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The CloudVeneto's Container-as-a-Service ecosystem

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CloudVeneto is a distributed private cloud, which harmonizes the resources of two INFN units and the University of Padua. Tailored to meet the specialized scientific computing needs of user communities within these organizations, it promotes collaboration and enhances innovation. CloudVeneto basically implements an OpenStack based IaaS (Infrastructure-as-a-Service) cloud. However users are also provided with some higher level services, such as the CloudVeneto Container-as-a-Service (CaaS).

Unlike the user-managed Kubernetes-as-a-Service (KaaS) model, CaaS offers a fully managed orchestration platform, eliminating administrative overhead for users. CloudVeneto has developed a CaaS solution designed to provide a secure, multi-tenant Kubernetes platform, where users deploy application containers to our service without the burden of administrative tasks. Our solution features a centrally managed Kubernetes control plane, allowing users to create and customize nodes on demand using CloudVeneto resources within their projects. These nodes, deployed as Virtual Machines, integrate seamlessly into the cluster, giving users the flexibility to maintain node privacy or share them within their OpenStack projects, while delegating deployment and monitoring tasks to CaaS. By implementing CaaS, CloudVeneto meets the diverse requirements of the user community, including those of Quantum, ISOLPHARM and SPES, underlining its adaptability within the CloudVeneto ecosystem. Furthermore, we were able to successfully demonstrate that it is possible to offload part of the workload submitted to a remote external Kubernetes cluster to the CloudVeneto CaaS service using the interLink-sidecar solution implemented in the context of the EU interTwin project, effectively extending the Virtual Kubelet concept.

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