ActiveScale Object Storage
Internship Project Overview 2026

Company: Quantum Storage Belgium
Location: Planet Group Arena (Ghelamco Arena)
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Duration: 4–6 weeks (longer periods or part-time arrangements—e.g. a few days per week—are possible upon discussion)

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Project 1: Quantum Installer Frontend – Guided UI for Deployment

The Quantum Installer is currently a low-level, engineer-oriented tool where field teams manually edit inventory YAML files and run a series of Ansible-based installation steps from the command line. While powerful, this workflow is not very user-friendly and leaves room for mistakes during configuration.

This project aims to design and develop a modern frontend that provides a guided, structured interface for configuring and preparing installations. The goal is to make the process more intuitive by introducing clear navigation, improved validation, and automatically derived configuration values—while still preserving full compatibility with the existing installer and YAML format. The final result should offer a smoother experience for both experienced engineers and new users in the field.

Technologies Involved: JavaScript/Typescript, React/Vue/Svelte or similar frameworks, YAML processing, REST APIs, Ansible-based automation

Wanted Profile/Background: Students with basic HTML/CSS/JavaScript skills and an interest in frontend development. Experience with modern frameworks or building form-based UIs is a plus but not required.

Project 2: Python 2 → Python 3 Migration – Analysis & Proof of Concept

Parts of the ActiveScale tooling and supporting services are still running on Python 2.7, which is end-of-life and no longer supported. This project focuses on analysing what is needed to migrate those components to a modern Python 3 version and, where feasible, implementing a proof-of-concept migration. You'll map out the affected code paths and dependencies, identify compatibility issues, and propose a structured migration approach. If time permits, you will update selected modules, add or adapt tests, and validate that behaviour remains consistent.

Technologies Involved: Python 2.7 and Python 3.x, dependency and static analysis tools, unit testing frameworks (e.g. pytest), command-line tooling, version control.

Wanted Profile/Background: Students with a good understanding of Python and an interest in working with existing codebases and technical debt. Experience with refactoring, testing, or maintaining legacy systems is a plus but not required.

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Project 3: On-prem Kubernetes Cluster for Internal Microservices

This project focuses on building and enhancing automation for deploying Kubernetes clusters to support internal microservices. You will explore architectural choices, improve the existing deployment scripts, and deliver a functional proof-of-concept. Potential topics include cluster configuration, networking and ingress, storage choices, security and RBAC, high availability, monitoring, and disaster-recovery strategies.

Technologies Involved: Linux, Kubernetes, Python, Bash, Ansible, networking and container tooling

Wanted Profile/Background: Students with an interest in DevOps/DevSecOps and distributed systems. Ability to work independently and explore open-source technologies is a plus.

Project 4: On-prem Private Cloud (Open-Source Stack)

The goal of this project is to research and deploy a proof-of-concept on-prem private cloud environment for hosting internal virtual machines. The team is looking to evaluate open-source platforms such as OpenStack, oVirt, or Proxmox and design an environment that supports VM migration, clustered and redundant storage, snapshots, networking features, HA, and centralized management. The entire PoC should be deployed through Infrastructure-as-Code, with VM lifecycle management handled the same way.

Technologies Involved: Linux, hypervisors, Python, Bash, Ansible, networking and virtualization technologies

Wanted Profile/Background: Students with an interest in DevSecOps, virtualization, and infrastructure automation. Comfort with exploring and evaluating open-source platforms is beneficial.

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Project 5: Test Case Management Tool – Evaluation & Proof of Concept

The ActiveScale QA tooling team is working on modernising how test cases are defined, tracked, and executed. Today, much of the test knowledge is stored informally, and the goal is to move toward a structured Test Case Management System that captures preconditions, profiles, success criteria, evidence collection, cleanup steps, and more. The solution should support categorisation across multiple axes, highlight gaps in business coverage, assist with planning tests across available hardware, and ideally provide change tracking, peer review, and optional Jira integration. Preference goes to open-source tools that can be deployed on Linux.

This project involves researching available tools that meet these needs, comparing their capabilities, and identifying the best candidates for adoption. You will prepare a hands-on proof-of-concept with the two most promising solutions.

