DevSecOps and Continuous Integration / Continuous Deployment (CI/CD)

C2 LABS
TAKE BACK CONTROL

C2 Labs Experience

› Implemented CI/CD in GitLab

› Implemented CI/CD using GitHub and Azure DevOps

› Complex Deployments using Docker Swarm and Kubernetes

› Integrated with multiple source code and vulnerability scanning tools

› Performed daily Infrastructure Operations tasks using DevOps deployments in containers vs. running on traditional servers

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Providing DevSecOps Expertise to Rapidly Automate a Secure CI/CD Pipeline

CUSTOMER DEVELOPMENT

• Our customer required a fully automated CI/CD pipeline to deploy applications and to conduct additional governance, technical, and security checks before code was deployed to production

• C2 Labs partnered with our customer and Docker to deliver a fully automated DevSecOps pipeline to deploy applications to a Docker Enterprise Edition (EE) Swarm environment using their existing on-premise GitLab for both Windows and Linux containers (code repository, CI, and CD processes)

• Implemented Ansible playbooks to automate manual install/upgrade processes to the Docker EE platform which reduced process time by 83% and achieved annual labor cost savings of ~$60k

• Conducted DevSecOps workshops to enforce Organization Change Management and train employees on the tools and techniques of CI/CD

INTERNAL RESEARCH AND DEVELOPMENT

• Implemented DevSecOps for our product team leveraging GitHub, Azure DevOps, and Kubernetes for development workflow

• Developed a CI/CD pipeline replete with static source code scanning, vulnerability scanning of the containers/packages, and formal code reviews prior to any Pull Request being approved. Once approved, deployment and upgrade of the database and infrastructure are 100% automated in DEV, QA, and PROD.

Benefits of a Modern DevSecOps Approach

C2 Labs has extensive experience implementing a modern DevSecOps approach, both for our customers as well as our internal software development team. We have been able to implement these techniques using a myriad of tools and environments, ranging from: 1) fully on-premise with GitLab for a source code repository and CI/CD tool with custom Windows and Linux runners, to 2) fully cloud-based using GitHub, Azure DevOps, security scanning tools, and Kubernetes. We are able to continually expand our pipeline capabilities to provide full automation and a zero-friction coding environment for the application developer, infrastructure engineers, and system administrators. Some of our key accomplishments include:

• Implemented Security-as-Code to configure and audit security settings on new technologies with baselines created by C2 Labs in the absence of existing industry standards

• Leveraged the CI/CD pipeline and sophisticated DevSecOps techniques for integrating customer security tools, connecting via the customer proxy, and running recurring scripts securely and reliably

• Improved security by scanning code prior to merge or deployment to identify code vulnerabilities, bugs, smells, reliability, and Section 508 accessibility issues

• Enforced scan of created containers and packages prior to merge or deployment to ensure vulnerabilities do not enter the production environment

We applied sophisticated and modern DevOps techniques to lower the cost of operating the container/cloud environment while removing many manual steps that increased the quality, resiliency, and security of the environment. We were able to utilize these techniques for both our customer as well as our internal teams.

C2 Labs CI/CD features and benefits include:

- CI/CD pipeline triggered by PR from feature branch to protected branches (DEV/MASTER in GitLab or GitHub)
- Improved security with clean builds of the container performed each time versus traditional patching
- Each code change and dependent package is scanned for bugs, vulnerabilities, smells, and 508 accessibility using free tools
- Improved governance by adding workflow rules and integrating change management processes to the standard Git source code processes in a tool agnostic manner
- Reduced 100% of manual labor for deployments while reducing deploy times to under 10 minutes whereby multiple deploys per day can occur with no scheduled downtime
- Developers can repeatably and securely move code from their laptop, to the DEV environment, to QA, and then to PROD with no reliance on manual operations support; unlocking maximum developer productivity while also improving deployment reliability and security
- Deploy the container(s) to Docker Swarm or Kubernetes, on-premise or in the cloud, all based on customer preference and using their defined workflow and governance processes
- Processes for automating upgrades to the database for both schema changes and data loads during the deployment (with a full QA test prior to production deploy)

Extending DevOps and CI/CD

C2 Labs has extensive experience supporting leading-edge DevSecOps work in both commercial and government environments. We have implemented multiple tool chains to deploy fully automated pipelines and are consistently able to "shift left" our customers' schedules in order to deploy more reliable, scalable, and secure code. We also understand a key aspect of any DevSecOps project is the cultural change required, and we accelerate this change through hands-on training, detailed documentation, workshops, and demonstration of rapid delivery of business value.

We continue to find innovative ways to use DevSecOps techniques within organizations to accomplish complex and day-to-day tasks and believe in trying to automate as much as possible in order to ensure a secure, reliable, and scalable customer environment. Contact us today at sales@c2labs.com for a free, no cost consultation.

About C2 Labs

C2 Labs serves as a security-focused agile digital transformation partner that blends Art and Science to enable our customers to expand their vision, drive cultural change, and avoid being left behind. We see Digital Transformation as:

- Applying acceleration in technology to reimagine business models, eliminate technical debt, lower cost, and free customers from bureaucracy in highly regulated industries to not be left behind
- Applying domain expertise in emerging technology to help new organizations securely architect greenfield solutions to compete and thrive in tomorrow's digital ecosystem

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