



BRILLIANCE. TOGETHER.

OCF Managed Services

G-Cloud 15

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About OCF

Background & History

As a UK foremost Value-Added Integrator in High Performance Computing (HPC) and storage solutions, OCF Limited have consistently delivered our industry-leading technical expertise, consultancy services and in-house professional capabilities for over two decades. Primarily servicing the higher education and public sector research industries, OCF combine our specialised knowledge with our numerous trusted partnerships to create cutting edge technology solutions which allow our customers to excel in research and product development.

Headquartered in Sheffield, England, OCF was founded in 2002 supplying High Performance Technical Compute and Visualisation Solutions to organisations throughout the UK and Ireland. Since that time, OCF has delivered well over 100 HPC solutions, including several systems featured on the World Top500 Supercomputing List and 100's of Petabytes of research and HPC storage.

20
Years
Experience

Research and technical computing technologies never stand still, and with recent advances in areas including Cloud Computing and AI, OCFs expertise, together with its solution partners skills and technologies, allows OCF to support customers in adopting these cutting-edge technologies today and into the future.

Over the last 20 years, HPC systems have become more mature and business critical - OCF continues to expand its professional services, support and managed services capabilities to meet these more demanding customer requirements.

The OCF business grows from strength to strength, and with a management buy-out in November 2019, by three long-standing and experienced employees, OCF will continue to support its new and existing customers in meeting their HPC, storage, cloud and AI requirements long into the future.

The Team & Skills

Designing, integrating, and supporting HPC and technical computing solutions requires significant expertise. To meet this need, OCF have a team of 50 staff including 24 full-time engineers with the sole purpose of supplying Research and Technical Computing Solutions. We believe this to be the largest dedicated team in the UK.

Specialist
in-house
skills

OCF's in-house professional services capabilities and technology expertise spans our sales, pre-sales, engineering, operations, support, and project management teams making it possible for OCF to guide customers through the whole process from conception to a production ready research or technical computing service.



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Approaching Your Unique Requirement

Designing an HPC cluster or Storage Solution can be incredibly involved and complex. Selecting the most appropriate vendor, processor, memory architecture, accelerators and interconnect are all interdependent, along with choosing a suitable filesystem and cluster management/orchestration platform.

OCF have a team of highly experienced Account Managers, all of whom have extensive experience in research and advanced computing across various market sectors, but primarily within universities and UK research councils. Our Account Managers, reporting directly to the Sales Director, are geographically dispersed, and are assigned to customers within their respective assigned territories/sectors.

OCF's 20+ experienced technology experts, along with our customer services teams, will be available to offer support and assist throughout a project. Our technical experts will (free of charge) provide technical advice, design upgrades, and propose strategic plans. OCF customers receive direct post-sales support from our in-house teams and 1st line dedicated support. The University will receive ISO9001 accredited delivery and order management from our dedicated team in Sheffield UK.

Every requirement is reviewed as a team and the most appropriate partners and technologies are selected considering the technical requirement, commercials, and supportability of the end solution. Every solution OCF proposes is unique but based OCF/Vendor best practices and proven 'building blocks' wherever possible to give the flexibility of a fully bespoke solution without the associated risk.

The OCF sales and pre-sales teams undergo continuous professional development and training, both internally and with our partners and suppliers, ensuring that all teams are up to date with both current and future technologies.

Every solution
is bespoke,
based on best
practices and
vendor
reference
architectures

Delivery, Project Management & Integration

Every project delivered by the OCF Professional Services Team is coordinated by a PRINCE2 Accredited Project Manager. All OCF projects follow a tried and tested PRINCE2 methodology and are delivered in line with ITIL V3. OCF's accredited Project Managers lead implementation and onboarding, verify that Buyer expectations are fulfilled, and advise on timescales and professional services requirements.

A proven, repeatable
process for
successfully delivering
complex systems

All project phases, from delivery to build to operational support, are discussed and documented during a Project Definition Workshop to ensure that all parties have an opportunity to discuss and agree the technical, communication and logistical requirements of the project.



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A Statement of Work document is created by the OCF team which details the work to be undertaken, the results to be achieved and how these will be measured.

The OCF Project Manager communicates with Buyers and stakeholders throughout the process, guaranteeing that all parties are aware of progress made and that any challenges are effectively communicated and swiftly resolved in a collaborative manner. To ensure successful delivery of projects, OCF has implemented a Quality Management System (QMS) based on the requirements of BS EN ISO 9001:2015. The system has been developed to enable full integration of customer, in house and any 3rd party specific requirements.

