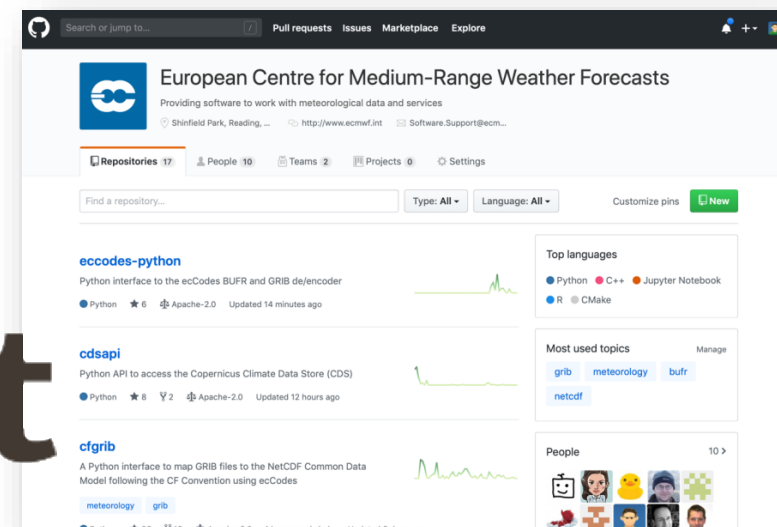


The important role of versioning your code

Versioning as an essential part of a reproducible workflow

Stephan Siemen

Development Section, Forecast Department



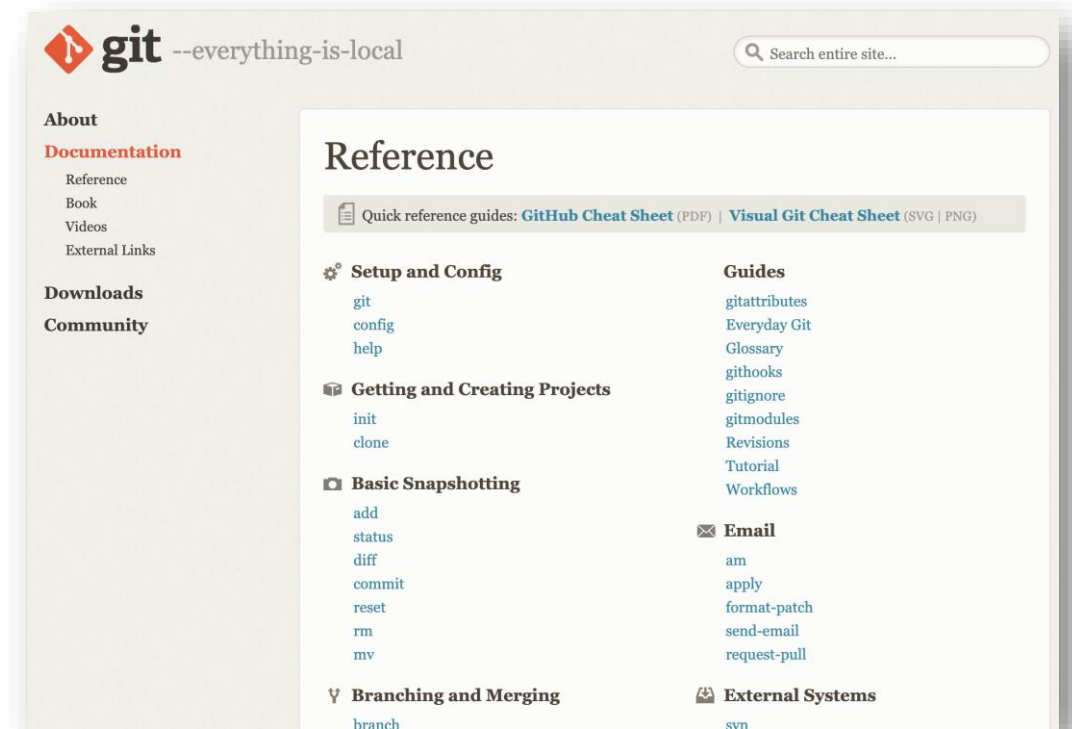
Why versioning code is so essential for reproducible workflows

- Track changes
 - Makes them visible for colleagues
 - Lets the team see what has changed to understand their impact
- Revert if necessary, e.g. in case of regressions
 - Records also what has not worked → don't only commit what worked
- Makes it easy to share code and keep up-to-date with developments
 - Powerful when linked with Continuous Integration/Deployment (CI/CD)
- But can you version more than just your code?
 - Yes, and you should → data & configurations

