

Developer Survey

Questions requiring a response are in **red**.

Questions in which a response is NOT required are in **blue**.

This survey is a critical element of the developers workshop. We are using it to capture nuts and bolts information about codes within the community so that we can assess the landscape before the workshop and use this information to drive the discussions.

Please collaborate to provide **only one submission per code** and submit your response using the online survey: https://ucdavis.co1.qualtrics.com/jfe/form/SV_57wtv4gpuaowTsh

Basic Information

Code identification

1. **What is the name of the code?** [small text box]
2. **Who are the primary authors/maintainers?** [medium text box]
3. **URL of webpage for the code** (if different than the version control repository) [small text box]
4. **URL of version control repository** (if public) [small text box]

Software

1. **Which license(s) do you use?** Select all that apply.
 - a. Apache license
 - b. BSD license
 - c. GNU General Public License
 - d. GNU Lesser General Public License
 - e. MIT license
 - f. Mozilla Public License
 - g. Common Development and Distribution License
 - h. Eclipse Public License
 - i. Other. Please specify [small text box]
 - j. No license
2. **What programming language(s) is your code currently written in?** Select all that apply
 - a. Fortran 77
 - b. Fortran 90 or later
 - c. C
 - d. C++
 - e. Go
 - f. Python
 - g. Julia
 - h. Matlab
 - i. Other. Please specify. [small text box]
3. **List the primary (high-level) code dependencies** (e.g., PETSc, deal.ii, FEniCS) [medium text box]
4. **List any additional (low-level) code dependencies** (e.g., MPI, NetCDF, HDF5) [medium text box]
5. **How do you install any dependencies?**

- a. OS package manager (Linux package manager, Homebrew, MacPorts, etc)
- b. Conda
- c. System administrator installs them for me
- d. Install binaries via tarballs
- e. Build from source
- f. Other. Please describe [medium text box]
- g. No dependencies

Development Environment and Workflow

1. **What editor/integrated development environment (IDE) do you use when coding?** Select all that apply.
 - a. Eclipse
 - b. Visual Studio Code
 - c. Atom
 - d. Xcode
 - e. Spyder
 - f. PyCharm
 - g. Emacs
 - h. Vi/Vim
 - i. Other. Please specify. [small text box]
2. **What sort of software repository do you use?**
 - a. GitHub
 - b. GitLab
 - c. Bitbucket
 - d. Institution/department/local Git or GitLab server/repository
 - e. Institution/department/local Subversion server
 - f. Other. Please describe. [small text box]
 - g. None
3. **Do you use different version control branches for bug fixes and new development?** Y/N
4. **Is each new feature added in a separate version control branch?** Y/N
5. **Do you use a stable development branch for rapid release of new features?** Y/N
6. **Are bug fixes and new features incorporated via pull requests?** Y/N
7. **How long does it take for pull requests from the community to be reviewed and merged?**
 - a. One day
 - b. One week
 - c. One month
 - d. We don't accept pull requests
8. **How do you acknowledge contributions to your code from people who are not the primary developers/maintainers?** Select all that apply.
 - a. Coauthors on peer-reviewed publications
 - b. List of contributors in manual
 - c. List of contributors in release notes
 - d. List of contributors on website
 - e. Other
 - f. N/A
9. **Which tool(s) do you use for configuring build?** Select all that apply.
 - a. Autotools (autoconf/automake/libtool)
 - b. CMake

- c. Makefile(s)
- d. Pip
- e. Other [small text box]

Testing and Continuous Integration

1. Which methods(s) do you currently use for testing? Select all that apply.
 - a. Unit testing.
 - b. Regression testing.
 - c. Method of manufactured solutions
 - d. Community benchmarks.
 - e. None
 - f. Other. Please describe [medium text box]
2. Which tool(s) do you currently use to run automated tests?
 - a. Jenkins
 - b. Travis CI
 - c. Circle CI
 - d. Microsoft Azure
 - e. GitHub Actions
 - f. GitLab pipelines
 - g. Buildbot
 - h. Other [small text box for name]
 - i. None
3. Do you use code coverage tools to assess how much of your code is tested? Y/N
4. Does the code include consistency checks that trap most internal errors and generate an error message that helps the developer fix the problem? Y/N

Documentation

1. Which tool(s) do you currently use for documentation? Select all that apply.
 - a. LaTeX
 - b. Doxygen
 - c. reStructured Text
 - d. Markdown
 - e. Sphinx
 - f. Jupyter/Binder
 - g. Other [small text box]
 - h. We don't supply documentation
2. What format(s) are the documentation distributed in? Select all that apply.
 - a. ASCII files
 - b. Word document
 - c. PDF
 - d. Jupyter notebooks
 - e. Online - GitHub Pages
 - f. Online - readthedocs
 - g. Online - project website
 - h. Online - other [small text box]
 - i. Ebook
 - j. Other [small text box]

- k. None
- 3. Does the code generate detailed error messages? For example, do the error messages describe how to fix the problem? Y/N
- 4. Does the documentation describe how to extend code in anticipated ways? Y/N