On-going Support & Managed Services

OCF 'Frontline' Service Level Agreements are available for all OCF solutions. In conjunction with vendor and community support, OCF provide a break/fix service to assist in the problem diagnosis and resolution of all support issues. The OCF Customer Support Team are skilled HPC engineers who can provide Level 1 to Level 3 support in-house. If further support is required, 'Frontline+' allows the below supplemental options to be added.

**The OCF Remote
System Administrator
will become an
extended member of
your Team**

OCF offer an optional fully managed Remote System Administration capability which handles all HPC resource administration, enabling Buyers to focus on organizational activities.

OCF's Remote System Administrator will become an extended member of Buyers' teams, ensuring the smooth day to day running of HPC clusters, storage and associated services as well as dealing with support issues, user requests and keeping on top of software updates and security/feature updates.

OCF greatly value our strong customer relationships; the OCF Account Management business model places focus on customer satisfaction and collaboration. OCF aim to grow together with our customers, with our in-house expertise and an extensive network of contacts and partnerships offering a unique value to Buyers.



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1. OCF Managed Services Overview

OCF's ISO9001 accredited Managed Services maintain our customers' HPC systems to enable the continuity of business-critical tasks. Our highly experienced Managed Services team offer a proactive, fully managed system administration capability which removes the requirement for our customers to complete day-to-day monitoring and administration tasks. OCF's Managed Services are available both remotely and on-site - while our standard offering is a fully remote service, our dedicated Managed Services team can design a bespoke option tailored to a customer's specific business needs upon request. In addition, as a Cyber Essentials certified business, OCF recognise the importance of security regarding customer data and will agree custom data access procedures and limitations in accordance with each customer's specific requirements.

OCF's Remote System Administrator is designed to integrate as an extended member of our customers' teams, ensuring the smooth day-to-day running of the HPC cluster, storage and associated services as well as dealing with support issues, triaged user requests, software updates and security/feature updates. Likewise, customers are entitled to a dedicated Virtual Systems Administration and support package which helps resolve issues quickly and effectively.

Customers of OCF's Managed Services will be provided with:

- Continuous monitoring – OCF's Remote System Administrator will manage the customer environment and pro-actively respond to any issues, includes notification alerts
- Dedicated OCF Virtual HPC Systems Administrator access
- Call management of support issues with Hardware and Software vendors
- Operating system management and housekeeping
- Configuration management of software and frequent system updates to comply with OCF best practices
- Monthly online service review meetings with OCF's recommendations for improvements
- Incident management – OCF will fully manage any incidents raised including stakeholder communication and post-incident reviews in accordance with ITIL V3
- Named escalation points for each step to coordinate, follow technical issues



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through to resolution and help focus on the operations of the service

- Defined roles and responsibilities for service management
- Service user request management
- Service enhancement entitlement – to architect and deploy additional service requirements, adhering to change request procedures
- Ongoing service documentation maintenance
- Entire solution support including but not limited to: operating system; cluster management system; scheduler; storage; network; hardware; user applications; user management; firmware updates and patching.
- Optional uplift to on-site hands CRU service

2. What's Included?

Hardware and software support form a vital part of the OCF Managed Services offering. Hardware support will be provided by the dedicated Virtual HPC System Administrator (VHPCA) team in conjunction with active vendor support entitlements. Comprehensive software support includes remote support for end-user applications and operating systems pre-installed by OCF.

OCF provide **collaborate assistance** to all Managed Services customers. We provide a best endeavours approach to open-source software support. Where commercial software is purchased, OCF will escalate to the relevant software third party vendor for issue resolution. If a problem arises with one of the listed software products either pre-installed by OCF or requested by the customer through a Service Enhancement request, OCF will serve as a single point of contact until the problems are isolated and escalated to the third-party product vendor. The OCF VHPCA will escalate hardware and software RMA issues to suppliers when/break is not achievable by the OCF VHPCA.

Customers of OCF Managed Services receive **RMA management and component replacement**. Standard component replacement is managed by the dedicated VHPCA. Customer replaceable units will be requested from the manufacturer and scheduled for delivery to site, enabling customers to perform the replacement and return the faulty part. Field replaceable units will be accompanied by a Certified Engineer, allowing the manufacturer to perform more complex break/fix resolution. OCF Second line support will be engaged to perform issue determination on the software environment that manages



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the OCF delivered solution and create a resolution for the customer. OCF work with our customers to identify suitable workarounds where possible, ensuring the managed service continues performing for users.