Git – the right choice for versioning



- Git is well designed and very powerful
 - Lots to learn, but in the end it you survive with a small set of commands
 - Big community and ecosystem of tools
 - Very good documentation
- Not always easy
 - Have to be careful to not leave branches open for too long
 - Easy to start again from a fresh clone
 - Initial struggle to version larger binary files
 - Helps to have a GUI to keep track of history and branches
 - And there is always Google ... ;-)



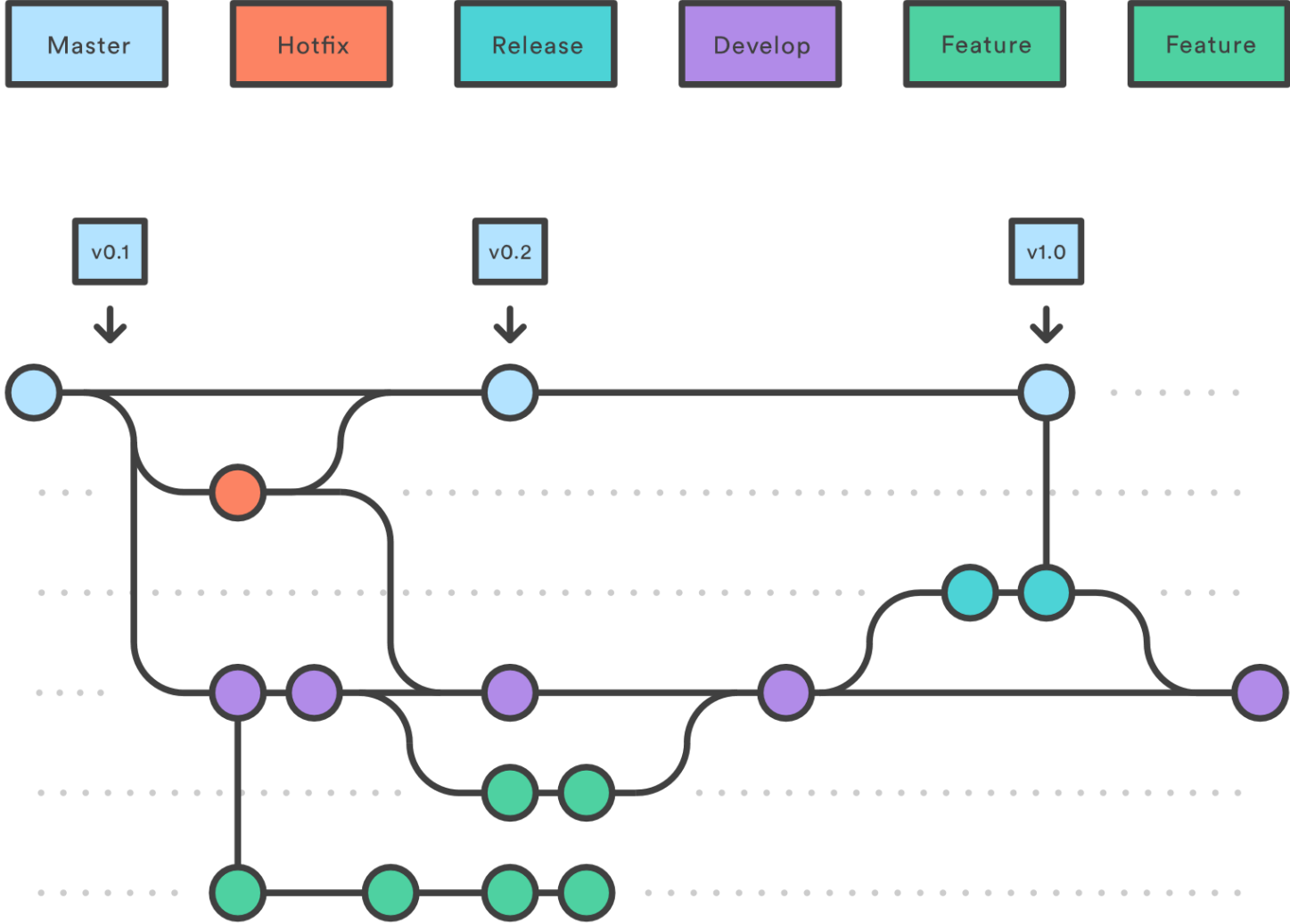
At ECMWF we use internally Bitbucket

The screenshot shows the Bitbucket interface for the 'magics' repository. The 'Source' view is active, displaying a file tree with folders like '.settings', 'apps', 'bamboo', 'cmake', 'docs', 'metview_files', 'notebook', 'regression', 'rpms', 'share', 'src', 'test', 'tools', 'toolsjs', and 'utils'. The left sidebar contains navigation options such as 'Clone', 'Create branch', 'Create pull request', 'Create fork', 'Compare', 'Source', 'Commits', 'Branches', 'Watches', 'Pull requests', 'Forks', and 'Repository settings'.

