

DevOps Internship Program Report

Business Automation Ltd.

Duration: 15 May 2025 – 01 June 2025

Coordinator:

Sohana Mehbuba

System Engineer, CIRT and Infra Team

Business Automation Ltd.

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1. Executive Summary

This report details the DevOps Internship Program conducted by Business Automation Ltd. from 15 May 2025 to 01 June 2025, aimed at equipping aspiring DevOps engineers with practical and theoretical skills. Over 18 days, 10 participants engaged in a structured curriculum covering key DevOps domains such as automation, continuous integration and deployment (CI/CD), containerization, GitOps, and security best practices.

Key achievements:

- Successful completion of hands-on sessions using Jenkins, Docker, Kubernetes, Argo CD, and k8s.

- Collaborative final project demonstrating end-to-end CI/CD and GitOps pipeline implementation.
- Enhanced participant proficiency in scripting (Bash, YAML) and DevOps toolchain integration.
- Recommendations for advanced follow-up training and certification preparation provided.

2. Program Overview

- **Duration:** 15 May 2025 – 01 June 2025
- **Total Participants:** 10
- **Organized by:** Business Automation Ltd.
- **Coordinator:** Sohana Mehbuba
- **Target Audience:** Entry to mid-level professionals aspiring to build careers in DevOps engineering
- **Program Format:** Combination of theory, practical workshops, and team-based project work

3. Objectives

The primary objectives of this internship were:

- To instill a thorough understanding of DevOps culture and workflows aligned with modern software development lifecycle (SDLC) enhancements.
- To develop hands-on skills in key DevOps tools and practices including automation, CI/CD pipelines, container orchestration, and GitOps deployment strategies.
- To introduce foundational security practices integrated into the DevOps pipeline (DevSecOps).
- To prepare participants for recognized professional certifications (CKA, GitOps, Jenkins).

4. Session-Wise breakdown

Session	Topic	Learning Objectives	Tools/Tech	Key Outcomes
01	Introduction to DevOps	Understand DevOps principles, culture, and differences with SDLC	Conceptual	Developed DevOps mindset and workflow understanding
02	Linux Essentials	Master terminal commands, file permissions, basic CLI operations	Linux CLI	Demonstrated proficiency in command-line interface operations
03	Git & GitHub	Learn Git flow, branching, collaboration, pull requests	Git, GitHub	Practical version control and team collaboration skills
04	CI/CD Fundamentals	Understand pipeline concepts and benefits of automation	Conceptual	Established foundation in CI/CD lifecycle and automation

05	YAML & Bash Scripting	Write YAML configuration files and Bash scripts	YAML, Bash	Created configuration files and automated scripts
06	Jenkins Basics	Setup Jenkins server and create freestyle jobs	Jenkins	Built and executed basic CI jobs
07	Advanced Jenkins	Develop declarative pipelines, manage plugins, credentials securely	Jenkins	Developed complex CI pipelines with security practices
08	Containers 101	Learn Docker image building and container lifecycle	Docker	Ran applications in local containers
08	Kubernetes Introduction	Understand pods, services, deployments, and kubectl usage	Kubernetes	Deployed sample workloads to Kubernetes cluster
09	k8s Hands-on	Setup lightweight single-node Kubernetes cluster	K8s	Installed and managed a local k8s cluster
10	ArgoCD Workshop	Automate Kubernetes deployments using GitOps methodology	ArgoCD	Synced Git repositories to live clusters
11	DevOps in Practice	Integrate tools and design workflow architecture	Toolchain Integration	Gained holistic understanding of DevOps toolchain workflows
12	Project Planning	Organize team project structure and responsibilities	Collaboration Tools	Prepared project plans and task assignments
13	Final Project Demo	Implement full CI/CD and GitOps pipeline in team	Jenkins, Kubernetes, ArgoCD	Delivered working DevOps pipeline demonstration
14	Security Basics	Introduce secrets management and DevSecOps principles	DevSecOps Tools	Applied core security best practices in pipelines

5. Final Project Overview

The capstone project required teams to design and deploy an automated CI/CD pipeline integrating source control, build automation, containerization, Kubernetes deployment, and GitOps synchronization via ArgoCD. Participants coordinated tasks such as writing Jenkins pipelines, containerizing applications, managing Kubernetes manifests, and securing secrets.

