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### Original Citation

Kureshi, Ibad, Holmes, Violeta, Gubb, D., Liang, Shuo, Bonner, Stephen and Cooke, D. (2012) Providing IaaS using a private cloud in an HE environment. In: Proceedings of The Queen's Diamond Jubilee Computing and Engineering Annual Researchers' Conference 2012: CEARC'12. University of Huddersfield, Huddersfield, p. 155. ISBN 978-1-86218-106-9

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## PROVIDING IaaS USING A PRIVATE CLOUD IN AN HE ENVIRONMENT

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### ABSTRACT

Cloud – A term that now seems associated to all web services. Services that have existed for 15-20 years have also been rebranded to be included into this ever growing cloud. What is cloud computing? Academically speaking cloud computing comprises of 3 important components. Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). True offerings of the latter two services include Microsoft Azure (PaaS) and Goggle Docs (SaaS). Traditional web hosting is also now being incorrectly lumped in as IaaS. Infrastructure as a Service is where academics split from the Commercial definition of the cloud and within the academic community there is passionate debate as to the true definition of cloud computing. One school of thought is that ANY On-Demand infrastructure is cloud computing. Another school of thought believes that any infrastructure deployed utilising virtualising technologies constitutes a IaaS cloud. While both definitions are correct, they are not complete. The UK NGI (formerly the National Grid Service) has adopted a definition that an IaaS cloud is one where a user can get accesses via a technical-interface (without any other human interaction) to infrastructure which runs virtualised on some central resource.

The hype associated with an IaaS cloud comes from the fact that for a smaller hardware and power footprint, the organisations can meet their infrastructure needs by creating virtual machines. For start-up internet based companies this means that the barrier to market becomes lower. In a cloud environment the infrastructure can also be expanded and contracted based on demand thus saving the company money. The private cloud – an IaaS cloud where the underlying hardware is own by the company for internal use, can be confused with virtualisation. Many companies and HE/FE institutions are moving to virtualised environments to reduce their hardware and power footprint, mostly in an effort to cut costs and become green. Using tools like VMWare®, XEN® and VirtualBox® IT managers are able to consolidate their entire server family into a couple of racks rather than a full data centre. This is not a cloud! Based on the UK NGI the above mentioned hypervisor packages still require the end user to contact the hardware administrator to create the required virtual machine (VM). A true cloud would allow the user to create systems as and when he requires using some sort of API or web-frontend.

A private IaaS cloud would help a HE/FE institute by providing a scalable and flexible resource to the academic and research community. For early researchers or academics with small projects there is a next to nothing financial, power or spatial cost to get the hardware up and running. Using the existing cloud they can create VM to meet their needs. Projects usually have a short life and the hardware cost is not fully justifiable thus a central cloud would enable the academics conserve their funding. If a research project becomes intensive and computationally heavy in later stages the VM infrastructure that underlines a typical cloud makes for easy migration to a dedicated resource. Software developers requiring access to different platforms (e.g. Win XP®, Win 7®, Ubuntu® Linux, Redhat® Linux, BSD®, OS X® etc) to test their software don't need to purchase each required system but can take advantage of a cloud infrastructure by deploying each as a virtual machine, using them as and when required.

The poster based on this work will show how the High Performance Computing Resource Centre has established a private infrastructure as a service cloud, utilising the Ubuntu® Enterprise Cloud® software stack, for the academic and research community at the University of Huddersfield. With the starting capacity of 192 virtual machines this system contributes to users requiring a multi-platform testing resource and lowers initial costs of acquiring hardware for researchers till they get their funding in place.

**Keywords** IaaS, cloud, eucalyptus, UEC, Ubuntu enterprise cloud, private cloud, public cloud, HE/FE research infrastructure