The screenshot shows the Bitbucket 'Commits' view for the 'magics' repository. A commit history table is displayed, listing recent commits with their authors, commit IDs, messages, dates, and associated issues or builds.

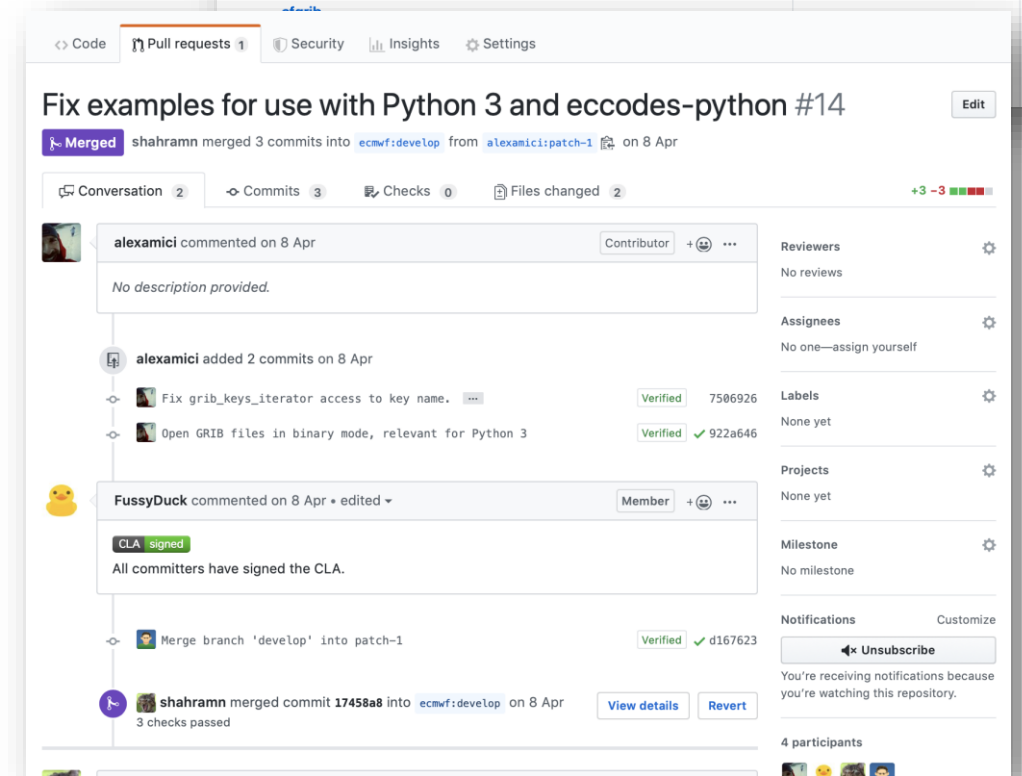
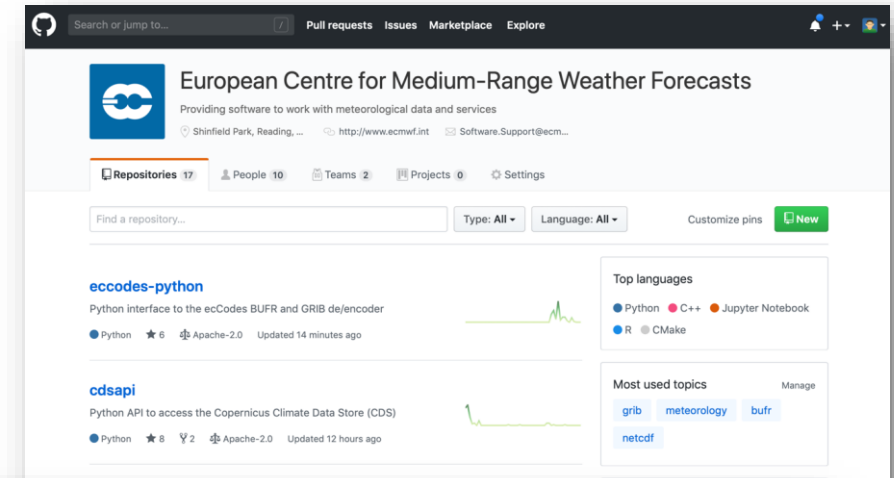
Author	Commit	Message	Commit date	Issues	Builds
lain Russell	05ed8c83edd	Fix for Windows build	3 days ago		✓
lain Russell	98b88b5cf42	Fix for Windows build	3 days ago		✓
Sylvie Lamy-Thepaut	60020a1c3a6	Merge branch 'de... web-2019-10-09-...	6 days ago		✓
Sylvie Lamy-Thepaut	dc7319aeeb0	adding support for extended CDF graph	6 days ago		✓
Sylvie Lamy-Thepaut	6128b9dd863	Merge branch 'master' of ssh://git.ecmwf...	1 week ago		✓
Sylvie Lamy-Thepaut	8c22288b463	Merge branch 'release/4.2.0'	1 week ago		✓
Sylvie Lamy-Thepaut	935efc8f096	Web Version : 4.2.0.1 --> fix on...	02 Oct 2019	EPSP-32661	✓
Edward Comyn-Platt	8234133e07a	msh.json edited online with Bitbucket Add...	26 Sep 2019		✓
Edward Comyn-Platt	c1c05740e53	msh.json edited online with Bitbucket Add...	26 Sep 2019		✓
Sylvie Lamy-Thepaut	72641511d5c	Update Version number	26 Sep 2019		✓
Sylvie Lamy-Thepaut	ef4a1a95067	Mkake sure that latitudes lables do not exce...	26 Sep 2019	MAGP-1211	✓
Sylvie Lamy-Thepaut	e775d98bc82	Merge branch 'develop' of ssh://git.ecmwf...	26 Sep 2019		✓
Sylvie Lamy-Thepaut	c4810da8d7a	Mkake sure that latitudes lables do not exce...	26 Sep 2019	MAGP-1211	✓
Stephan Siemen	d02a778b21d	CAIRO - reduce threshold to use cairo ima...	24 Sep 2019	MAGP-1212	✓

