

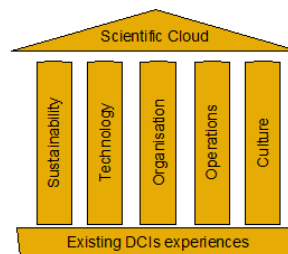
# VENUS-C

**Summary:** VENUS-C will develop and deploy a Cloud Computing service for research and industry communities in Europe by offering **an industrial-quality service-oriented platform based on virtualisation technologies**. VENUS-C aims to facilitate and empower these communities through the easy deployment of end-user services, in order to make e-Infrastructures more widely valuable across a spectrum of research fields without the complexity of existing grids and high up-front costs.

With its industrial partners and the broad range of scientific user communities, the consortium will demonstrate the feasibility and potential of a Scientific Cloud for Europe. A strong focus on training and networking activities will drive the engagement of European researchers in cloud technologies and services. This will cover both technical and policy issues, interoperability between clouds, between cloud and on-premises data centres, rich versus thin client interfaces, cloud locality, benchmarking, latency, privacy, trust, security and legal issues.

*“Scientific Cloud Computing is not a new technology, but more of an innovative model of putting together a platform with the potential to make research easier and more effective. Cloud Computing is gaining fertile ground with both customers and technologists because it offers elasticity of service provisioning, pay-per-use, availability of resources and above all simplicity. VENUS-C brings together these benefits in the context of a Scientific Cloud for Europe, demonstrating the suitability of this model to reduce costs and increase opportunities for researchers across EU27.”* **Andrea Manieri, Engineering and VENUS-C co-ordinator**

**Objectives:** VENUS-C will provide an easy-to-use, user-tested, industrial-quality, service-oriented e-Infrastructure. This will enable research and industry communities from various disciplines to carry out their research in a more effective way. VENUS-C will promote the concept of the Scientific Cloud as a sustainable complement to existing distributed computing infrastructures (DCIs). By exploiting commercial solutions, and avoiding vendor lock-in through broad interoperability, VENUS-C will provide an easy way to deploy end-user services.



**Action plan:** The project will first develop the VENUS-C infrastructure and underlying platform, and then issue an Open Call to broaden the application and geographical scope of the project. VENUS-C will liaise with partner projects to drive interoperability, and engage actively with evangelists and standards experts to ensure sustainable impact and adoption of project results.

In the first 12 months, the project will focus on the delivery of an end-to-end prototype which delivers immediate value to our scientific partners: the first release (to be achieved in 4-6 months) will focus on dynamic job submission and workload dispatch into multiple underlying DCI and cloud providers. Subsequent milestones will enable integration with data management, security and programming models, working in synergy with our scientific users, primarily focusing on the functionality of directly usable application-level. Less-visible infrastructure work will start after the initial delivery of the core platform.

*“Cloud computing could revolutionise science by giving people the resources they need when they need them to do their science and pursue their ideas very quickly. However, building complex systems for science is very difficult. What we need are high-level cloud platforms to make that much easier.”* **Paul Watson, Newcastle University**

**Networking activities:** The project will place strong emphasis on building a user community and user training. This will enable European researchers across various disciplines to adopt the platform, and thus to benefit from cost savings and research value-add from cloud technologies and services. Understanding policy and legal issues, as well as developing business models, so that the researchers can access the cloud without their own personal credit cards, will certainly contribute to the sustainability of the VENUS-C concept. VENUS-C will also consider different follow-up scenarios, such as a project using some of the new European instruments like Public-Private Partnership (PPP), integration with the European Grid Initiative or the provision of



**Project acronym:**  
VENUS-C

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**Project type:** CP-CSA

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**Funding from the EC:**  
4,500,000 €

**Total funded effort in person-month:**  
639,3 PM

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UNEW	UK
UPVLC	ES

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Cloud computing, e-science, scientific cloud

**Collaboration with other EC funded projects:**  
EGI-Inspire  
EMI  
Stratuslab  
IGE  
EDGES  
eScience Talk  
SIENA  
D4Science-II

services through open tenders based on the Consortium conviction in the long-term sustainability of VENUS-C.

**Service activities:** Service activities in VENUS-C are designed to support user communities through access to the infrastructure and the tools developed. Each user community has identified the scenario where an existing application may be extended or ported to fully exploit the benefit of a federated cloud environment. The VENUS-C platform will be based on both commercial and open source solutions, striving towards interoperable services, so that the users can avoid the so-called vendor lock-in and are able to move their applications to different cloud and DCI providers. **Microsoft's Windows Azure** platform and its European data centres will provide the commercial public cloud solution. Azure offers a multi-layer solution, including computing and storage power, a development environment and immediate services, together with a wide range of services that can be consumed from either on-premises environments or the Internet. From an Open Source perspective, the Eucalyptus and OpenNebula solutions will be evaluated, while the Emotive middleware for clouds will be offered by the Barcelona Supercomputing Centre, thus demonstrating interoperability and ultimately portability to the VENUS-C users.

**Joint Research activities:** Joint Research Activities aim to provide seamless integration of diverse and previously unrelated user groups, the vast collection of services/applications and the multiplicity of computational platforms, such as different vendors' cloud and grid infrastructures. The main goal is to make available to individual users a collection of services at different layers which will be automatically mapped into a virtual platform utilizing the many heterogeneous resources collected into a federated cloud.

**User communities:** The VENUS-C system will be tested by major user groups across diverse scientific disciplines and commercial sectors, spanning **Biomedicine** (integrating widely used tools for Bioinformatics, System Biology and Drug Discovery); **Civil Protection** and **Emergency** (focusing on forest fire early detection and management), **Civil Engineering** (related to building's information management for green constructions and building structural information analysis), as well as **Data-related science** with a focus on Marine Biodiversity.

To broaden the scope in terms of application areas, VENUS-C will co-ordinate an **Open Call** with funding for up to twenty new experiments to address the advanced needs of user communities, in some instances handling complex workflows and data-intensive scenarios. Additionally, generic application programming interfaces (APIs) and programming models will be offered to system users and supported by training for the scientists involved. VENUS-C will thus help to broaden inter-disciplinary scientific collaboration in Europe, ensure co-ordinated, strengthened and focused software deployments, to improve the usability of DCI platforms targeting the largest possible base across a range of fields in science and engineering, and advance exploitation in the rapidly changing hardware environments through appropriate software developments.

**International aspects:** VENUS-C is committed to working closely with pertinent European initiatives across the board and particularly on aspects of mutual interest to foster the development of Distributed Computing Infrastructures in a way that effectively serves user communities. Close synergies with EGI-Inspire, StratusLab and the European Middleware Initiative (EMI) are already being defined. VENUS-C has also embarked on a strategy to bring on board experts of data computing infrastructures at European and global level through the project's External International Advisory Committee (EIAC), offering guidance on complex technical and policy issues while also engaging with the wider Distributed Computing Infrastructure community. The feasibility of different follow-on scenarios, such as Public-Private Partnerships, integration with pertinent on-going initiatives, or service provision through open tenders will be investigated and will bring on board the value-add that each partner in VENUS-C, whether public or private, can bring in terms of ensuring sustainable growth.