OCF perform **remote access services** in the form of proactive monitoring, housekeeping and service enhancements through secure shell (ssh) connectivity to the service. We utilise key based authentication to ensure the VHPCA has a secure single sign-on encrypted access method to provide the service. Where required, all graphical/web browser-based management tool access will also be tunnelled through the ssh protocol. OCF will connect to VPN services that the customer has in place for additional security measures.

OCF Managed Services utilise the **cluster monitoring** implemented with the solution to perform daily proactive checks on the health of the service. Metrics to monitor include node status of systems, storage status, storage availability, system temperatures and power usage, load, memory usage, GPU activity and power consumption. This monitoring enables OCF Managed Services to identify and mitigate potential problems on the server before they become an active incident. Monitoring is customised to each customer's unique requirements and will be utilised for trending data on the cluster which can be used in reporting on the cluster's performance.

3. OCF Service Desk & Communications

OCF provide customer with several methods of communication to engage with our dedicated support team. During business hours (Monday-Friday 9am-6pm excluding Bank Holidays), customers can reach the support team via calling 0330 124 4700, emailing managementservices@ocf.co.uk or through the OCF Support Portal (<http://support.ocf.co.uk>). Support requests raised via these methods will be acknowledged and triaged before a support ticket is generated to document and track incident resolution within the OCF Revelation Support Helpdesk. Critical incidents which occur outside of normal business hours should be logged via the out-of-hours telephone number (stated in the Service Level Agreement upon contract commencement). Incidents can be logged 24/7 and will be triaged during business hours, after which a resolution plan will be provided to the customer.

Critical incidents which occur outside of normal business hours should be logged via the out-of-hours telephone number (stated in the Service Level Agreement upon contract commencement). Response times may vary depending on purchased entitlement. If the incident is deemed low priority by the dedicated support call handler, a Next Business Day ticket will be raised to be triaged during working hours. If the incident is deemed high priority, the OCF on-call engineer will perform the remedial action necessary to restore the

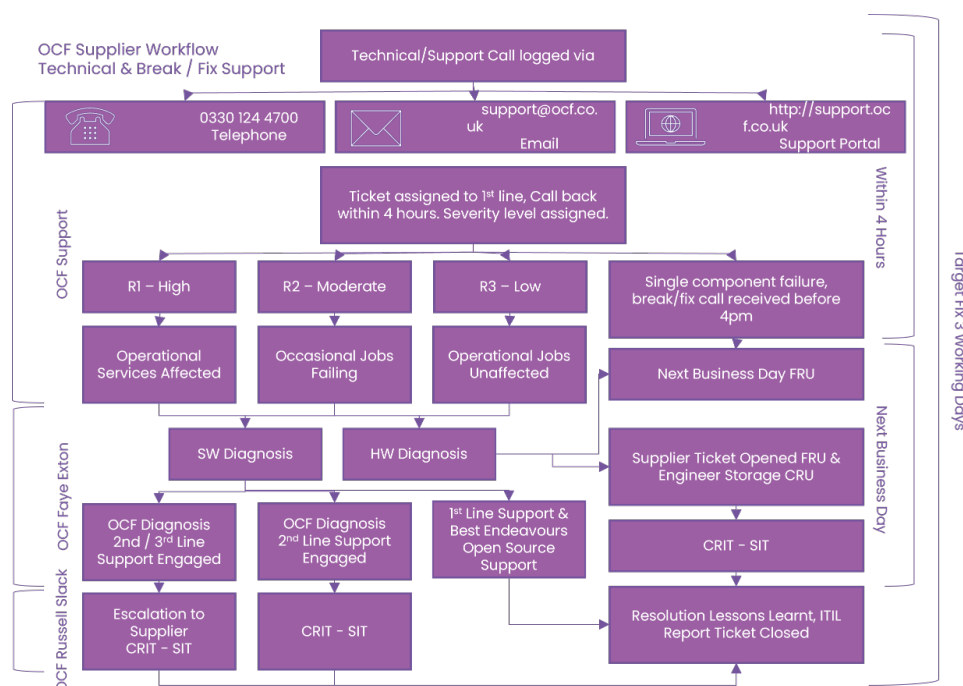


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customer's service. Triage and handling of support tickets received during standard business hours will be performed in line with the following workflow diagram.



