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SMEs empowered by a pioneering approach to cloud computing

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Green, sustainable design is the new watchword among architects. Buildings that save energy and minimise environmental impact are needed around the world, but they are not easy to design - location, geography, climate, cost and many other factors need to be taken into account. A pioneering start-up company is solving the problem thanks to advances in cloud computing developed with EU funding.

Collaboratorio, an Italian think tank for architects and civil engineers, has set up Green Prefab to provide collaborative cloud computing services and applications to help architects, engineers and contractors around the world design, model and analyse the environmental impact of buildings. The start-up is a direct spin off from Collaboratorio's involvement in the [VENUS-C](#) [2] * project, an initiative supported by EUR 4.5 million in funding from the European Commission that is helping researchers and SMEs working in many scientific disciplines access open, industrial-quality cloud computing infrastructure.

'Green Prefab is one of the top VENUS-C success stories as it demonstrates an entrepreneurial spirit coupled with small-scale funding support at regional government level and through private investment to help kick-start this new company,' explains Andrea Manieri, the VENUS-C project director from ICT group Engineering Ingegneria Informatica in Italy.

The Green Prefab platform enables architects to determine what type of building design best fits local environmental and urban contexts, with tools that can model and visualise its environmental impact and lifecycle. Thanks to cloud access to powerful, distributed computation, software and storage resources provided by Microsoft Azure, the platform enables Green Prefab researchers to identify trends in building design, perform extrapolation studies and provide advice on common challenges related to environmental impact.

'The very first prototype was for 3D rendering visualisation, and we are now integrating eco-efficiency tools,' explains Collaboratorio CEO Furio Barzon. 'We feel like pioneers heading in the right direction to a still untouched gold mine.'

Collaboratorio is one of seven project partners working on specific cloud applications in specific domains, alongside 15 pilot projects that received seed funding from the VENUS-C team in order to support a user-centric approach to developing interoperable, easy-to-use cloud infrastructure. Several other VENUS-C users, including SMEs and start-ups, are developing commercially viable technologies on the back of their involvement in the project.

From drug discovery to maritime safety... in the cloud

Molplex, a start-up based in the United Kingdom, is using VENUS-C's cloud computing infrastructure to carry out molecular computations for drug discovery, speeding progress on the development of new medications that could save lives.

'This application allows us to quickly estimate the activity in the human body of new chemical compounds,' says Molplex co-founder Vladimir Sykora. 'Thanks to the VENUS-C platform we will be able to do in a few weeks molecular computations that would have taken a year to complete on our own servers.'

Saving processing and computing time is not the only benefit of the cloud infrastructure. For DFRC, a small Swiss company, the key issue is scalability. Using resources enabled by VENUS-C, the company is involved in an EU flagship project called PERSEUS aimed at improving the security and safety of Europe's maritime borders, combating illegal immigration, crime and smuggling through improved real-time access to shipping and maritime data.

'Scaling our platform with the VENUS-C infrastructure will enable us to support future growth in terms of vessels monitored in real-time and usability by operators,' explains DFRC's Chief Technology Officer Erel Rosenberg.

For SMEs in particular, perhaps the biggest benefit of cloud computing is cost and accessibility. There is no need to buy banks of servers and computers, purchase expensive software or struggle up a steep learning curve, as with some other distributed computing approaches. Instead, cloud resources can be used as and when needed for relatively little cost and accessed through an easy-to-use web browser interface.

'Not having to commit to large up-front costs and investments can have a big impact on the success of a small business,' Mr. Manieri emphasises. 'Instead of buying and configuring a small farm of computers that will serve up to a maximum estimated workload, which normally requires an overestimation to fulfil a service level agreement, resources can be rented on a public cloud infrastructure. These resources can be purchased at the infrastructure portal of the provider.'

One test case in the VENUS-C project demonstrated a 10-fold acceleration in processing speed compared to an SME running the software by themselves, using resources that cost about EUR 1,000

monthly.

Put simply: 'Computer resources can be scaled as required without committing to large capital purchases, which is critical to the success of our small business,' says Molplex's Mr. Sykora.

More broadly, cloud computing offers important opportunities for collaboration between research-focused SMEs and academia.

Austria-headquartered RISC-Software, for example, is using its experience in VENUS-C to assist technology transfer between research and industry. In collaboration with the University of Malaga in Spain and the Johannes Kepler University in Austria, the company is harnessing the collaborative power of cloud computing and benefiting from the open approach adopted in the VENUS-C project.

Likewise, Collaboratorio start-up Green Prefab is working together with other VENUS-C civil engineering pilots for building structural analysis with the Universidad Politecnica de Valencia in Spain and on energy efficiency with the Royal Danish Academy.

The collaborations are clear examples of the advantages of an accelerating trend toward 'open science.'

'Open science is beginning to gain traction as a new way of doing science, sharing and accessing research results early on, accessing scalable computing resources on easy to use and cost effective commercial clouds,' explains Dr. Fabrizio Gagliardi, Microsoft Research Connections, chair of the Project Management Board of VENUS-C. 'This new approach means that researchers can build on the findings of other researchers and make new discoveries that were not possible before. Microsoft Research believes in this approach and has invested considerable Azure resources to help VENUS-C to succeed with the support of its European innovation centres.'

VENUS-C received research funding from the European Union's Seventh Framework Programme (FP7).

* 'Virtual multidisciplinary environments using cloud infrastructures'.

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