

TECHBYTE

Insights Into Research Computing



CLOUD HPC

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AUTHOR
RAKESH SABHARWAL
Founder
ON DEMAND SYSTEMS PTE LTD

CLOUD HPC

In the last decade, High Performance Computing (HPC) has gone mainstream and is used by many enterprises to solve complex data-driven challenges. Research organisations have traditionally built and maintained on-premise HPC infrastructure to handle these workloads. However, the demand for more flexibility and scalability or to ramp up resources on demand has pushed the adoption of HPC in the cloud, or Cloud HPC or HPCaaS.

For small to medium size HPC centres, it makes economic sense to consider HPC in the cloud or native cloud HPC. These enterprises would get cloud flexibility and scalability along with security.

ODS's HPC as a Service (HPCaaS) gives customers great flexibility in the HPC operations.



CLOUD HPC

We have partnered with AWS to offer seamless Hybrid and cloud-native HPC services. If you have an existing on-premise HPC infrastructure, we could help you to set up cloud bursting to the cloud. This would also integrate with your existing job scheduler, identity and storage infrastructure.

The components of Cloud HPC include:

- Compute Node (On Demand-performs numerical computations)
 - Network (High-Speed cluster interconnect)
 - Storage (Data synchronisation, input/output data, Managed storage services, e.g. Lustre as a service)
 - Login node (Gateway to the cluster)
 - Head Node (Cluster Management)
 - Job Scheduler Node (Batch scheduling, job management)
- (Login, Head and scheduler nodes can be consolidated into a single instance)



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HYBRID HPC, BEST OF BOTH WORLDS

You can leverage HPCaaS on-demand to complement your dedicated on-premise HPC environment and burst into the HPC on-demand service for ultimate agility in your HPC operations.

Fast scale-out and wind-down allow ultimate agility to handle any workload and maintain a “base workload” footprint of infrastructure on-premise.

Delivery time can be reduced and additionally HPCaaS can be used to reduce lists of jobs when waiting time for resources has become a pain point in the operation.

Cloud service provider do enable greater flexibility with regard to type of instances (various sizes and even bare metal), platform types (Intel, AMD and ARM), GPU instances (training and/or inference specific).



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BENEFITS OF CLOUD HPC

HPC clouds provide several advantages, including:

- **Scalability:** Users can scale their computational resources based on their needs, allowing them to handle varying workloads efficiently.
- **Cost Efficiency:** Cloud-based models enable users to pay for the resources they use, avoiding the need to invest in and maintain expensive dedicated on-premise HPC infrastructure.
- **Flexibility:** HPC cloud platforms offer various hardware configurations and software environments, enabling users to choose the best setup for their workloads.



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- **Accessibility:** Users can access HPC cloud resources remotely, enabling distributed teams to collaborate effectively and for researchers to run experiments without needing to be physically present near the hardware.
- **Resource Optimization:** Dynamic provisioning and management of resources through orchestration tools allow for efficient utilization of computational power, minimizing idle time.
- **Backups, Recovery, and Resiliency:** Data is essential to an HPC workload. An HPC cloud environment can support impressive computation, backup, and recovery performance. For example, you can purchase cloud resources that automatically backup to hot and cold storage for long-term security. In the case of hot backups, HPC clouds can support immediate recovery in the event of an emergency or catastrophe.

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