

Quick Take

Motivators and Limitations for HPC Cloud Users

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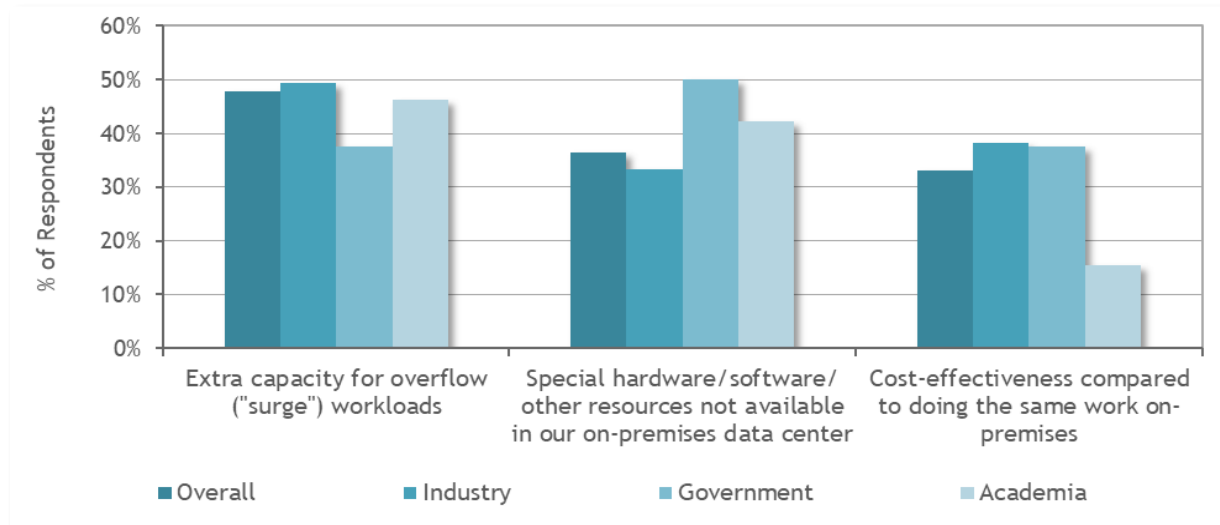
HYPERION RESEARCH OPINION

Much of the discussion on HPC cloud motivators and barriers centers on how to encourage new adopters to move from purely on-premises to a hybrid environment. An alternative viewpoint is to focus on current HPC cloud users to determine the strongest factors that promote sustained usage of cloud or limit the scale of HPC cloud workloads. According to a recent Hyperion Research study, the top motivator for continued cloud use was extra capacity for overflow or surge workloads with nearly half of respondents (47.8%) highlighting this capability, followed by access to special hardware or software not installed at their site. The top limitations for HPC cloud users were high costs compared to alternatives and data locality or access speed (38.3%, each). Ironically, cost savings was also a top motivator for sustained usage (33.0%). This highlights the stark differences in running different workloads in the clouds and underscores why many HPC users are opting for hybrid environments.

This data is from an annual study that is part of the eighth edition of Hyperion Research's HPC end-user-based tracking of the HPC marketplace. It included 181 HPC end-user sites with 3,830 HPC systems.

FIGURE 1

Top Motivators for Sustained Cloud Use by Sector



Note: n = 115; 81; 8; 26

Source: Hyperion Research, October 2023

STUDY FINDINGS

Table 1 displays the motivators for external cloud use expressed by HPC cloud users. The top response for each sector is highlighted in blue, with the second and third top choices in green.

- Extra capacity for surge workloads was the top motivator overall (47.8%), as well as in industry (49.4%) and academia (46.2%).
- Access to special hardware, software, or other resources not available on-premises was one of the top three motivators across all sectors. It was the top motivator among government sites surveyed (50.0%).
- Cost effectiveness compared to doing the same work on-premises was the third top motivator overall (33.0%), as well as among industry and government (38.3% and 37.5%, respectively).
- Academia was the only sector to rank access to public data sets among the top three motivators (38.5%).

TABLE 1

Motivators for Sustained HPC External Cloud Use by Sector

Q: Which of the following is a reason you use external (third-party) clouds for HPC?

	Overall	Industry	Government	Academia
Extra capacity for overflow ("surge") workloads	47.8%	49.4%	37.5%	46.2%
Special hardware/software/other resources not available in our on-premises data center	36.5%	33.3%	50.0%	42.3%
Cost-effectiveness compared to on-premises	33.0%	38.3%	37.5%	15.4%
Corporate policy decision	25.2%	32.1%	12.5%	7.7%
Access to public data sets	23.5%	19.8%	12.5%	38.5%
Testing before investing in HW/SW for onsite HPC	23.5%	25.9%	25.0%	15.4%
Separate environment for development and testing	20.9%	25.9%	12.5%	7.7%
Data collection from edge devices for AI applications	18.3%	17.3%	25.0%	19.2%
Long term off-prem data storage (archive)	15.7%	19.8%	0.0%	7.7%
Lack of access to an on-premises data center	8.7%	11.1%	12.5%	0.0%
Other	5.2%	3.7%	12.5%	7.7%

n = 115; 81; 8; 26

Source: Hyperion Research, October 2023

Table 2 shows the limitations for external cloud use expressed by current HPC cloud users. The top response for each sector is highlighted in blue, with the second and third top choices in green. Overall, the top limitations were high costs compared to alternatives and data locality/access speed (38.3% each). Both factors were also among the #1 concerns for government sites (62.5% each) and academic sites (42.3% each).

- Inadequate data security was the top limitation for industry sites (35.8%) and tied for #1 limitation among government sites (62.5%).
- Government was the only sector to rank inadequate performance/solution time as a top limitation (62.5%).
- Academia was the only sector to rank lack of internal cloud expertise as one of the top three limitations (34.6%).

TABLE 2

Limitations for Expanding HPC External Cloud Use by Sector

Q: Which of the following do you consider to be important limitations of EXTERNAL or PUBLIC clouds for HPC workloads? Select all that apply:

	Overall Percent	Industry Percent	Government Percent	Academia Percent
Costs are too high compared with our on-premises data center or other alternatives	38.3%	34.6%	62.5%	42.3%
Data locality/access speed, i.e., initial upload times are too long	38.3%	34.6%	62.5%	42.3%
Data security is inadequate for our needs	33.9%	35.8%	62.5%	19.2%
Lack of internal expertise on cloud computing	24.3%	22.2%	12.5%	34.6%
Performance (solution time) is inadequate for many HPC applications	22.6%	18.5%	62.5%	23.1%
Cloud solutions are difficult to use	13.9%	13.6%	12.5%	15.4%
The ISV software applications we need are available but too expensive to use	11.3%	13.6%	0.0%	7.7%
The ISV software applications we need are unavailable	5.2%	4.9%	0.0%	7.7%
Other	3.5%	3.7%	0.0%	3.8%

n = 115; 81; 8; 26

Source: Hyperion Research, October 2023

FUTURE OUTLOOK

Notably, cost was listed among both the top sustained motivators and top limitations in this study. This highlights the stark differences in running different workloads in the clouds and underscores why more and more HPC users are opting for hybrid environments where the locality of each workload is strategically determined.

Over time, the factors affecting cloud usage are expected to fluctuate as CSPs work to address barriers and users become more comfortable with running and optimizing cloud workloads. This has been seen consistently in other recent cloud-related studies.

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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). Hyperion Research provides 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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