

# easybuild

## State of the union

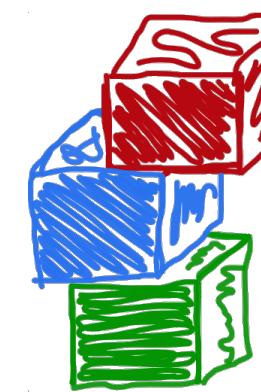
Kenneth Hoste (HPC-UGent)

*kenneth.hoste@ugent.be*

7th EasyBuild User Meeting

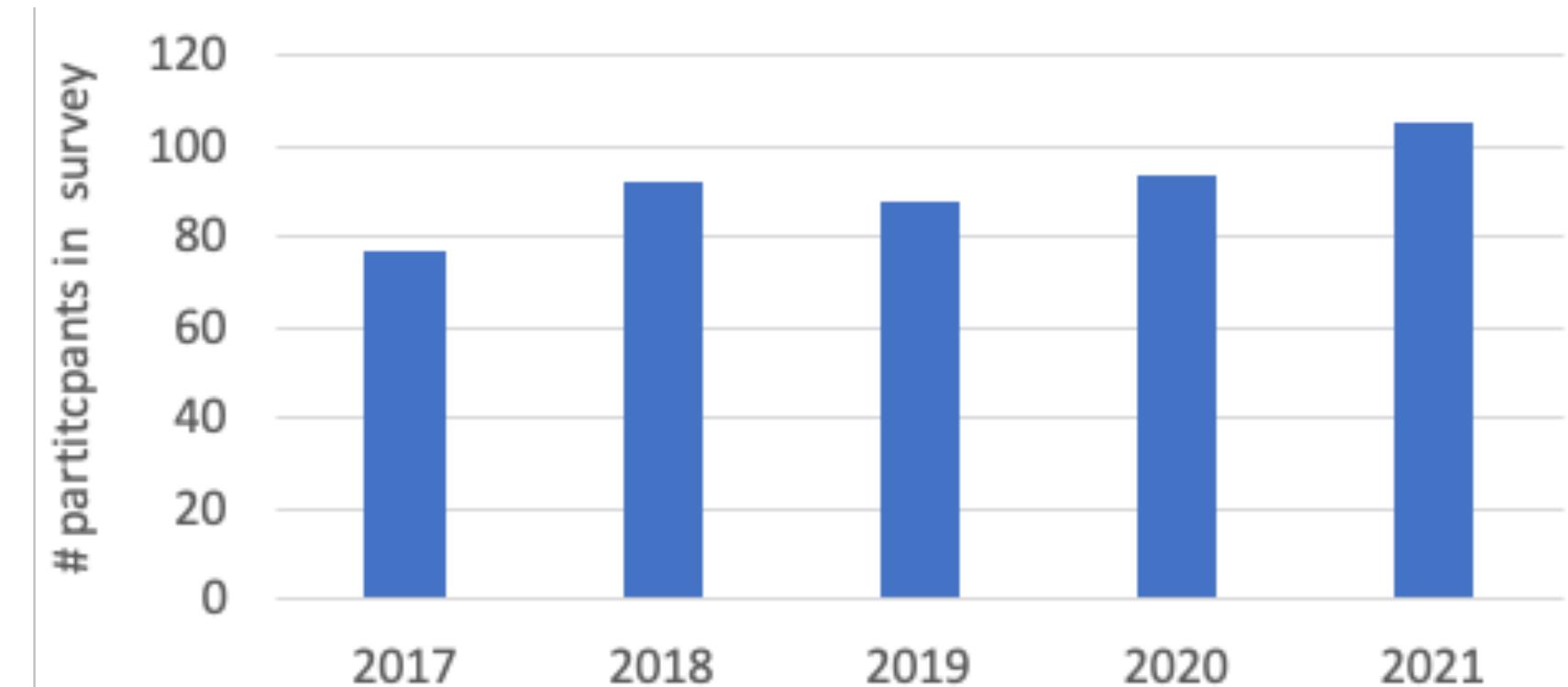
virtual - Jan 24th 2021

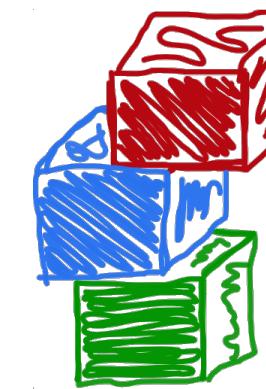
<https://easybuild.io/eum22>



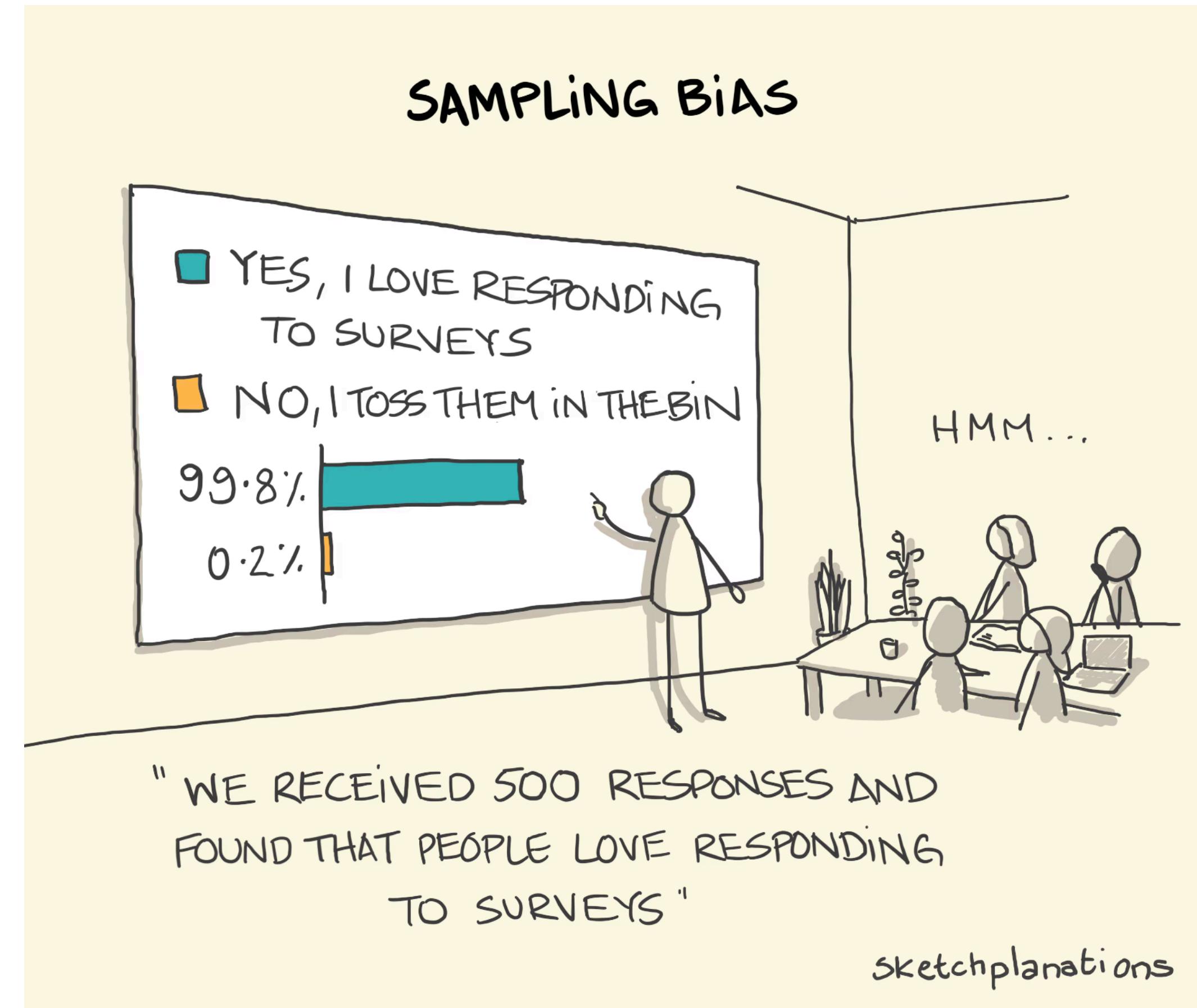
# easybuild User Survey

- anonymous survey via  **SurveyMonkey®**, 5th edition!
- get feedback from / gain insight into EasyBuild community
- 47 questions (incl. 7 new), covers wide variety of aspects
- **105 people participated in 2021 survey** (new record, > 100 %)
- **full survey results (raw) are available at [https://easybuild.io/user\\_survey](https://easybuild.io/user_survey)**
- highlights are covered in this talk, some questions were skipped, order of questions is different
- **5 years of survey results allow for tracking how things are (not) changing...**

