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## Managed Kubernetes —Next Gen Academic Infrastructure?

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Academic infrastructures and institutions continuously develop new computing services to support research and education. These services are traditionally based on HPC batch systems and cloud services. Recently, a new computing paradigm based on containerization of applications has been adopted across the scientific community. Computations executed in containers are becoming increasingly popular because of their ease of use –the user encapsulates the entire environment (including software, its dependencies, and optionally data) into a single package that can be run independently of hardware and operating system. Such computations can be run on traditional HPC systems and virtual servers. However, running containerized computations in the Kubernetes (K8S) orchestration tool simplifies the execution and management of containers significantly.

Running the Kubernetes infrastructure is a challenging task that requires non-negligible know-how and resources dedicated to its operation and maintenance. Therefore, it is reasonable to offload this line of work to dedicated IT professionals positioned within research infrastructures, NRENs, and other similar institutions providing IT environments to support research.

Czech NREN “CESNET” embraced the opportunity presented by containerization by offering its own managed Kubernetes platform. Resources required to develop and maintain the platform, together with the operation of all the underlying IT layers such as hardware and networking, are fully realized by CESNET. Such an environment allows the researchers to focus solely on executing the containerized computation workflows.

The viability of the Kubernetes infrastructure for research was verified on several use-cases traditionally run on HPC or IaaS, demonstrating the advantages of the managed K8s infrastructure in research applications. It covers use-cases such as scalable Jupyter notebooks, RStudio servers, personalized storage, true 3D game streaming (low-latency virtual desktops), and more. These use-cases make a strong argument for establishing the federated managed Kubernetes sites, which could be provided within the EGI to the broad scientific community.

### Any relevant links

### Topic

A Federated Compute Continuum

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