CASE STUDY:
FLOWHD LTD

FlowHD are the UK reseller of XFlow and have many years experience across many disciplines in the field of advanced engineering.

With consultants who have in-depth knowledge in the market, they are able to offer consultancy and support to their clients and solutions that give a clear competitive edge.

ADVANCED CFD APPLICATION DELIVERED VIA enCORE SERVICE

Business Impact Summary

Challenge:

FlowHD, sole UK reseller of XFlow CFD application, needed flexible and cost-effective access to a modern HPC cluster in order to deliver its solution to a major automotive manufacturer. State-of-the-art remote visualisation tools were also needed in order to deliver the full XFlow capability.

Solution:

FlowHD chose the OCF enCORE service, which utilises the Hartree Centre's BlueWonder cluster, along with DragonHPC's advanced remote visualisation server implementation.

Result:

After a period of testing, which involved NextLimit, the authors of XFlow, FlowHD were able to deliver a full SaaS solution to their client, providing remote visualisation for pre and post processing, and the ability to submit compute jobs using up to 2,000 CPU cores.

Advanced engineering codes demand high performance compute clusters

In all areas of the engineering sector, competition is forcing companies to bring products to market more quickly and at the minimum possible cost. The need, therefore, within the engineering community for greater fidelity within ever more complex computational models is continually growing. This presents significant challenges in terms of affordable software and access to the compute power required to deliver the necessary performance.

"The nature of XFlow and the way it computes lends itself very well to the enCORE HPC environment"

Matt Hieatt, FlowHD

Spanish software vendor Next Limit Technologies has developed a state-of-the art Computational Fluid Dynamics (CFD) application called XFlow. For engineers and analysts who require quick and accurate feedback on flow, thermal, and acoustic behaviour, XFlow is a CFD software system that enables users to solve problems involving moving boundaries, free surface and fluid structure interaction on complex geometric domains. The design of this CFD package differs significantly from traditional applications, in that it features a novel lattice-Boltzmann technique. This negates the needfor the classic domain meshing process, making the end to end process for producing CFD results much faster.

FlowHD required a large, modern HPC facility on which to test XFlow in a variety of uses and across differing numbers of CPU cores. The Hartree Centre's BlueWonder cluster, with some 8,000 cores was selected and engagement arranged via Hartree's industry partner OCF, through its enCORE HPC on demand service model. With Dragon HPC providing its state-of-the-art remote visualisation technology, a complete Software as a Solution (SaaS) has been engineered, allowing the user to operate a complex remote software package as if it were running on his own workstation.

The viability of operating XFlow on hundreds or even thousands of CPU cores is totally dependent upon the application scaling at near-linear rates. FlowHD was able to deliver stunning performance with XFlow on the BlueWonder cluster via enCORE, with performance scaling as close to linear as is realistically possible.

FlowHD's Matt Hieatt commented: "The nature of XFlow and the way it computes lends itself very well to the enCORE HPC environment. We achieve scalability of over 85% on 1024 cores or more. Essential to the commercial viability of this service is the ability to use XFlow on a purely pay per use model with the release of the new token based licence model from Next Limit. You buy tokens which are used by XFlow as it runs, which can be topped up online by the user."

"OCF and The Hartree Centre have worked closely with FlowHD, Next Limit Technologies and Dragon HPC to deliver excellent performance and value for XFlow users"

Jerry Dixon, OCF

FlowHD re-sell the XFlow product in the UK and will, via OCF's enCORE service, deliver it as a ground-breaking CFD-as-a-service solution that threatens to significantly disrupt the market for CFD software. It's ground-breaking token based license model directly challenges the traditional model and makes the CFD SaaS solution a reality.

A specific requirement for FlowHD was the availability of an advanced and flexible remote visualisation node, to deliver online access to the application for case generation, pre and post processing and for submission of compute jobs to the compute cluster. Dragon HPC, a UK SME, were selected for their advanced, Citrix-based solution that delivers market-leading remote graphics performance.

The collaboration with software vendors and UK SMEs such as FlowHD, Dragon HPC and OCF is central to the objectives of the Hartree Centre, a government funded initiative involving the Science and Technology Facilities Council (STFC) and IBM. Targeted with bringing the benefits of HPC to UK industry, and making access to it both simple and affordable, this service ticks all the boxes for Cliff Brereton, Hartree Centre Director: "A key Hartree Centre objective is to engage with innovative SMEs who are building businesses around HPC technology. The relationship with FlowHD via OCF is a perfect example of this, and shows how access to our technology and expertise has allowed them to develop business with major industrial organisations."

The continued adoption of cloud computing across all market sectors will continue to bring changes in the CAE marketplace. Next Limit Technologies, with its innovative token-based licensing model, marks a new era in advanced CFD codes, and will bring even greater focus in the ISV community to the user demand for flexible and affordable licensing.

About

OCF is a high performance data processing, data management, data storage and data analytics provider. It aims to successfully meet the significant "big data" challenges of UK firms – public and private, SMBs up to complex organisations. Website: www.encore-hpc.co.uk

The Hartree Centre is a collaboration between key partners The Science and Technology Facilities Council, a leading multi-disciplinary research body, and IBM. With a remit to bring the benefits of HPC to a wider audience within UK industry, the Hartree Centre's computational skills are relevant to many market sectors. Website: www.stfc.ac.uk/hartree

Next Limit Technologies are a Spanish software house. Research and development at Next Limit continues to explore and improve simulation techniques, advanced mathematical models and programming methodologies. Passionate about innovating, their mission is to push the boundaries of research and simulation technology, to constantly reach and conquer the "Next Limit".

DragonHPC are a UK SME specialising in cloud-based IT solutions for a wide variety of market sectors and applications. The advanced graphics capability of its remote visualisation solution brings new possibilities to the world of cloud computing. Website: www.dragon-hpc.com

OCF plc,
5 Rotunda Business Centre,
Thorncliffe Park, Chapeltown,
Sheffield, S35 2PG
T: 0114 257 2200 E: info@ocf.co.uk
W: www.ocf.co.uk