

CodeCove: A Code Review Tool

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Introduction & Objectives

- Web-based tool for distributed code review and collaboration
- Git integration with pull requests and inline comments
- React frontend with Node.js backend hosted on AWS EC2
- SSH-based authentication and permission control
- Inspired by Gerrit; tailored for scalability and security

Architecture Overview & Features

Backend (Node.js + MySQL)

- REST APIs with Express and Sequelize ORM
- Hosted on AWS EC2
- Git operations via NodeGit
- JWT for auth, Gitolite for access control

Frontend (React)

- React Router + Axios for API communication
- Components for repo management, PRs, analysis, etc.
- Communicates with backend via public IP

Pull Request Workflow

- Create PRs from feature to target branches
- Submit title, description, source/target branches
- Reviewers approve, reject or merge
- PR dashboard tracks status (open/approved/merged)
- Detailed commit history and diffs visualized

Static Analysis & Git Endpoints

Static Analysis Tools

- Bandit (Python security)
- Flake8 (Python quality)
- Cppcheck (C/C++ issues)
- Results shown in PR detail view

Git Endpoints

- View commit history
- Generate diffs for review (side-by-side + inline)

Networking

- Backend hosted on AWS EC2
- CORS enabled for frontend-backend communication
- Security groups for ports 5000 (API) and 22 (SSH)

Access Control with Gitolite

- SSH key-based user authentication
- Granular permissions (R, RW, RW+)
- Managed via Permissions interface

Learnings from Computer Networks Perspective

- Understood RESTful API design and HTTP communication
- Applied client-server architecture concepts using EC2-hosted backend
- Implemented secure key-based authentication with SSH
- Configured CORS and AWS Security Groups to manage cross-origin and network access
- Realized importance of network reliability and port-based service separation
- Gained practical exposure to application-layer protocols and cloud connectivity

Conclusion & Future Work

- CodeCove enables collaborative, secure code reviews
- Combines GitOps, permission control, static analysis
- Future enhancements:
 - Inline diff commenting
 - Merge conflict resolution
 - Real-time notifications
- Scalable for multi-team environments