

OCF / LENOVO High Performance Computing (HPC) Cluster



Overview

OCF will leverage our deep expertise to design, deliver, deploy and support your next (or first) Turnkey HPC Cluster based on Lenovo technology. Every bespoke OCF / Lenovo cluster is built on proven technologies designed to maximise performance and optimise data centre efficiency, tailored to your workloads and budget.

Design Process

OCF's solution design process is driven by a dedicated team of Presales Technical Architects who specialise in creating tailored HPC and storage architectures.

This team works in close collaboration with customers, technical partners and our in-house engineering teams to translate requirements into optimised, future-ready solutions. In addition to a broad market view of the industry and relevant technologies the team is fully accredited and extremely experienced in architecting solutions based on Lenovo technologies.

From initial scoping and concept design through to validation and refinement, the Presales team ensures that every solution is technically robust, scalable and aligned with the customer's strategic objectives. Throughout the lifecycle of each project, the team provides continuous design support and technical assurance, ensuring that the proposed architecture evolves alongside project needs.

OCF's proven experience and processes ensure that the solutions we design incorporate the latest advancements and best practices, delivering maximum performance, efficiency and long-term value for our clients.

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Compute Hardware

Lenovo's "From Exascale to EveryScale" design concept gives OCF a raft of hardware options ranging from ultra-dense Lenovo Neptune liquid-cooled systems, through to air-cooled systems and extremely powerful desktop workstations.

OCF's consultative approach is designed to understand your workloads, space and power restrictions and budget, while aligning these requirements with your institution's goals and aspirations to provide well-informed hardware recommendations.

Lenovo compute options include Intel and AMD CPUs, as well as NVIDIA and AMD GPUs.

N.B. Some of Lenovo's compute options can be found [here](#).

Interconnect

The interconnect is critical for HPC as it turns several individual servers into a network of interconnected processing nodes that can communicate and work together as a single system. High-bandwidth, low-latency interconnects like InfiniBand and Omni-Path can improve application performance, particularly at scale, and ensure you are wholly maximising your CPUs, GPUs and storage. For many use cases, high-performance Ethernet using RDMA may offer sufficient performance for your use case. OCF works closely with our clients to identify which of the available options, including InfiniBand, OMNI-PATH and Ethernet, will offer the best cost performance or ultimate performance as required.

Options include:

- NVIDIA InfiniBand
- Cornelis Networks OMNI-PATH
- High Performance Ethernet

Storage

Storage is an integral part of any HPC environment. Ensuring it is properly sized for capacity, performance, and resilience will ensure your compute nodes remain busy and your valuable data is kept safe.

Whether you require a small scratch file system or need a replicated, backed-up, multi-tiered, multi-petabyte storage system supporting both scratch and research workloads, OCF can deploy it as part of a comprehensive, end-to-end HPC project. Many of our customers choose to pair a Lenovo compute solution with a Lenovo storage solution. OCF can supply the following Lenovo storage solutions:

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Storage (cont.)

Lenovo DSS-G Spectrum Scale Appliance

Lenovo Distributed Storage Solution for IBM Storage Scale (DSS-G) is a software-defined storage (SDS) solution for dense, scalable file and object storage suitable for high-performance and data-intensive environments. Enterprises or organisations running HPC, AI, Big Data or cloud workloads will benefit the most from the DSS-G implementation.

Lustre on Lenovo Hardware

The Lustre file system is an open-source, parallel file system that supports many requirements of leadership-class HPC simulation environments.

Lenovo has a number of storage appliances that are ideally suited for OCF to use to deliver a bespoke Lustre environment.

BeeGFS on Lenovo Hardware

BeeGFS is developed by ThinkParQ and is designed to provide scalable, high-throughput access to file storage systems, making it particularly well-suited for use in HPC and AI environments. BeeGFS is hardware-independent and is developed with a strong focus on performance, and is designed for ease of use, simple installation, and management. OCF has referenceable experience in designing, delivering and supporting BeeGFS solutions based on Lenovo hardware.

Operating System

Whilst historically several options have been available, including Microsoft HPC Pack, almost all HPC Clusters designed today are based on a Linux operating system.

For clients who don't require commercial operating system support, OCF recommends Rocky Linux. If the safety blanket of commercial support is of value, OCF offers Red Hat Enterprise Linux -the world's leading enterprise Linux platform

Solution Delivery, Implementation and Project Management

Despite industry advances over the last 20+ years, HPC systems remain relatively complex environments featuring numerous interconnected parts, often supported by technologies from a number of different vendors. To deliver a successful outcome, all of these hardware and software components need to be integrated as a single solution, working together as one to deliver world-class research and business value.

With over 20 years in the market and a maintained position as the largest independent HPC deployment team in the UK, OCF is your trusted partner in delivering a HPC project at any scale.

OCF has dedicated PRINCE2 accredited Project Managers that adhere to both ITIL V3 and the risk mitigation methodologies of PRINCE2 to ensure projects are delivered smoothly and to specification. Using a proven recipe for success, our dedicated in-house Hardware, HPC Compute, and Expert Storage teams work together to deliver a performant, reliable, unified HPC system that delivers value for our clients.

Support and Managed Services

A HPC Cluster delivered by OCF is not a one-time project; it is a multi-year relationship where OCF support our clients to ensure that their HPC system is delivering value to their organisation.

OCF provide several support and managed services options to ensure that your organisation can offer a smooth, seamless service to users.

Furthermore, we have an array of other value-added services, including application support and end-user training, to develop and enable the users of the environment.

Support Options:

Frontline Support

An OCF front-line support contract gives you a single point of contact for the entire environment on a break/fix basis

Service Credits

Service credits can be applied to requests in scope of “break/fix” support, whether its installing an application or applying a patch. Simply contact our team and use your credits to have the change implemented.

Managed Services – Remote System Administrator

Our remote administration services give you access to a dedicated remote system administrator who works collaboratively with your team to ensure your HPC cluster is kept optimal and online.

References:

- The University of Nottingham ([read case study](#))