. This decrease is based on the impact of the decline in 2013 and near-term fiscal budgetary constraints across the world. We anticipate that toward the end of the forecast period, the emergence of sub-exascale systems will have a positive impact on HPC spending.

TABLE 7

Worldwide Technical Computing Server Revenue, 2009-2018: Comparison of May 2013 and May 2014 Forecasts ($M)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
May 2014 forecast	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
May 2013 forecast	8,614.1	9,498.3	10,300.1	11,097.7	11,137.0	12,005.6	12,874.2	13,742.8	15,440.7	NA

Notes:

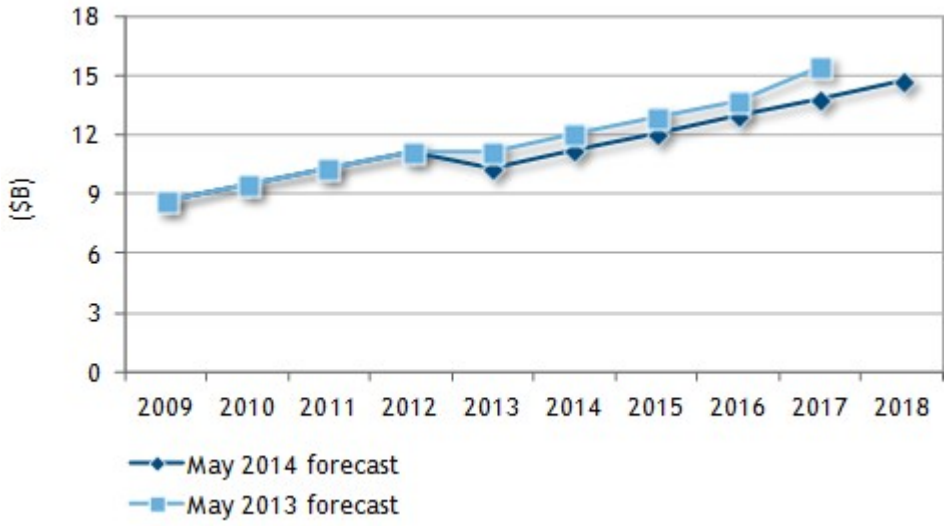
See *Worldwide Technical Computing Server 2013-2017 Forecast* (IDC #241154, May 2013) for prior forecast.

Historical market values presented here are as published in prior IDC documents based on the market taxonomies and current U.S. dollar exchange rates at the time the existing data was published. For more details, see the Methodology in the Learn More section.

Source: IDC, 2014

FIGURE 5

Worldwide Technical Computing Server Revenue, 2009–2018: Comparison of May 2013 and May 2014 Forecasts



Source: IDC, 2014

ESSENTIAL GUIDANCE

After three consecutive years of healthy growth, HPC has substantially recovered from the 2008–2010 recession. With the changing market dynamics in many different areas, we advise vendors as follows:

- HPC ecosystem complexity and capability are increasing, especially due to the proliferation of accelerators and coprocessors, clouds and other new environments, and the growth of newer analytics methods. Vendors will need to address this rampant complexity with differentiated solutions that make life easier for system administrators and end users.
- Many new trends are driving growth, for example Big Data combined with HPC, that will require new capabilities and features. These trends will likely drive system architectures.
- Vendors should watch the evolution of memory and interconnect technologies, such as flash memory, SSDs, and interconnect technologies, carefully as HPC architectures embark on a long-term shift away from today's extreme compute centrism.
- More than ever, users are now rethinking ways to acquire HPC capabilities. Those considerations then become the driver for new ways of delivering HPC such as cloud computing, utility computing, and innovative cycle leasing models. Vendors should pay close attention to evolving user requirements and explore innovative designs that directly address these changes.

- Vendors should proceed, but proceed with knowledge and caution, when considering expansion into HPC markets in China, Russia, Latin America, MEA, and other potential growth areas.
- Software continues to be major pain point for most buyers, in particular the problems of data movement and problem decomposition to extract optimal performance from hardware architectures. So anything that vendors can do to help improve the software situation will likely be highly valued by HPC buyers.

LEARN MORE

Related Research

- *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 #IcUS24300913, 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 #IcUS24190613, 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)
- *Worldwide Technical Computing Server 2013-2017 Forecast* (IDC #241154, May 2013)

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 2013. 2013 and all future years are forecast at a constant exchange rate.

Synopsis

This IDC study presents an overview of IDC's forecast for the technical computing server market for 2013-2018 (2014-2018 data is forecast). 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.

According to Earl Joseph, IDC HPC program vice president, "We are now forecasting a 7.4% CAGR for the HPC 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.

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