DevOps | Security Controls, Shared Repos

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What are we talking about?

In shared code repositories involving multiple users, sensitive data must be protected, code integrity must be maintained, and unauthorized access must be prevented. Security controls help us do this.

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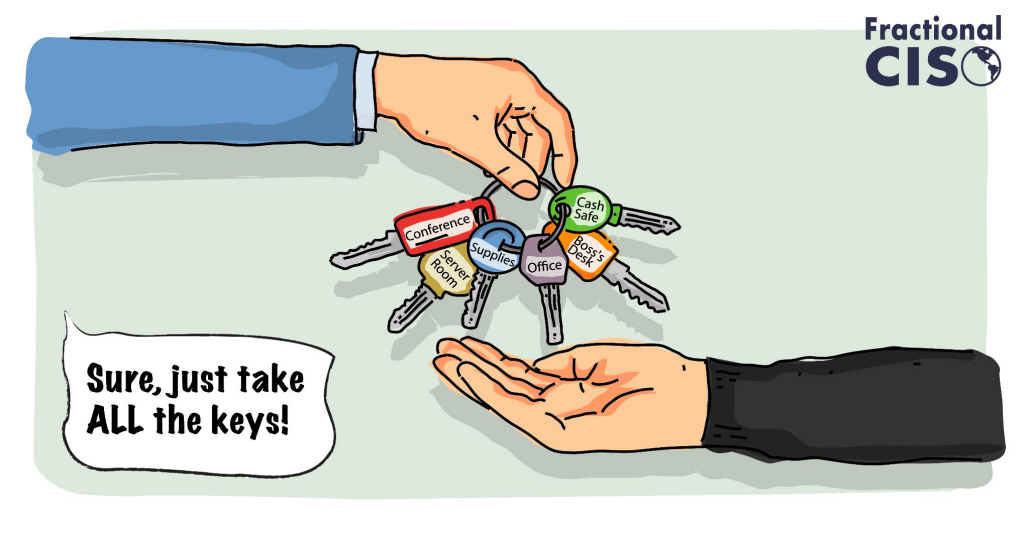
Access Control & Least Privilege

- Use role-based access control to limit permissions based on user roles
- Enforce least privilege so users have only the access they need, no more
- Use multi-factor authentication to secure repository access



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Code Reviews & Pull Request Policies

- Enforce peer code reviews
- Use protected branches
- Implement branch protection rules
  - Require pull request approvals

