

EPIC: LINKING EXPERTS WITH USERS AND DATA

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OpenFOAM®¹ is the most successful and empowering open-source computational fluid dynamics (CFD) software ever produced. Professionals and students alike derive benefit from transparency in the algorithms that are implemented. Innovative new solutions are rapidly implemented in the code and demonstrated at scale without the need for costly license fees.

However, it is very common to find users (particularly beginners) struggling with problems that might easily be solved by more experienced specialists, or even other students. Professionals often encounter problems when upgrading from one release to the next, when keyword usage evolves and underlying code structures and algorithms are modified.

Forum questions – such as (but not limited to) those on CFD Online [1] – are often posed to the wider community in the form of simulation inputs (mesh, control files, etc.) where the originator has been unable to obtain their desired results. This is often a case of inexperience with the code, and sometimes with a fundamental misunderstanding of CFD generally. It is left to the wider, voluntary community to solve the problem or offer some form of guidance. In a world of competing priorities including paid work – such questions sometimes go unanswered, or worse – answered incompletely. This can lead to speculation and tangential discussion threads. Where questions are only partially addressed, beginners may assume that the original or subsequent input files posted online are now correct and complete – when sometimes they are not. In short, the market for end user support could be improved.

For industrial end users this is very challenging. A better balance might be struck between the attractive features of free (open-source) software and the commercial support model in place for more expensive code suites. A number of organisations offer premium level support for OpenFOAM®, but this is a small fraction of the expertise pool available worldwide. This is surely an anachronism in the world of eBay, Uber and Gumtree.

Imagine a service where a problematic CFD case can easily be uploaded and made visible to a global market of experts from seasoned professionals and niche physics specialists to graduate students who can tender to solve the problem for payment. Customer feedback would be used to rank the experts, and market dynamics would establish the going rate for help with the more straightforward problems. For a great many students, this might usefully augment living costs and even help locate future full-time employment prospects.



Figure 1: EPIC Cloud Brokering Platform [2] for OpenFOAM® on HPC (epic.zenotech.com). EPIC (is a portal to a range of high performance computing (HPC) platforms (including Amazon Web Services [3], CFMS [4], HPC Midlands [5], Cambridge University CUTS [6], and the list is growing) with pre-installed versions of OpenFOAM. Custom code variants or other software can also be added quickly and easily. EPIC provides secure and private access to scalable computing resource, without the need for end users to work directly with queuing systems or other complex computing infrastructure. Within EPIC, OpenFOAM jobs can be scheduled to make use of cheap prices, and launch visualisation servers (via ParaView [7]) without the need to move large volumes of data.

¹This offering is not approved or endorsed by OpenCFD Limited, producer and distributor of the OpenFOAM software and owner of the OPENFOAM® and OpenCFD® trade marks.

We believe that this service adds value, and are using our existing cloud-brokering platform for high performance computing (EPIC – epic.zenotech.com) to help. In the short term we have added a section to EPIC corresponding to the OpenFOAM[®] software where experts can identify themselves to end-users following software selection. Thus if end users do encounter problems, there is visible help on hand from a range of specialists. We are pleased to provide this advertising service FREE OF CHARGE to the OpenFOAM[®] community (both end users and expert helpers who want to register). We will also provide a preview of a more comprehensive service, currently under development, that facilitates a full assistance package to be delivered. This service includes support for financial transactions and data sharing that have been identified above as necessary to deliver improved user support.

The new service will include features that allow individuals or organisations to:

1. Register to submit or tender for assistance tasks.
2. Share data files with others to obtain help with OpenFOAM[®].
3. Authorise and/or receive payment for successful assistance.
4. Provide feedback on how things went.

We will be asking the community for feedback on the above model during the workshop, in order to refine the workflow and identify any other community requirements.

References

- [1] [Online]. Available: <http://www.cfd-misc.com>
- [2] [Online]. Available: <https://epic.zenotech.com>
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