Gitflow workflow

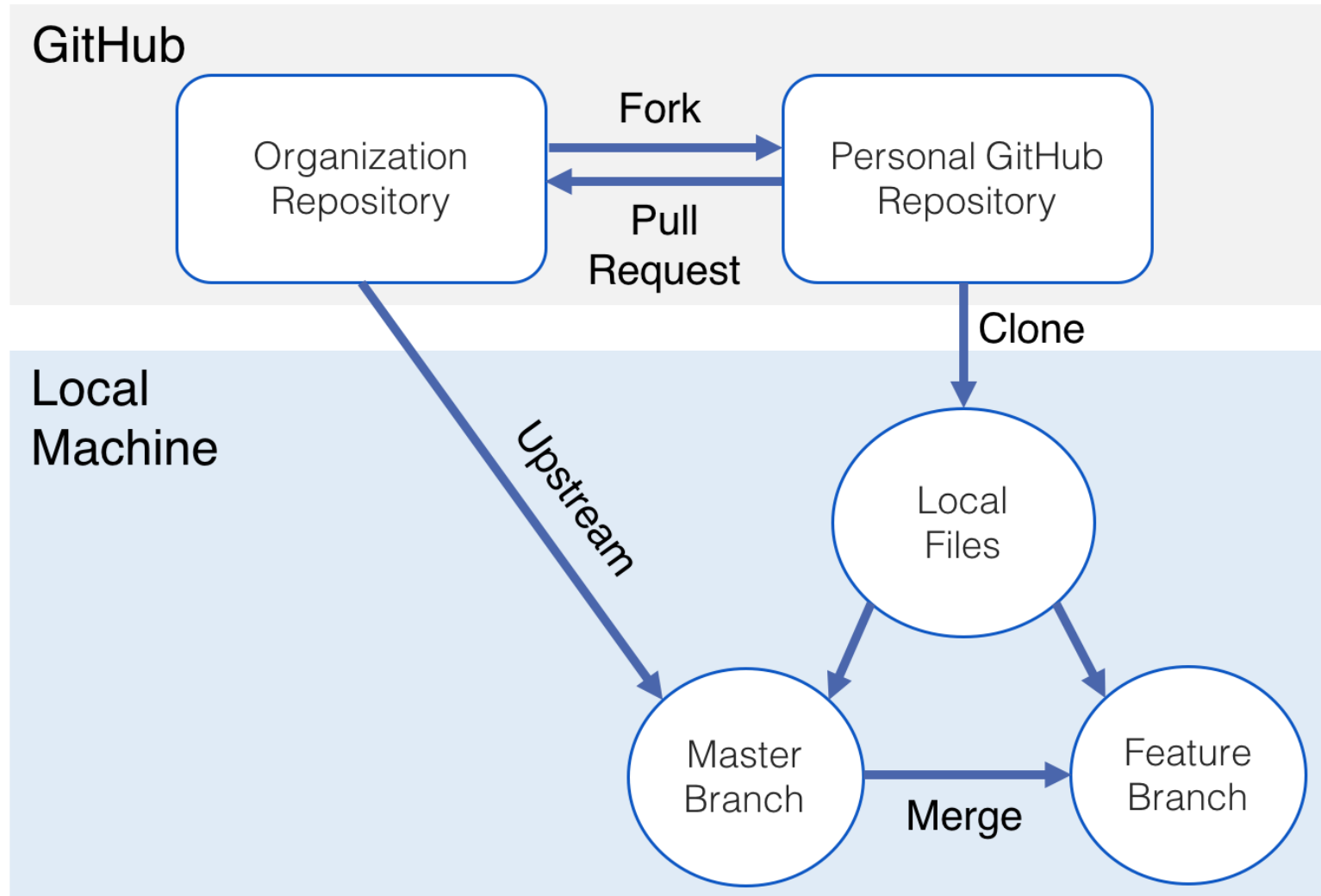


GitHub – bringing versioning to the next level

- Version control → social media
 - Collaboration platform
 - Linked into many other systems/services