Project Deliverables:

- Source code in GitHub repository with CI/CD pipeline configuration
- Docker images and Kubernetes deployment manifests
- Automated deployment using ArgoCD from Git to Kubernetes cluster
- Presentation and demo illustrating workflow and outcomes

6. Overall Outcomes

- Participants demonstrated proficiency with critical DevOps tools: Jenkins, Docker, Kubernetes, ArgoCD, and k8s.
- Successfully completed hands-on labs and a team-based CI/CD pipeline project.
- Developed scripting skills in Bash and YAML configuration management.
- Gained practical exposure to DevOps culture emphasizing collaboration, automation, and security integration.
- Raised awareness of certification pathways to further professional development.

7. Challenges and Lessons Learned

- Initial unfamiliarity with Kubernetes concepts required extended hands-on practice sessions.
- Coordination among team members highlighted the importance of clear communication and task allocation.
- Managing secrets securely within CI/CD pipelines introduced complexities handled through Jenkins credentials and Kubernetes secrets.
- Balancing theoretical knowledge and practical exercises was key to participant engagement and skill acquisition

8. Recommendations and Next Steps

Training Enhancements:

- Introduce advanced Kubernetes training targeting Certified Kubernetes Administrator (CKA) preparation.
- Include Infrastructure as Code (IaC) sessions utilizing Terraform for automated provisioning.
- Expand coverage on monitoring and alerting with Prometheus and Grafana.
- Integrate a comprehensive DevSecOps pipeline incorporating security scanning and compliance checks.

Participant Development:

- Encourage certification preparation: CKA, Jenkins Certification, GitOps Fundamentals.
- Facilitate mentorship programs and peer learning groups for ongoing skill reinforcement.
- Schedule regular follow-up workshops for continued learning and industry updates.

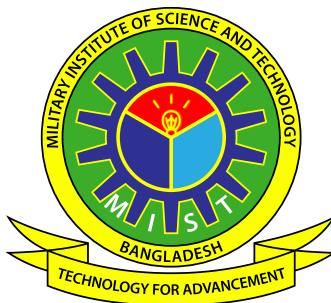
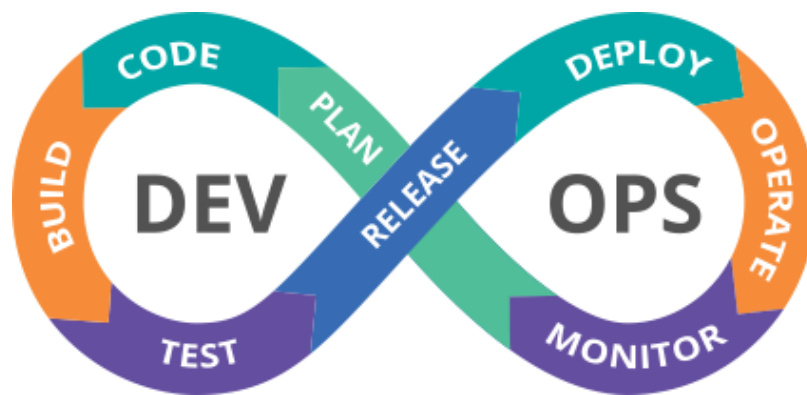
9. Glossary of Terms

- **CI/CD:** Continuous Integration and Continuous Deployment – automated software build, testing, and deployment processes.
- **GitOps:** A methodology using Git repositories as the single source of truth for automated infrastructure and application deployment.

- **K8s:** Lightweight Kubernetes distribution ideal for local or edge deployments.
- **DevSecOps:** Integration of security practices within DevOps workflows.
- **Pipeline:** Automated sequence of steps for software integration, testing, and deployment.

10. References

- Certified Kubernetes Administrator (CKA) Official Documentation – <https://www.cncf.io/certification/cka/>
- Jenkins User Documentation – <https://www.jenkins.io/doc/>
- Docker Documentation – <https://docs.docker.com/>
- ArgoCD Documentation – <https://argo-cd.readthedocs.io/>
- Terraform Documentation – <https://www.terraform.io/docs>



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