



OCF HPC in the Cloud Implementation & Support 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. Description of the Service

OCF offers pre-packaged professional services to implement a Linux HPC cluster in Amazon Web Services (AWS). This works package will deliver a HPC 'head-node' on an always on AWS instance and a 'stretchy' compute capability of one node type. This cloud HPC cluster will be built solely for this end user and hosted in Amazon Web Services (AWS). The works package will implement a Linux HPC Cluster based on widely adopted Open-Source technologies including Slurm and AWS automation tools and includes configuration of a new AWS account and monthly billing through OCF.

This project delivers an OCF Slurm cloud burst implementation 100% in the cloud meaning that compute nodes are spun up as and when required. This uses repurposed core Slurm functionality together with custom OCF scripts to enable intelligent scaling and shrinking of the cluster within AWS using the Slurm Workload Manager. This pre-packaged services offering can be complimented with further professional services, support packages and managed services are described in more detail below.

2. Description of the Slurm Cloud Cluster

2.1. Scalable Compute Cluster in the Cloud using Slurm

Slurm cloud cluster is an extension of Slurms power saving functionality. When a cloud node is not in use it is 'suspended' and when it is required again it is 'resumed'. This is achieved by triggering customisable scripts in either condition. For a cloud cluster the script is replaced with one that spins up or down cloud instances. Within Slurm different types of nodes are separated into "partitions". All nodes will be partitioned appropriately depending on node type. If a job is submitted to multiple partitions the schedulers default behaviour is to allocate it to the partition which will result in the earliest completion of the job. For more specific conditions (such as 90% cluster utilisation and job pending periods) OCF develops custom scripts for our customers.



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2.2. Accounting

Slurm can be configured to collect accounting information for every job and job step executed. Accounting records can be written to a simple text file or a database. Information is available about both currently executing jobs and jobs which have already terminated. The `sacct` command can report resource usage for running or terminated jobs including individual tasks, which can be useful to detect load imbalance between the tasks. The `sstat` command can be used to status only currently running jobs. It also can give you valuable information about imbalance between tasks. The `sreport` can be used to generate reports based upon all jobs executed in a time interval. One thing to note is that if you want to give users a set allocation of 'credits' and prevent them from using more than that amount, rather than giving them uncapped access and billing them for it at the end of a period, this requires the use of a different plugin, Slurm Bank (`sbank`). `sbank` can also be used by administrators to generate reports displaying credits used and left available.

3. Standard 'Pre-packaged' Implementation

- Create AWS account and enable OCF monthly billing
- Configure cluster in the cloud in AWS:
 - o 1 'Head Node'
 - o 1 Machine Type included
 - o 1 Network Type
 - o Amazon S3 Storage
 - o Amazon EFS Storage
 - o Amazon FSx for Lustre
 - o VPN configuration
- Install cluster Management stack and Slurm on Head Node in AWS
- Configure Slurm as workload manager



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- Enable and Configure Slurm (1 Queue)
- Implement basic accounting or sbank capability
- Carry out acceptance tests on one pre-agreed application and handover
- Informal hands-over Training (1/2 Day)
- Build notes/documentation (PDF)
- 1 Year Front Line Support SLA (Monday – Friday, 9x5)

4. OCF Support – Onboarding & Offboarding

OCF will assign a PRINCE 2 accredited Project Manager and Lead Engineer to the project. Following purchase of OCF HPC Cloudburst using Slurm Professional Services package, the Buyer will be contacted by the OCF Project Manager who will run through a mini Project Definition Workshop (PDW) via web-conference. The PDW will include describing the solution, discussing and agreeing technical details and finalising how the project will be approached. Following the PDW a Statement of Work will be proposed to the Buyer for review and approval. The Project Manager will drive the project from PO through to Acceptance and handover back to the Buyer and OCF's Support Team. Following handover, OCF will assign an Account Manager to provide the Buyer with a primary non-support contact within OCF and to ensure a continued relationship between OCF and the Buyer.

5. Example Implementation Plan

High level implementation plan for HPC in the Cloud (AWS)

- Create AWS account and enable OCF monthly billing
- Configure cluster in the cloud in AWS:

- o 1 'Head Node'



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6. Pricing Overview

Service	Cost (ex VAT)
OCF HPC in the Cloud (AWS) Pre-packaged project as described above, including 12 months break/fix support.	£12,500.00
25x OCF Service Credits OCF will provide remote consultancy at the request of the customer to perform environment change requests to a customer environment. Used units are based on 1x hour of remote time at a minimum, 8x units will constitute an entire working day of consultancy, 12x units can be converted into an onsite consultancy day if required, this must be pre-agreed with the OCF Professional Services team before conversion. OCF Service Credits are valid for 12 months.	£4,062.50
1x Day on-site Consultancy	£1500.00
1x Day remote Consultancy	£1300.00
1 Year Managed Services Contract	£75,000.00
Additional Year OCF Break/Fix Support Monday-Friday 9:00 – 17:00	£7500.00



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7. Service Levels & Support

OCF provide single point of contact support entitlement via email, telephone, and Web Portal for Break/Fix support, providing Buyers with problem determination and break/fix support for agreed hardware, cloud service and software listed under the SLA. OCF will escalate hardware and software issues to suppliers as required when break/fix is not achievable. OCF will provide the Buyer with access to the OCF web-based support portal, OCF support hotline and OCF support email channels. All support tickets will be created within the OCF web-based support portal for review by the Buyer and OCF support teams at any point.

OCF Agreement Response: 4 Hours Response

(Mon – Fri, 9am – 5.30pm excluding Public Holidays)

4hrs response is an acknowledgement of the service/incident on our systems – this is not a guaranteed fix or a guaranteed HPC engineer working on the problem within these 4hrs, however OCF will endeavor to have an HPC engineer working on the solution ASAP once the ticket is raised.

8. 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



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9. 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

10. 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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