GitHub Branch Protection

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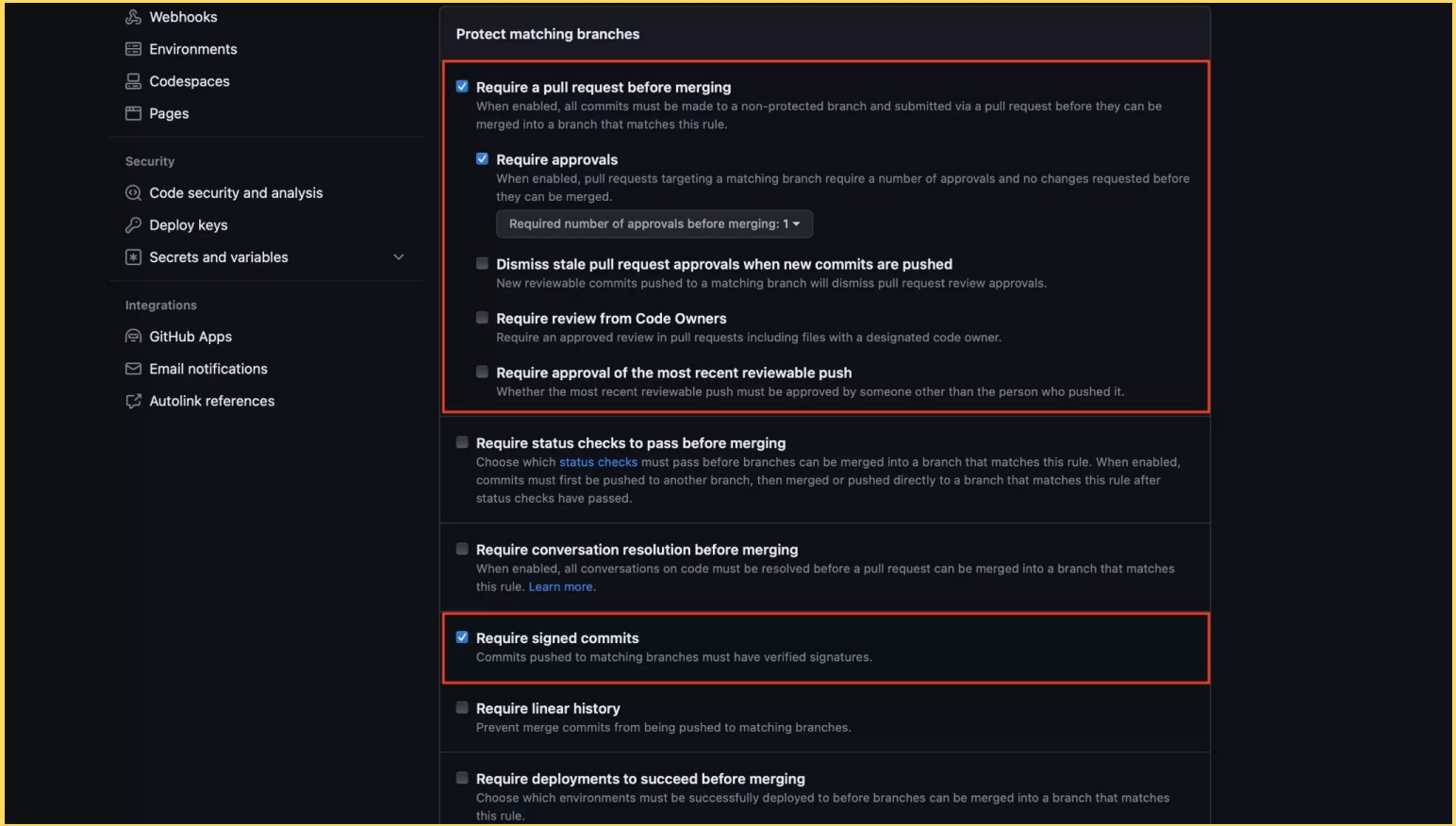
Set GitHub Branch Protection Rules



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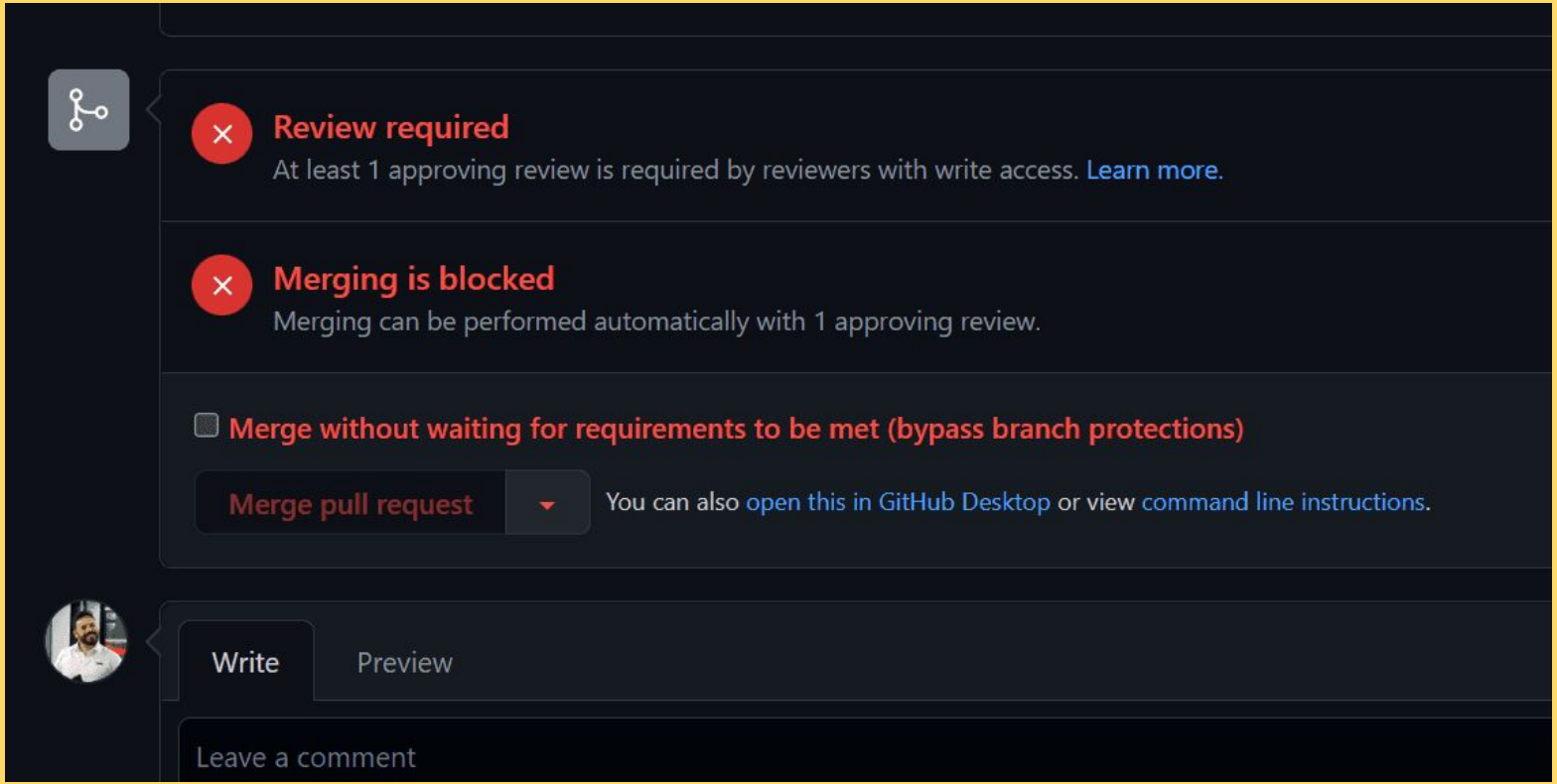
Encountering Branch Protections



