

Special Analysis

Buyers' Expected Short-Term Spending Changes for HPC Servers, Public Clouds, and Desktops

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HYPERION RESEARCH OPINION

Covid-19 has impacted the worldwide HPC ecosystem in a variety of manners, leading to unpredictable changes in spending trends on systems, production, and installation of those systems, as well as changes in the sources of users' compute resources. Hyperion Research conducts surveys throughout the year to ask buyers for their expected short-term and long-term HPC spending changes in order to keep a tab on the ebbs and flows of the market. This Special Report explores changes in short-term budgets and expected spending. Due to the ever-changing situation of the world, these surveys have become critical in understanding, and predicting, the short-term spending trends of HPC buyers.

In questions from surveys across a variety of topics, respondents predict the percentage change in spending over the following quarter in several important categories, including HPC technical servers, public cloud services, and desktop computers. Despite the relatively low revenues seen at the beginning of 2020, buyers have reported optimism for their next-quarter budgets. Through the increase in cloud spending, as well as delayed rather than cancelled HPC procurements, the HPC market is responding better than initially thought in the second half of 2020.

Hyperion Research uses these surveys to help guide the forecasts and to better understand the state of the HPC market more effectively. Based on data collected through the time period indicated below, as well as other interviews with HPC buyers and vendors, the market is reacting better than anticipated, with public cloud spending growth shining through as a bright spot.

This document highlights survey findings from March 2020 to July 2020 from HPC users in industry, academia, and government institutions:

- Buyers expect the strongest growth in public cloud spending, an average of 9.4% in the following quarter.
- On average, respondents report expected budget increases in all category areas.
- HPC/technical servers were expected to have the slowest quarter over quarter growth (1.5%).
 - While HPC servers are seeing a decline in 2020, the number of sites that expect to see increases is 3 times the number that expect to see a decline. However, more than half expect to see flat spending on HPC servers, which indicates a weakness in the market.
- Analyzing the weighted average of predicted growth by site budget size shows that large sites expected to spend more than average on HPC/technical servers, but less than average on public clouds or desktops.

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METHODOLOGY

This report tracks responses to surveys Hyperion Research regularly conducts with HPC buyers to help forecast market growth and to monitor short-term shifts in the HPC market. Each site reported two distinct measures of their near-term expectations. The first is a qualitative projection of their near-term spending: whether buyers anticipate increased, decreased, or flat spending relative to time of survey. The results are aggregated to show the proportion of sites predicting each possible outcome in each technology area.

The second type of data gathered is the expected magnitude of those near-term budget changes, reported as a percentage change in spending compared with the most recent quarter. The average increase or decrease for each product area can then be calculated for all sites and further broken down by major sector or other factors. These averages help project near-term growth rates in each technology area.

SITUATION OVERVIEW

Hyperion Research has consistently collected users' near-term budget expectations for years, which help define both overarching spending plans and seasonal spending patterns. The importance of such timely short-term data collection was underscored by 2020's sudden, dynamically changing economic effects spurred by the covid-19 pandemic. Quarter 1 of 2020 revenues were the most intensely impacted, down 17.5% compared to Q1 of the previous year. Quarter 2 showed a partial recovery, with 12.0% growth over the previous quarter, but still down 6.1% seasonally.

Hyperion Research has recently released the quarterly tracking database including Q3 of 2020, which shows growth both over the previous quarter (11.7%) and seasonally (3.4%). This suggests that buyers are starting to resume their previously scheduled purchases, and systems that were postponed towards the beginning of the year may now be back on track.

EXPECTED SHORT-TERM GROWTH IN REVENUES/PURCHASES

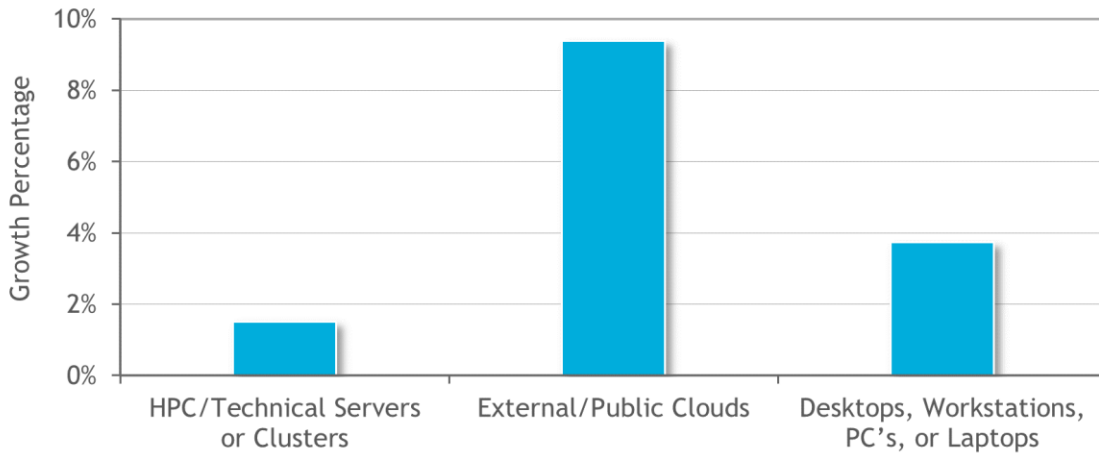
This first section looks at HPC buyers' expectations for short-term growth for servers, public cloud, and desktops as a percent next-quarter change from their current-quarter budgets (relative to time of survey). These were calculated by averaging expected next-quarter changes as reported between March 2020 and July 2020, resulting in aggregate percentages representing projected net changes in budget during the year. These figures are significant because buyers in general can be assumed to have a strong sense of their HPC budgets only for a few quarters in the future. Hyperion Research considers many factors in developing near-term forecasts for the global HPC market, and surveyed buyers' expectations serve as an important reality check in this process.