- Introducing pull requests
 - Extra layer to encourage code review and testing
- Trigger actions & services on commits & PRs

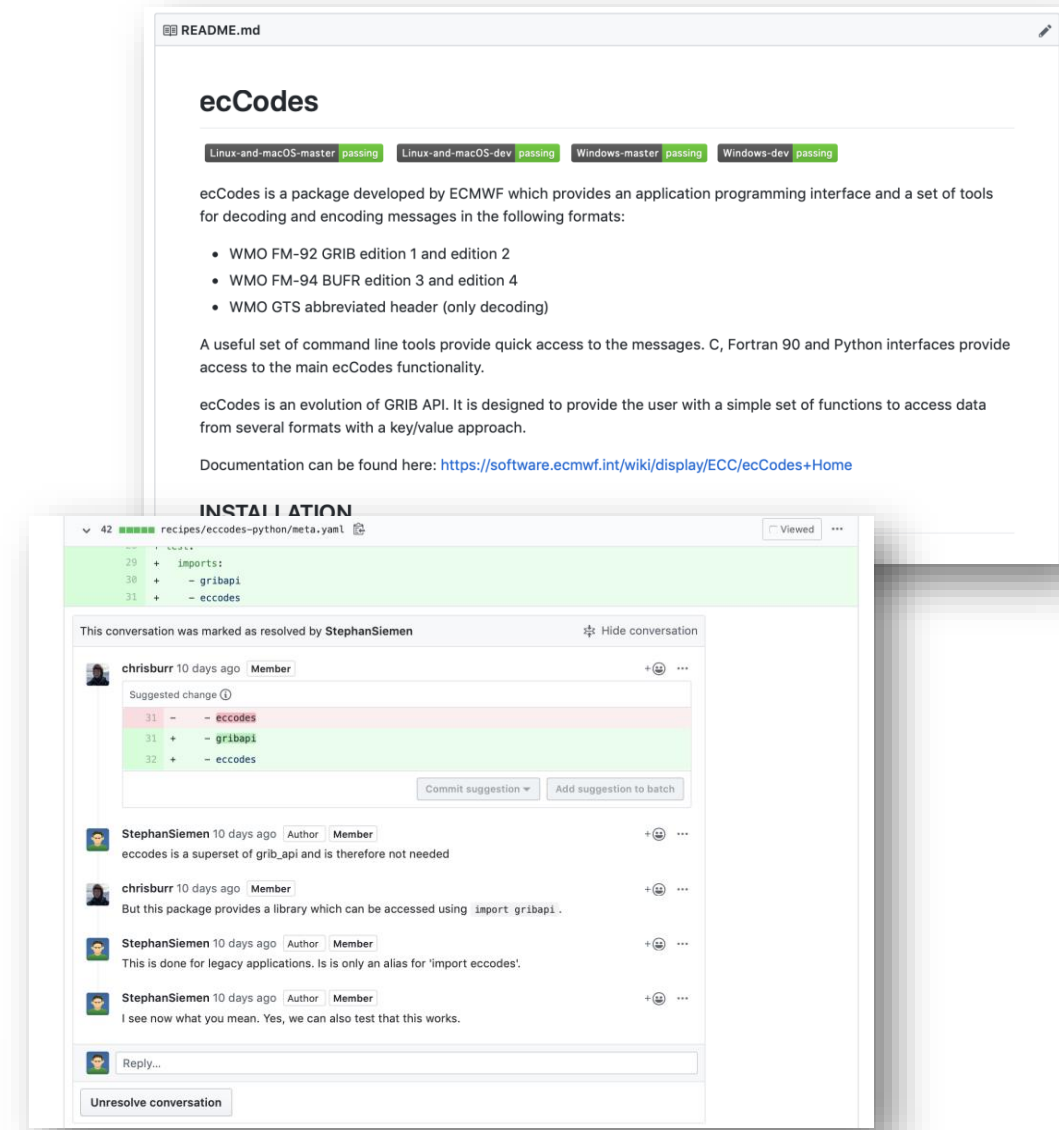
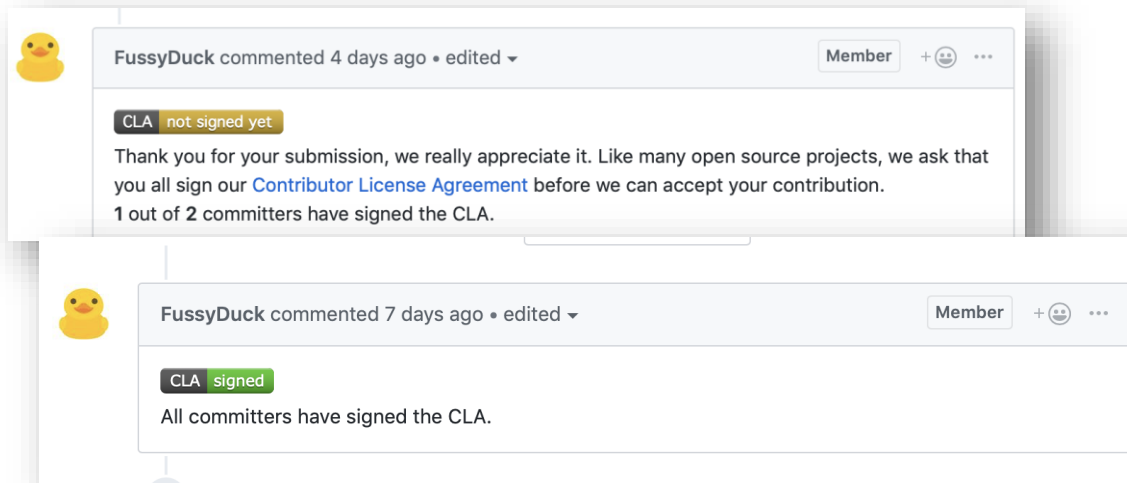