Technologies Involved: Depends on the selected tools; may include Linux, Ansible, Docker, or similar deployment technologies

Wanted Profile/Background: Students with an interest in software quality assurance and structured testing practices.

Project 6: Orchestration of Concurrent S3 Workloads for QA

The ActiveScale QA tooling team is evolving its internal tooling for running concurrent S3 workloads across distributed hardware. These workloads require central coordination, real-time feedback, and the ability to dispatch work dynamically over a pool of nodes. The goal is to explore modern orchestration frameworks that can provide flexibility, extensibility, and a clean integration path with ActiveScale's systems. The preferred solutions should be open-source and deployable on Linux, with the orchestration layer decoupled from underlying infrastructure.

This project involves surveying available orchestration engines, evaluating their characteristics, and preparing a proof-of-concept using the two most suitable candidates.

Technologies Involved: Linux, Kubernetes, Docker, Python, Ansible, and related orchestration technologies

Wanted Profile/Background: Students with an interest in distributed systems, concurrency, and real-world coordination challenges.

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Project 7: Scalable Prometheus Metrics Storage

The ActiveScale team wants to expand how system metrics are retained by leveraging the large S3 storage capacity already available in the platform. Today, Prometheus metrics are stored on a small local partition, forcing retention to be limited to around one day. Several open-source components support storing Prometheus metrics on an S3 backend, allowing much longer retention at scale.

This project explores how to integrate such solutions, evaluates the benefits and trade-offs, and develops a proof of concept using the system's own S3 storage. A second phase may investigate whether the current distinction between short-term (detailed) and long-term (global) metrics is still necessary once scalable storage is enabled.

Technologies Involved: Prometheus, Grafana Mimir or similar TSDBs, Python, Ansible, Linux

Wanted Profile/Background: Students with some Prometheus familiarity and a general Linux background. Interest in observability or monitoring systems is a plus.

Project 8: ActiveScale Cold Storage – Eventing Framework

This project focuses on designing and building the next-generation eventing framework for ActiveScale Cold Storage, Quantum's tape-based archival platform. The new system will identify operational issues, such as tape transfer problems, capacity thresholds, and data-integrity warnings and surface them through APIs and in the UI as part of wider manageability improvements.

Work includes defining event categories, contributing to backend event-driven components, integrating event forwarding from subsystems, and developing automated tests for failure scenarios. There may also be opportunities to validate event behaviour in the UI or run automated UI tests in a virtualized environment.

Technologies Involved: Python, Golang (depending on component), gRPC, Docker or VirtualBox, Prometheus, Linux, Jenkins or GitHub Actions

Wanted Profile/Background: Students with experience in Python and Linux administration and an interest in backend or distributed systems. Curiosity about APIs and event-driven architectures is more important than prior tape-storage knowledge.

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Project 9: User-Friendly Configuration for ActiveScale Cold Storage

ActiveScale Cold Storage, Quantum's tape-based archival platform currently relies on a script-based setup where users manually fill in configuration variables. This project aims to make the installation and configuration process more intuitive by building an interactive tool that validates user inputs and reduces configuration mistakes.

The first version may be a command-line interactive interface, with the potential to evolve into a GUI-integrated configuration workflow. Additional enhancements could include automated validation tests that write and read data from the tape library to confirm correct configuration.

Technologies Involved: Python, JavaScript, REST APIs, tape-library interaction

Wanted Profile/Background: Students with some JavaScript experience and interest in UX improvements. A general enthusiasm for improving user-facing tooling is valuable.

Project 10: Synthetic Reproduction of 3rd-Party Workloads

The ActiveScale QA tooling team wants to better understand how third-party tools interact with the system in real-world scenarios. Using our demo lab, we can capture network traces (tcpdump) of integrations with products such as Veeam, Weka, NetBackup, and others.

This project focuses on analysing those captures to identify communication patterns, extract meaningful metadata, and translate those patterns into repeatable regression test cases. The goal is to build a clearer picture of typical 3rd-party behaviour and ensure it can be consistently tested in future releases.

Technologies Involved: Networking fundamentals, tcpdump / packet analysis, Linux tools

Wanted Profile/Background: Students with an interest in networking, protocol behaviour, or traffic analysis.

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