Figure 1, below, shows the average projected growths for each technical area over the following quarter. All three categories are expected to have growth, on average. External cloud spending is expected to show the strongest growth at 9.4%. This is consistent with other Hyperion Research studies showing increased investment in public cloud spending.

On-premise HPC servers also show a return to growth from the declines seen early in the year when many previously planned expenditures were delayed to covid-19 and the resulting economic uncertainty.

FIGURE 1

Overall Average Projected Spending Increase for Following Quarter



Note: n=125

Note: Respondents were surveyed between March 2020 and July 2020, and expected growths are relative to time of survey.

Source: Hyperion Research, 2020

Table 1 displays the average expected budget change in three key technology areas for each major sector. Overall, government sites reported the highest budget increases in all areas, followed by industrial sites. External cloud services were predicted to be the highest growth area for each sector. Public cloud growth among government sites was predicted to grow the fastest, on average increasing by nearly a third per quarter at 31.8%, but from a lower starting point.

TABLE 1

Average Next Quarter Spending Increase by Sector and Technology Area

Area	Academia Percent	Government Percent	Industry Percent
HPC/Technical Servers or Clusters	0.0%	6.4%	1.4%
External/Public Clouds	4.2%	31.8%	8.8%
Desktops, Workstations, PC's, or Laptops	2.2%	8.5%	3.7%

Note: n=125

Note: Respondents were surveyed between March 2020 and July 2020, and expected growths are relative to time of survey.

Source: Hyperion Research, 2020

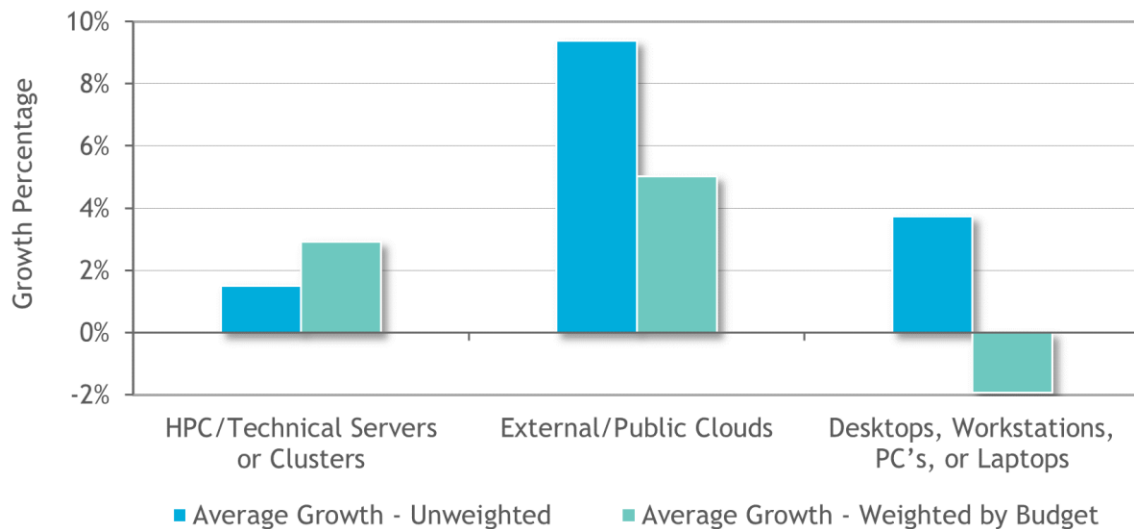
Figure 2 compares the unweighted averages in Figure 1 (above) to weighted averages calculated according to each site's budget size. After analyzing by site size, average expected HPC/technical server spending growth increased to 2.9%. This suggests that large sites are more likely than the average user to prioritize HPC servers, perhaps because they are more likely to invest in larger systems and/or a larger variety of servers. Smaller sites who purchase servers infrequently are more likely to delay such a purchase in times of economic uncertainty.