The GitHub workflow



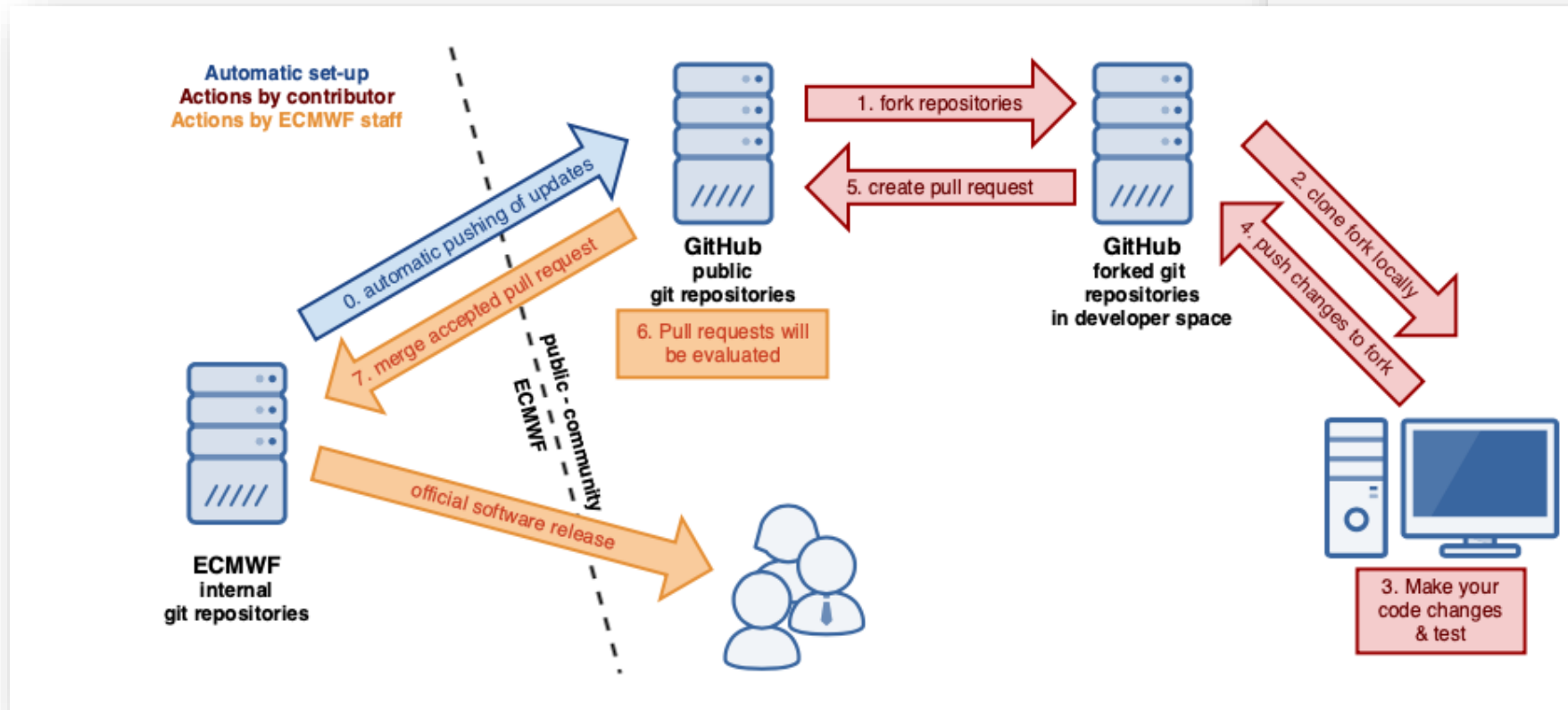
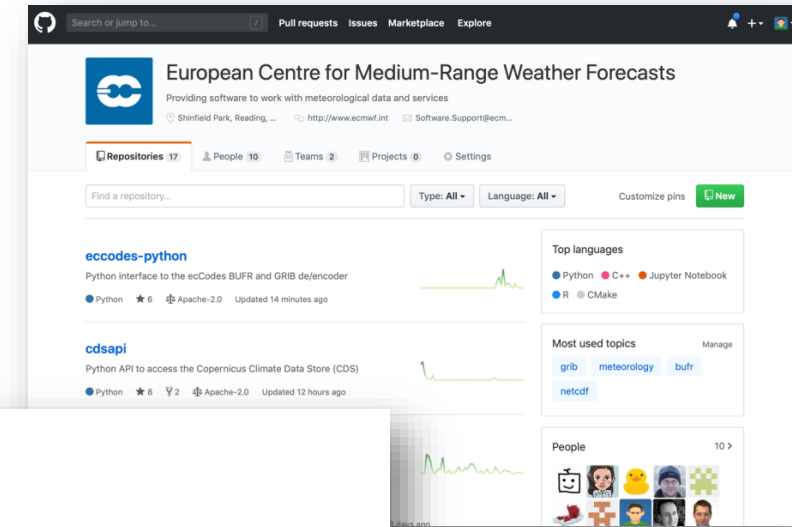
Supercharging your workflows with GitHub

