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Design and Implementation of a Container-based Public Service Cloud Platform for HEPS (Remote Presentation)

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High Energy Photon Source (HEPS) is a crucial scientific research facility that necessitates efficient, reliable, and secure services to support a wide range of experiments and applications. However, traditional physical server-based deployment methods suffer from issues such as low resource utilization, limited scalability, and high maintenance costs.Therefore, the objective of this study is to design and develop a container-based public service cloud platform that caters to the experimental and application needs of synchrotron radiation sources. By leveraging Kubernetes as the container orchestration technology, the platform achieves elastic scalability, multi-tenancy support, and dynamic resource allocation, thereby enhancing resource utilization and system scalability. Furthermore, incorporating robust security measures such as access control, authentication, and data encryption ensures the safety and integrity of users' applications and data.This research also focuses on the design, application, and deployment of Continuous Integration and Continuous Delivery (CICD). By implementing CICD workflows, the platform automates the build, testing, and deployment processes of applications, resulting in improved efficiency and quality throughout the development and deployment lifecycle.HEPS Container Public Service Cloud offers a comprehensive range of services including ganglia and nagios monitoring, puppet, cluster login nodes, nginx proxy, user service system, LADP and AD domain authentication nodes, KRB5 slave nodes, and more.The research findings demonstrate that the container-based public service cloud design and application deliver high-performance, stable, and secure services, effectively meeting the demands of synchrotron radiation source experiments and applications. Additionally, the utilization of CICD further enhances the efficiency and quality of development and deployment processes. Future work should focus on optimizing and expanding the capabilities of the container-based public service cloud to accommodate diverse user requirements and scenarios.

Primary authors: QI, Fazhi (Institute of High Energy Physics,CAS); HU, Qingbao (IHEP); [redacted]; ZENG, SHAN (IHEP); CUI, Tao (IHEP); ZHENG, Wei (Institute of High Energy Physics, CAS); YAN, Xiaofei (IHEP)

Presenter: [redacted]

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