Analyzing the weighted average of trends by site size resulted in a dampened external cloud growth, down to an average 5.0% increase for the next quarter. Historically, sites with smaller overall budgets are more likely to consider cloud offerings since this may give them access to multiple systems with a variety of technical specifications that they would not be able to afford to purchase on-prem. Meanwhile, some large sites (particularly those in government) have been more limited in their cloud usage due to data security concerns. Overall, however, it seems that sites of all sizes have been more likely to utilize public cloud offerings since the constraints of the covid-19 pandemic have made in-person operations more difficult.

Many sites who purchase large systems also purchase small systems, even down to desktop machines. As the economy evolved during the pandemic, near-term budgets for desktops were hit harder than long-term budgets for large machines, which usually have funds earmarked far in advance. Many of these desktop purchases have been delayed, or in some cases cancelled altogether, and those users are keeping their current systems longer and exploiting the cloud for additional resources. When the trends were weighted to incorporate site size, the average for desktop spending dropped to a decrease of 1.9% for the next quarter, highlighting the trend above.

FIGURE 2

Overall Average Projected Spending Increase for Following Quarter



Note: n=125

Note: Respondents were surveyed between March 2020 and July 2020, and expected growths are relative to time of survey.

Source: Hyperion Research, 2020

EXPECTED GROWTH BY SITE COUNTS

This section measures expected HPC market growth by the proportion of sites that projected their short-term spending to increase, decrease or stay flat in each of the three product areas. Respondents were surveyed between March 2020 and July 2020, and these projections are relative to the time of survey. Table 2 shows the overall percentages of sites' expected budget changes for each of the three technology areas.

- More than half of sites (58.1%) projected increase spending on external/public clouds, consistent with many recent Hyperion Research studies showing increased investment in cloud across many sectors.
- In both technical servers and desktops, about half of sites (54.5% and 52.0%, respectively) expect their spending to remain flat over the following quarter. For HPC servers, the number that expect to increase their budgets is 3 times the number that expect to see a decline.
- Among the three product areas, desktops had the most expected decreases (19.4% of respondents) and the fewest expected increases (28.6% of respondents).

TABLE 2

Anticipated Spending Changes for Following Quarter

Area	Increase	Flat	Decrease
HPC/Technical Servers or Clusters	33.3%	54.5%	12.1%
External/Public Clouds	58.1%	34.3%	7.6%
Desktops, Workstations, PC's, or Laptops	28.6%	52.0%	19.4%

Note: n=125

Note: Respondents were surveyed between March 2020 and July 2020, and expected growths are relative to time of survey.

Source: Hyperion Research, 2020

FUTURE OUTLOOK

Hyperion Research has been generating updated global HPC market forecasts for 2020 on a quarterly basis in response to the recent economic changes related to covid-19. Consistent surveys of buyers to determine short-term HPC budget changes is an essential tool for generating both frequent forecast updates and traditional annual forecasts. The aggregate data presented here, collected from March 2020 to July 2020, provides strong first-person evidence of buyers' optimism for increased spending despite widespread economic changes. Further, it reinforces the resiliency of the HPC market and helps to answer the question of: *Were HPC procurements and funds delayed or cancelled?* From this, it appears that many users experienced delays in their procurements instead of full cancellations.

However, the bottom portion of the market was hit very hard by this economic turmoil and is experiencing the lowest growth in the sector.

Public cloud spending is expected to have continued strong growth over the foreseeable future, especially as those who anticipated buying desktops or workstations, as well as workgroup HPC systems, have delayed on-prem purchases and shifted their focus to using the cloud to supplement their compute resources. Using public clouds for running HPC workloads experienced a major increase in growth in 2019, and the impacts of covid-19 in 2020 is driving an increase in usage of cloud resources.

While HPC servers are seeing a decline in 2020, the number of sites that expect increases is 3 times the number that expect to see a decline. However, more than half expect to see flat spending on HPC servers, which indicates a continued weakness in the market.

Hyperion Research is predicting a recovery for the last months of 2020 and continued growth over the next few years, leading up to the installation of exascale machines worldwide.

About Hyperion Research, LLC

Hyperion Research provides data-driven research, analysis and recommendations for technologies, applications, and markets in high performance computing and emerging technology areas to help organizations worldwide make effective decisions and seize growth opportunities. Research includes market sizing and forecasting, share tracking, segmentation, technology and related trend analysis, and both user & vendor analysis for multi-user technical server technology used for HPC and HPDA (high performance data analysis). We provide thought leadership and practical guidance for users, vendors and other members of the HPC community by focusing on key market and technology trends across government, industry, commerce, and academia.

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