4. Hardware & Software Support

Hardware support will be provided by the dedicated Virtual HPC System Administrator (VHPCA) team in conjunction with active vendor support entitlements. All hardware & software listed under the SLA agreement is detailed in the inventory. The OCF VHPCA will escalate hardware and software RMA issues to suppliers as required when break/fix is not achievable by the OCF VHPCA.

4.1. Software Support

Comprehensive Software Support includes remote software support for end-user applications and operating systems pre-installed by OCF detailed in the schedule below. OCF provide a best endeavours approach to open-source software support. Where commercial software has been purchased, OCF will escalate to the relevant software third party vendor for issue resolution.

4.2. Collaborative Assistance

If a problem arises with one of the listed software products either pre-installed by OCF or



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requested by the customer through a Service Enhancement request, OCF will serve as a single point of contact, until the problems are isolated and escalated to the third-party product vendor. Specifically, OCF will contact the third-party vendor and create a “problem incident” on behalf of the customer, providing the necessary problem documentation. Once a vendor is engaged, OCF will pro-actively liaise with the third-party vendor to provide problem determination and coordinate/apply any recommended resolutions. The customer must have the appropriate active support agreements and entitlement with the respective third-party vendor.

5. RMA Management & Component Replacement

Standard component replacement is managed by the dedicated Virtual HPC System Administrator (VHPCA). Customer replaceable units (CRU) such as hard drives or memory DIMMS will be requested from the manufacturer and scheduled for delivery to site, allowing the customer to perform the replacement and return the faulty part.

Field Replaceable units (FRU) such as motherboard/backplanes is managed by the dedicated Virtual HPC System Administrator (VHPCA) and will be requested from the manufacturer and scheduled for delivery to site along with a Certified Engineer (CE), allowing the manufacturer to perform more complex break/fix resolution.

OCF Second line support will be engaged to perform issue determination on the software environment that manages the OCF delivered solution.

Once the issue has been identified, OCF will work with the customer to resolve the issue. It will work to restore the environment to the last known good state based on maintenance sessions previously performed. In the event of a computational node failure our quick deployment through configuration management will help provision nodes to their last known good configuration.

Should the issue be related to a supplied commercial software product, OCF will engage with the relevant supplier to open support tickets and request patches.

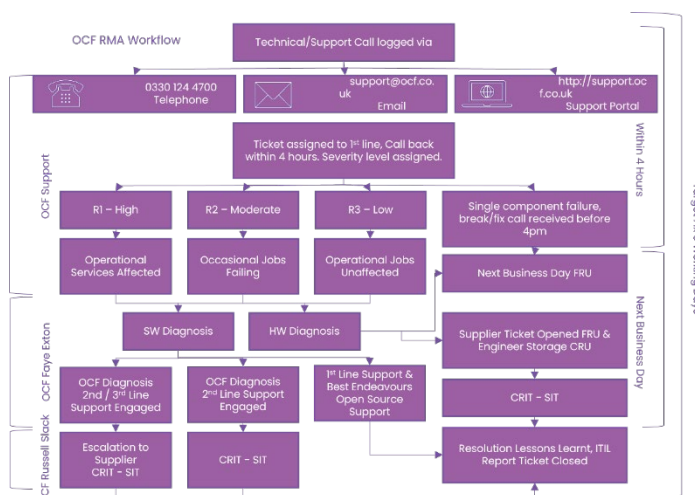
Should the issue be related to an Open-Source product, OCF will perform reasonable endeavors to reach out to the community and request a suitable patch be made available. Should no patches be available to resolve the issue, OCF will work with the customer to identify a suitable workaround where possible, to ensure the service continues to be able to perform for users.



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6. Remote Access Services

OCF perform proactive monitoring, housekeeping, and service enhancements through secure shell (ssh) connectivity to the service. OCF utilise key based authentication to ensure the VHPCA has a secure single sign-on encrypted access method to provide the service. Where required, all graphical/web browser-based management tool access will also be tunneled through the ssh protocol. Where required, OCF will connect to VPN services that the customer has in place for additional security measures.

7. Data Handling

OCF recognise the importance of security regarding customer data and will agree data access procedures and limitations in accordance with each customer specific requirements.