- CI/CD
 - connecting services like TravisCI, CircleCI, ...
- Enforce code reviews in pull requests
- Code contribution agreements



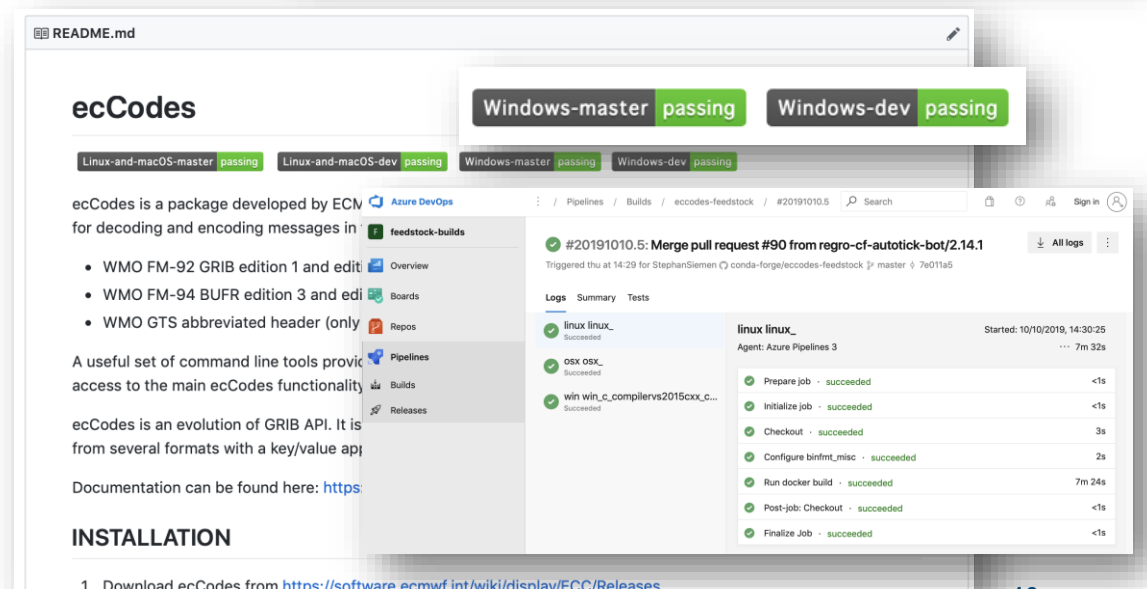
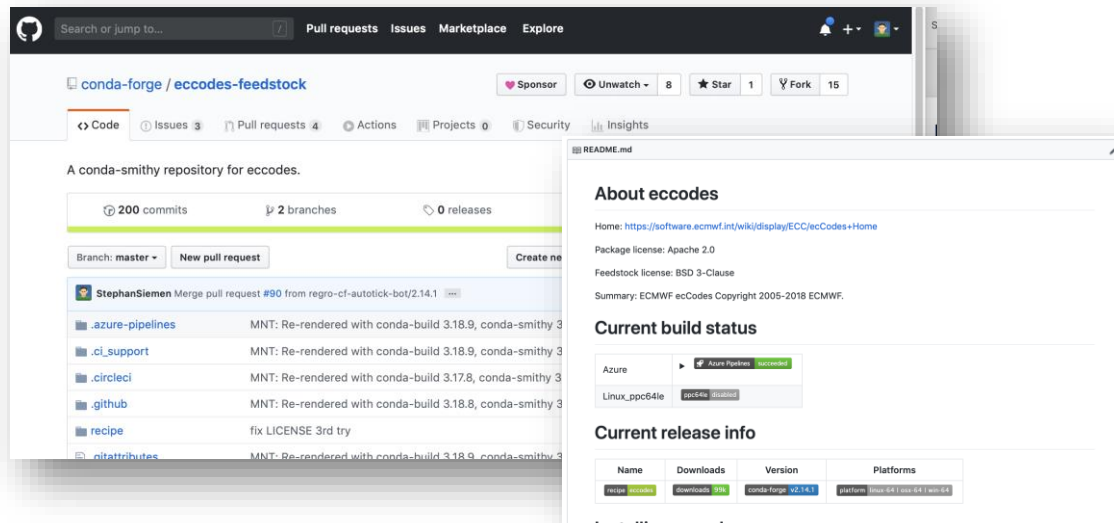
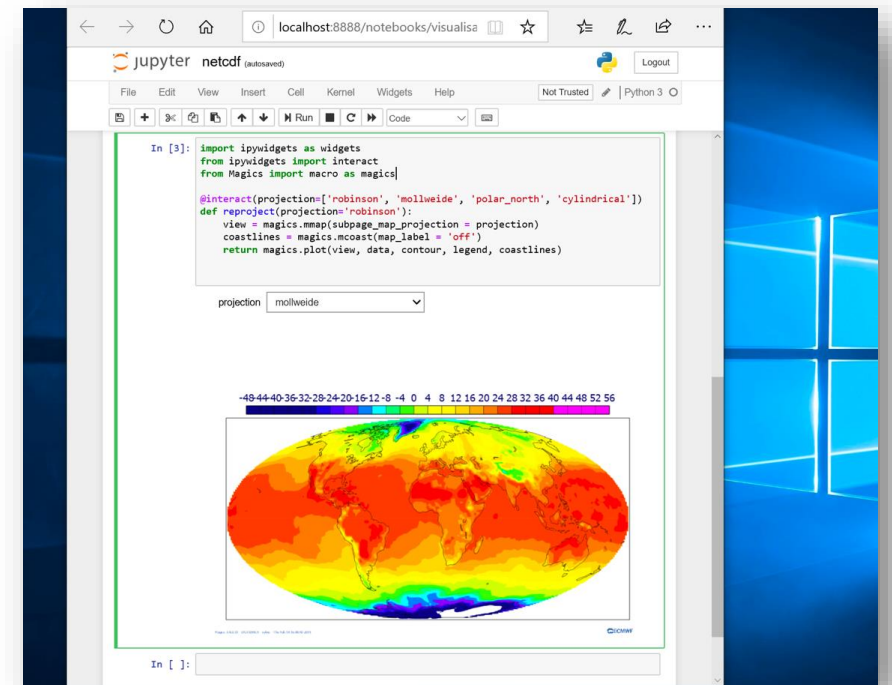
Embracing Open Development for ECMWF software

- ECMWF now available on GitHub
 - Allows for easier code contributions



First success – Windows port of software

- Ported key libraries to Windows
 - Need help from community
 - Test suites are running from GitHub
 - Work was done by company *Old Reliable Tech*
- Package software on conda & pip
 - Easy reach for Python community



Takeaway messages ...

- Versioning is essential for reproducible workflows
 - Not just to do reverts ;-)
- Versioning can be the start of robust development workflows
 - CI/CD, pull requests, code reviews, ...
- Community can now contribute to ECMWF software through a common workflow