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Development of a Monitoring System Using Modern Technologies for the IREN Facility at JINR

The IREN facility at JINR is a two-section linear electron accelerator with a neutron-producing target, requiring reliable monitoring to optimize its performance. This work presents a monitoring system for IREN that tracks key parameters: neutron flux intensity, target temperature, and section temperature. The system is built using the Proxmox virtual machine management system, LXC and Docker containerization technologies, with backups stored on a NAS (Network Attached Storage). It employs Prometheus for metrics collection and storage, and Loki for logs. Grafana is used for visualization, Alertmanager for sending notifications, Nginx as a web server, Promtail for log collection, and custom Golang agents for gathering the three main metrics. Data analysis has already revealed correlations, enabling improvements in the facility's operation. Currently, efforts are underway to incorporate additional signals, such as beam current, beam shape, and vacuum level, which will allow for more detailed control and optimization of the facility in the future.

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