OCF can provide the managed service utilising:

- Secure Shell key based remote access and named/security cleared OCF Personnel
- Designated OCF external IP connectivity whitelisted on firewalls
- customer prepared (secured) terminal/access point hardware
- End to End Encrypted VPN software (Customer or OCF provided)
- Commercially available encrypted remote desktop software such as

Teamviewer/Customer specific

OCF Limited and its employees accept no liability or responsibility for any direct or indirect loss of data arising from advice or activities performed in its consultation or support duties. The customer agrees to take full responsibility to maintain full and valid back-ups.



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8. Monitoring

OCF Managed Services will utilise the cluster monitoring that was implemented with the solution to perform daily proactive checks on the health of the service.

OCF will typically configure the following metrics to monitor:

- Node status of systems
- Storage status
- Storage availability
- System Temperatures and power usage (when available)
- Load
- Memory usage
- GPU Activity
- Power Consumption (if hardware supports)

Where required, checks will also be performed on the command line for detailed information on the health of hardware as well as network switches.

By performing the above as part of housekeeping and reactive monitoring on the cluster, Managed Services can identify and mitigate potential problems on the server before they become apparent at an end user level or before they become an active incident.

These monitoring tasks will be customised to suit the needs of the cluster and evolve as needed if a post incident review has identified the potential for earlier detection and/or prevention of an incident.

Cluster monitoring will be used for reactive break / fix scenarios where alerting has emailed the HPCA of a monitored parameter transitioning to a non-optimal state. Should re-active monitoring or trending data not identify this scenario, the Managed Services HPC Virtual System Administrator will use this alerting to investigate the cause and take necessary action (incident identification, diagnostics, agreed remedial action).

Cluster monitoring is expected to also lead to identifying drivers for incidents as well as identifying future incident causes and will be used to link incidents identifying a singular cause and when problems need to be raised. It will also be used for performance and trending data on the cluster which can be used in aiding reporting to highlight how the cluster is performing.



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Sample node based monitoring



Sample scheduler based monitoring



Sample temperature based monitoring



Sample GPU based monitoring



9. Key Performance Indicators

OCF Key Performance Indicators (KPIs) are based on ITIL best practices for service availability. The following KPIs are included in all Managed Service contracts.

Key Performance Indicator	Definition
Service Availability	Availability of the HPC Service, excluding planned maintenance, for 99% uptime per month.
Number of Service Interruptions	Number of service interruptions not exceeding 3 per month.
Duration of Service Interruptions	Average duration of all service interruptions does not exceed 7hrs per month.

As part of the Managed Service, weekly reporting is supplied in the form of emails to agreed stakeholders. Data includes open incidents, closed incidents, open problems, closed problems as well as open and closed tickets.

An additional monthly report via email and video/telephone conference call will include discussions related to the service performance as per these KPIs and trending data from reporting and helpdesk. Typical agendas include patching recommendations based on the agreed patching and security plans, a review of incident management including open and

closed incidents that occurred during that month or continued from previous months, and a post incident review analysis. Periodic incident reviews will also take place based upon frequency of incidents during these monthly meetings to ensure consistent customer satisfaction. All OCF customers have an experienced Account Manager who will act as their primary point of contact throughout their Managed Services contract. Customers have the option to escalate points to our Head of Operations, Faye Exton, or Managing Director, Russell Slack, should this be considered appropriate as per OCF's commitment to perpetual Managed Services improvement.

10. Pricing Overview

Service	Cost (ex VAT)
1 Year Managed Services Contract	£75,000.00
<i>Subject to service review and scoping of customer requirements</i>	



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11. Ordering & Invoicing Process

OCF Consultancy Services

- 25% Invoice upon receipt of Buyer Purchase Order
- 75% Invoice upon completion of services as defined in the quotation/proposal
- Payment due 30 days from Date of Invoice

Cloud Usage

- Previous months usage invoiced 1st of the Month
- Payment due 30 days from Date of Invoice

12. Terminating a Contract

- A PO raised for OCF HPC Cloudburst using Slurm is non-cancellable.
*Under exceptional circumstances an agreement may be made with Director approval
- Contract for supply of cloud Services (monthly invoicing) can terminate with 1 Month Notice

13. Technical Requirements

Every cloud burst implementation on an existing HPC Cluster is different. Please contact OCF to determine if the above pre-packaged services package is appropriate for your cluster/use case.

- Existing Linux Cluster & Documentation/Build notes
- Cluster Root Credentials
- Remote OCF access & credentials (for support)
- Network connectivity and sufficient bandwidth* to/from cloud service

*Varies depending on use case – please contact OCF if this is a concern.

Custom projects for non-eligible clusters may be based on the above and additional professional services.



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