Quick Take

Acquisitions Shake Up the HPC Middleware Landscape

Mark Nossokoff and Melissa Riddle
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As workloads become more diverse and traditional enterprise datacenters are increasingly adopting HPC and HPC-enabled AI workloads, middleware is receiving more attention as part of the overall solution. HPC users desire a more intuitive experience and want to deal with fewer vendors. Middleware vendors want to expand their product portfolios and increase the markets they serve. Expanding product portfolios and increasing market reach can be achieved largely through either investment in current product lines or via strategic acquisitions. A recent example of the latter is Altair's acquisitions of Univa and Ellexus.

With these additions to their product portfolio and development resources, Altair is moving to expand its position in the HPC applications and middleware market. In addition to the ability to offer solutions for a more diverse range of HPC infrastructures, Altair is also now in a better position to serve a wider breadth of HPC domain areas, supporting users across many industries in their pursuit of achieving faster times to results and scientific discovery.

Highlights of the overall middleware market and key features of Altair's recent acquisitions:

- Middleware is expected to have the second largest growth rate in on-prem HPC through 2024 (8.3% CAGR), outpacing on-prem HPC servers writ large.
- Most HPC users (80.9%) rely on middleware to manage their data intensive workloads, and most middleware users (74.5%) utilize multiple such programs.
- The Univa acquisition includes their flagships Grid Engine and Navops Launch, which focus on resource management on-prem and in the cloud (respectively).
- The Ellexus acquisition includes Mistral for system telemetry and Breeze for identification of dependencies and bottlenecks.

SITUATION OVERVIEW

The HPC market is nothing if not dynamic. The emergence of HPDA/AI/ML/DL workloads has added increased complexity into already elaborate HPC environments. Adoption of the cloud to run an increasing amount and variety of HPC workloads, now approaching 20% of HPC-enabled AI workloads, has also complicated HPC datacenter management and operations.

HPC infrastructure is also being adopted in enterprise IT environments to address their increasing application of HPDA and AI techniques, which can often require a high level of computational or data-intensive computing. Running increasingly complex workloads simultaneously on their system, both on-prem and in the cloud, further exacerbates the challenges of keeping their systems running smoothly and efficiently, particularly the application I/O and storage subsystem elements.

At first blush, the middleware segment can be seen as a sedate corner of the broader HPC ecosystem. Schedulers, workload managers, compliers, and other application-related monitoring and diagnostic tools are not areas where users typically like to allocate much of their HPC system budgets. Still, according to the recent Hyperion Research Multi-Client Study, the vast majority of users (80.9%) rely on middleware to manage their data intensive workloads, and three-fourths of middleware users (74.5%) utilize multiple middleware software programs. In addition, 11.3% of users report willingness to pay a premium of 10%-15% above HPC system price for a more integrated middleware solution that could provide ease of use and development.

TABLE 1

Revenues by the Broader HPC Market Areas ($M)

	2019	2020	2021	2022	2023	2024	CAGR '19-'24
Server	$ 13,710	$ 12,671	$ 14,097	$ 16,683	$ 18,813	$ 19,758	7.6%
Storage	$ 5,426	$ 5,105	$ 5,737	$ 6,873	$ 7,945	$ 8,406	9.1%
Middleware	**$ 1,613**	**$ 1,500**	**$ 1,671**	**$ 2,004**	**$ 2,275**	**$ 2,404**	**8.3%**
Applications	$ 4,689	$ 4,345	$ 4,725	$ 5,540	$ 6,144	$ 6,339	6.2%
Service	$ 2,238	$ 2,032	$ 2,164	$ 2,492	$ 2,711	$ 2,742	4.1%
Total Revenue	$ 27,677	$ 25,653	$ 28,394	$ 33,592	$ 37,889	$ 39,648	7.5%

Source: Hyperion Research, January 2021

As summarized in Table 1, the middleware segment made up approximately 6% of the broader on-prem HPC market spend in 2020 and is projected to have the second largest growth rate of the on-prem HPC segments through 2024, outpacing the HPC server sector writ large. As such, the middleware market represents an attractive but competitive business opportunity with numerous vendors providing a wide variety of solutions.

Altair recognized the recent shifts in the HPC market and announced the acquisitions of Univa and Ellexus in late 2020 as their solution to the new challenges and opportunities users face. These acquisitions not only provide the technology and products to address new user requirements but also afford Altair the opportunity to expand into new HPC vertical market areas. Table 2 summarizes the acquisitions and corresponding focus areas.

TABLE 2

Altair 2020 Acquisitions

Acquisition	Focus Areas
Univa	Expansion into life sciences, oil & gas, EDA, and financial services
	Support for converged HPC and ML infrastructure
	Workload Management
	Cloud Migration
Ellexus	Complement expansion into chip design, cancer research, finance, and oil & gas verticals
	Storage-aware scheduling for big data applications
	Detailed application tracing (Breeze)
	Application monitoring tool (Mistral)

Source: Hyperion Research, February 2021

The Univa solutions, including Grid Engine and Navops Launch, fortify Altair's position in workload management and cloud enablement for HPC. Support for converged HPC and ML infrastructure is also likely to be an attractive feature, as HPDA and AI workloads are increasingly being intermixed with traditional HPC modeling/simulation workloads. According to a recent Hyperion Research study, 68.0% of users run both HPDA/AI and modeling/simulation workloads on the same HPC system. Grid Engine's distributed resource management system aims to improve system performance and boost system productivity and efficiency. The Navops Launch application is intended to address transparent resource sharing and data migration between on-premises and cloud-based resources.

By profiling application I/O and providing per-job application telemetry for HPC and hybrid cloud environments, the Ellexus solutions aim to improve run times and support faster time to scientific discovery and results. Mistral addresses system telemetry and I/O monitoring while Breeze examines the system for file system and application dependencies and bottlenecks.

FUTURE OUTLOOK

As HPC workflows become more heterogenous with mixed traditional HPC modeling/simulation and newer HPDA/AI/ML/DL applications, simplifying scheduling, managing, monitoring, and diagnosing are increasingly critical for HPC users. Coupled with the additional complexity of hybrid on-prem and cloud infrastructures, these challenges are compelling users to increase investments in tools and solutions to ease the planning and managing of increasingly diverse workflows. Altair has recognized this and made the strategic decision to acquire Univa and Ellexus to address this critical area.

Competition is not apt to stand still. It is likely that other vendors and potential new entrants will be paying more attention to the middleware market in the near future, as the sector is expected to

experience significant growth throughout the forecast period. If this renewed focus leads to further acquisitions, mergers, or partnerships, then users may benefit. By having a one-stop-shop for many of their HPC middleware needs, users hope to have more tightly integrated solutions, easier deployment of new infrastructures, more seamless integration of on-prem and cloud workflows and unified maintenance and support.

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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). 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.

Headquarters

365 Summit Avenue
St. Paul, MN 55102
USA
612.812.5798
www.HyperionResearch.com and www.hpcuserforum.com
