GEOPM:
Open Source Development Process

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GEOPM Introduction

GEOPM: a distributed runtime for HPC job level power management

Main web page:
https://geopm.github.io

Open source project developed under BSD three clause license

Plug-in architecture enables user extension

Public Services for Development Process

Github issues

- https://github.com/geopm/geopm/issues
- One number to track all communication
- Issue number can be used in all other tools
- **Anyone** can create an issue:
  - Managers, internal developers, external developer, users, researchers, github searchers

Gerrithub code review

- https://review.gerrithub.io/#/q/project:geopm/geopm
- Checkpoint for all patches that are merged
- SW team vets patches and makes suggestions
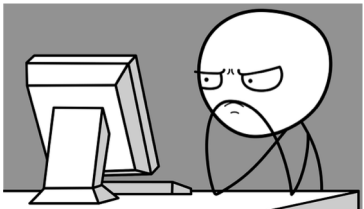
Travis-CI

- https://travis-ci.org/cmcantalupo/geopm
- Runs unit testing on all developers forks
- Every patch pushed by developer is tested
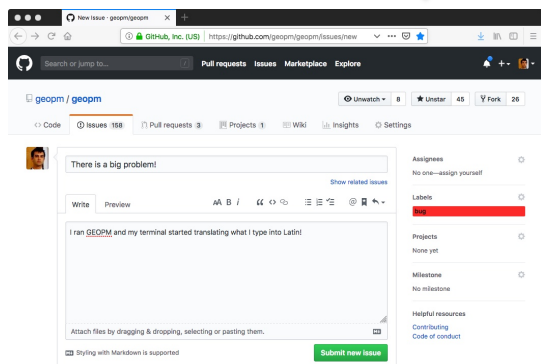- Passing Travis-CI is required for +1 review

Slack message board

- https://geopm.slack.com
- Announcements are made to the community
- Invited individuals and email domains
- Primary developer communication channel
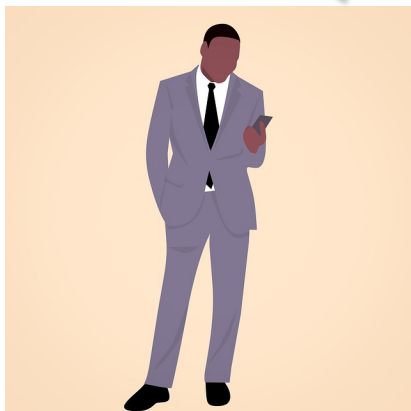- Users and researchers are enabled

User problem/request

Slack notifies community
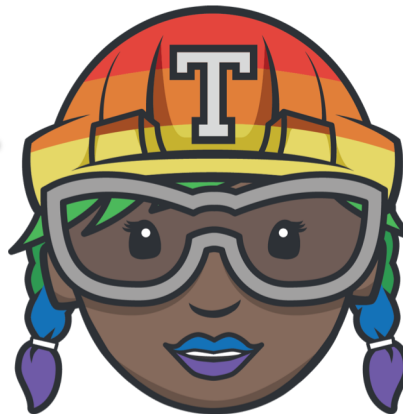

Travis-CI is triggered

Submit patch with Gerrithub

Patch ready to merge

User files an issue

Slack pings developers

Patch needs more work

Patch pushed to Gerrithub
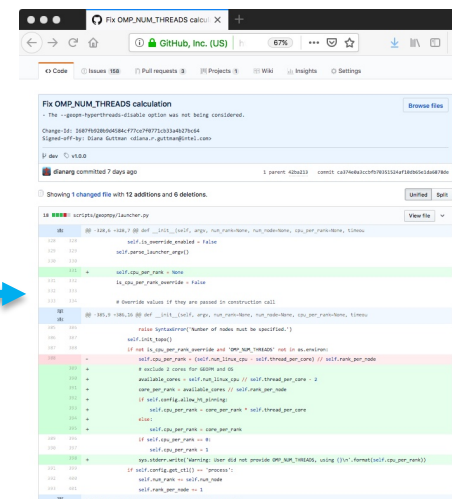
Team reviews the patch

Developer works on a solution

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Github Issues

Bug tracking

- Mark an issue with the `bug` label

- Leave bug report

- Critical details and links in comments

- Refer to bug number elsewhere

Feature planning

- Mark an issue with the `enhancement` label

- Milestones are planned every two weeks

- https://github.com/geopm/geopm/milestones

Large projects and big ideas

- Mark an issue with the `break-down-please` label

- Link related issues back to big idea issue

- Choose to create label for project

Releases

- Issues required for release labeled with version

- Version 1.0 issues

Arbitrary labels

- https://github.com/geopm/geopm/labels

- Enabling agile development and quick lookup

- Labels for project deliverable requirements

Sprint Review and Planning

Sprint schedule

- Sprints are scheduled every two weeks

- New milestone created for each sprint

- https://github.com/geopm/geopm/milestones

Sprint review

- Review last milestone closed issues

  - Discuss the done criterion for closed issues

- Review last milestone open issues

  - Determine progress on issue

  - Move open issues to backlog or next milestone

Sprint planning

- Review new milestone open issues

- Determine developer load by assignee tag

  - Overloaded: remove from milestone or reassign

  - Underloaded: Pull items from all open issues list

- Close completed milestone

Backlog

- Open issues updated continuously

- Prioritize by adding to future milestone

Slack

Provides open communication

- Direct access to external stakeholders

- Enabled through web/laptop/phone application

- Accessible anywhere on any network

- Common tool used in many business contexts

Integrates Github, Travis-CI and Gerrithub

- Automatic messages to #development channel

- Subscribers notified of important events

  - Github Issue opened/closed

  - Patch merged from gerrithub

  - Results of Travis-CI pass/fail on dev branch

- Pings phones of maintainers

Platform for collaboration

- High bandwidth chat sessions

- Historical record by topic (channel)

- Ability to "pin" important items

- Essential for internal development process

- Easy filtering by channel

- provides users with bandwidth limit

A virtual space for sharing

- Enables remote work

- Great for distance collaborations

- Initiate an ad hoc phone/skype meeting

Bug Tracking

Commit message includes "Fixes #"

- Developer marks commit message with <mark>bug</mark>

- "Fixes #123" messages github: close issue 123

- Github closes when the change is submitted

- This links the patch to the issue number

Gerrithub review process

- Patch to fix bug is created by developer

- Posted to Gerrithub for review

- Developer verifies bug is fixed and "+1 verifies"

- Developer signals ready by "+1 review"

- Reviewers marks "+1 review"

- Last reviewer marks "+2 review" and submits

Updating github

- Submit button merges patch to dev branch

- Messages with "Fixes #" in them close issue

- Close by hand if developer forgot the "Fixes #"

Travis CI

- Each developer maintains a fork of geopm

- This fork has an associated Travis-CI for testing

- When the main repo is updated Travis-CI runs

Slack integration

- The #development channel is automated

- Closed bug updates the channel with message

The Open Process

Follow best practices to produce a well engineered product

Engage the community by making the development process live, open and familiar

Open tools provide a great platform for development of open software

Github's flexible interface enables extensions like Gerrithub, Travis-CI and Slack

Future enhancements to enable public execution of private CI features

- Continuous code coverage
- Continuous static analysis