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Secrets Management

- Don’t store API keys, passwords, or other secrets in the repository
  - Use environment variables
  - Use secret management tools
- Use a secret scanning tool to detect accidental exposure of credentials
- Rotate secrets
- Revoke exposed secrets

HashiCorp Vault

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Secure Repo Configuration

- Use branch protection rules
  - Disable force pushes
  - Disable direct commits to main branches
- Sign your commits with GPG or SSH keys to verify authenticity of the developer
  - Enforce trusted commit authors

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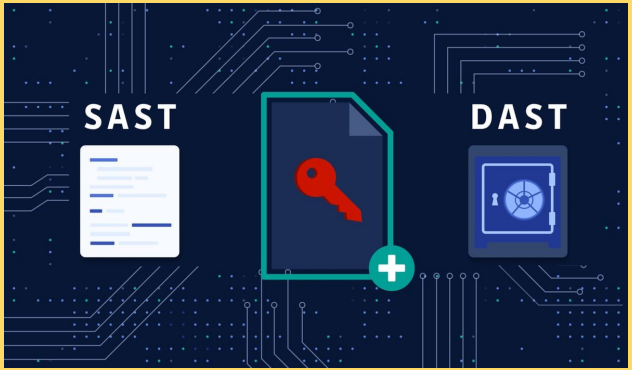
Continuous Security Scanning

- Static Application Security Testing (SAST) can/should be integrated into CI/CD pipelines
- Use Software Composition Analysis (SCA) to identify vulnerable dependencies
- Infrastructure as Code (IaC) scanning tools can identify misconfigurations



snyk

Dependabot

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Logging, Monitoring, Auditing

- Hosting platforms like GitHub have audit logging to track changes and detect anomalies – use it!
- Use Security Information & Event Management (SIEM) for real-time monitoring and alerting
- Don’t assume adherence to security policies, conduct regular security audits and compliance checks

Bitbucket

GitLab

GitHub

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Secure CI/CD Pipelines

- Build environments should be isolated to prevent injection attacks
- Use signed artifacts and immutable builds to prevent supply chain attacks
- Utilize vaults/encrypted storage for CI/CD access secrets

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Incident Response & Backup

- There should be a incident response plan for breaches/unauthorized access
- Use automated backups of repos, store the backups securely
- Leverage version control history to revert changes

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Conclusion

- Automate the security controls
- Educate developers on security
- Regularly perform security testing
- Repositories should be private by default

When security controls and repo management best practices are done correctly, source code can be successfully safeguarded while code collaboration takes place

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Sources

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