Packaging and releases

- 1. How do you currently distribute your code? Select all that apply
 - a. Source code is available in a public software repository (GitHub, GitLab)
 - b. Source code tarball/zip
 - c. Docker or Singularity container
 - d. Conda package
 - e. PyPI
 - f. Linux package
 - g. MacOS package
 - h. Windows installer
 - i. Spack
 - j. Binary tarball/zip
 - k. Installer utility (script that builds and installs the code)
 - l. Other. Please describe. [small text box]
 - m. Code is not public
- 2. How do others cite your code? Select all that apply.
 - a. DOI via zenodo
 - b. DOI via other source. Please specify how you get a DOI. [small text box]
 - c. Cite a peer-reviewed paper
 - d. Cite manual
 - e. Cite URL for code
 - f. Other. Please describe. [small text box]

Support / Training

- 1. How do you provide support for users? Select all that apply.
 - a. Comments in code
 - b. User manual
 - c. CIG community forum
 - d. GitHub/GitLab issues
 - e. Slack
 - f. Other community forum [text box for name(s)]
 - g. Email
 - h. Other [medium text box]
- 2. How do you provide training for users? Select all that apply.
 - a. Visiting scientist at developer's institution
 - b. Visit to developer's institution
 - c. In-person tutorials
 - d. Hackathons
 - e. Online interactive tutorials
 - f. Online non-interactive tutorials
 - g. Other. Please describe [medium text box]
 - h. We don't provide training

Software design

1. **What are the main challenges in implementing new features?** [medium text box]
2. **How does your code deal with units?**
 - a. All inputs/outputs must be nondimensional
 - b. The code assumes all inputs/outputs are in some system of units
 - c. User specifies the units of inputs/outputs
 - d. Other. Please describe [small text box]
3. **How does your code deal with georeferencing?**
 - a. Georeferencing library. Please provide the name [small text box]
 - b. Implicit (assumed) coordinate system. Please describe [small text box]
 - c. Other. Please describe. [medium text box]
4. **Are model parameters specified at runtime (as opposed to compile time) using files or graphic user interfaces outside of the source code?** Y/N
5. **Briefly describe how a user specifies values for boundary conditions and material properties, such as variation of material properties with depth or values for a Dirichlet boundary condition?** [medium text box]
6. **Does your code support alternative implementations of various components/modules?**
 - a. Alternatives are hardwired into the code (main source code must be edited and rebuilt).
 - b. Modular plug-n-play design at compile time.
 - c. Modular plug-n-play design at runtime.
 - d. Designed as a toolbox or application builder, not an application itself.
 - e. Other. Please describe [medium text box]
7. **What output format(s) are supported by your code?** Select all that apply.
 - a. Legacy VTK files
 - b. VTK XML files
 - c. NetCDF
 - d. HDF5 without Xdmf
 - e. HDF5+Xdmf
 - f. Xdmf
 - g. Standard GIS file formats
 - h. Custom ASCII files
 - i. Custom binary files
 - j. Other. Please describe [small text box]
8. **What information is included in the output files?** Select all that apply.
 - a. Solution field
 - b. State variables
 - c. Fields derived from the solution and/or state variables
 - d. Time stamps of output values
 - e. Topology of the data, e.g., how points are connected to form triangles of a surface
 - f. Geometry of the data, e.g., coordinates of points
 - g. Coordinate system information
 - h. Units of output values
 - i. Basis function information
 - j. Numerical quadrature information
9. **Does the code use parallel input and output?** Y/N
10. **Does the code support checkpointing?** Y/N
11. **Does the code use distributed/parallel data structures?** Y/N

12. Does the code transfer information among processes via messages (e.g., MPI) instead of the filesystem? Y/N

Workflow

1. How is the code intended to be used?
 - a. Small number of simulations with little pre- and post-processing
 - b. Small number of simulations within a larger modeling framework
 - c. Large number of simulations, e.g., sensitivity studies, uncertainty quantification, parameter search, inversion framework.
 - d. Other. Please describe [small text box]
2. What pre-processing software is required? [medium text box]
3. Are open-source tools available to do the pre-processing?
 - a. Yes and they are good
 - b. Yes but they are mediocre
 - c. Yes, but not at the current time because more development is needed to use the file format(s) output from the open-source tools
 - d. No, the tools are proprietary
 - e. No, the user must write scripts/code
4. What post-processing software is required? [medium text box]
5. Are open-source tools available to do the post-processing?
 - a. Yes and they are good
 - b. Yes but they are mediocre
 - c. Yes, but not at the current time because more development is needed to generate the correct file format(s) used by the open-source tools
 - d. No, the tools are proprietary
 - e. No, the user must write scripts/code

User issues:

1. Do you have a publicly available development plan that is updated regularly with prioritization of new features and estimated timetable for their implementation? Y/N
2. What are the most common difficulties users have in building your code? [medium text box]
3. What are the most common difficulties users have in using your code? [medium text box]
4. What do users find most annoying about your code? [medium text box]
5. Does the code output all configuration and build options at runtime to facilitate reproducibility? Y/N
6. Does the code output all parameters used (provenance information)? Y/N

General

1. What aspects of your software development are going well? [medium text box]
2. What aspects of your software development are the most challenging? [medium text box]
3. What additional documentation or training materials would be most beneficial to users? [medium text box]
4. What are the main bottlenecks in the release process for your code? [medium text box]
5. In what areas should CIG add more Best Practices for software development? [medium text box]
6. In what areas could CIG help you in your code development? [medium text box]

7. [What other geodynamics or scientific projects should CIG be aware of?](#) Please describe and provide a URL if possible. [medium text box]
8. [Please provide any additional comments.](#) [medium text box]