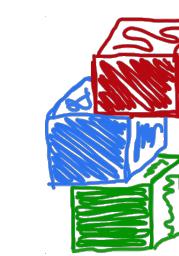




# easybuild User Survey



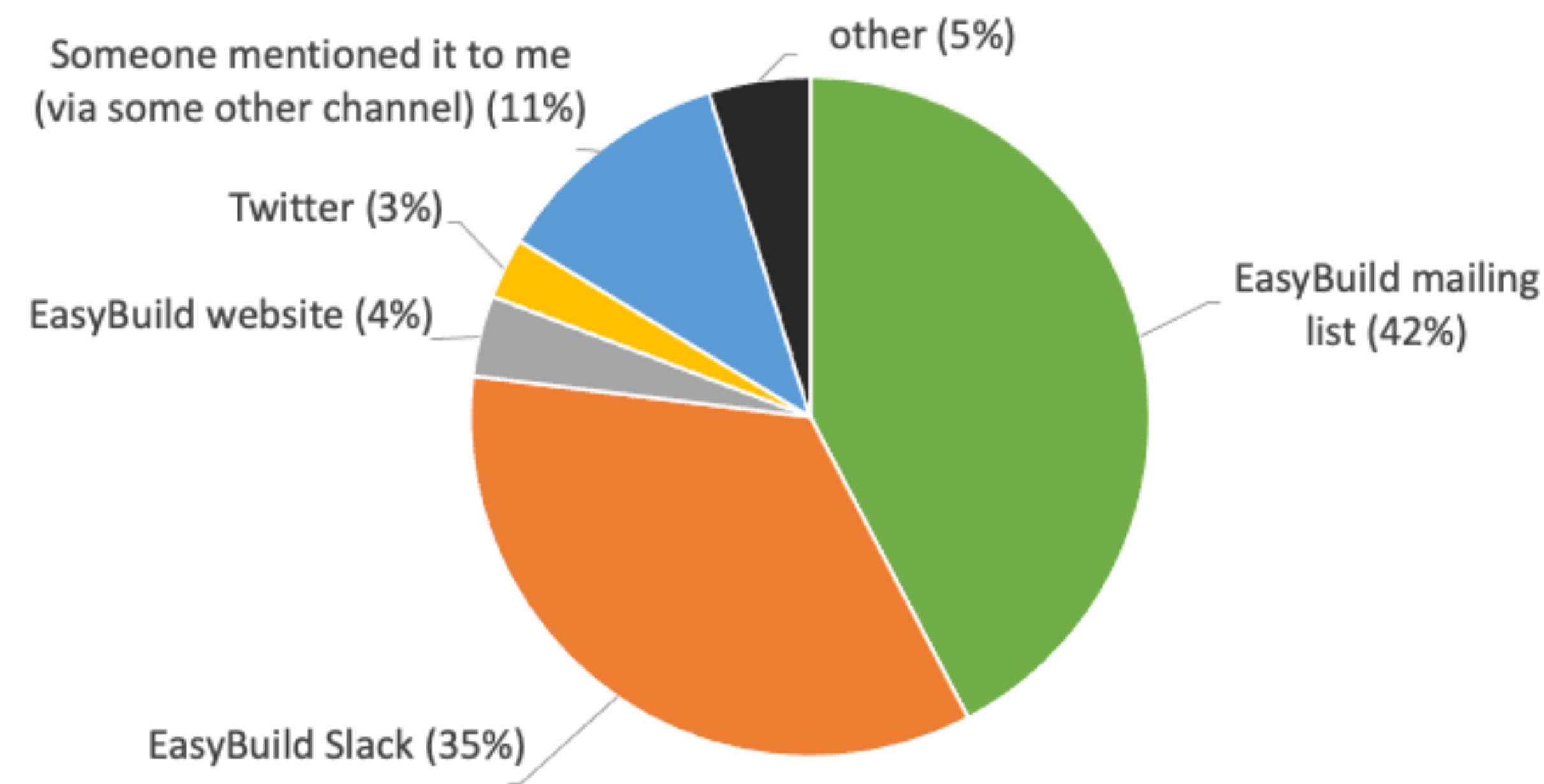
Assumption is that survey results give relevant view on EasyBuild community  
(but results are interpreted with a grain of salt)



# easybuild User Survey

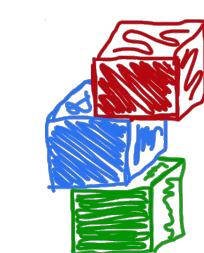
new survey question!

*Via which channel did you become aware of the 5th EasyBuild User Survey?*



More participation via mailing list, while Slack has almost twice as many members...

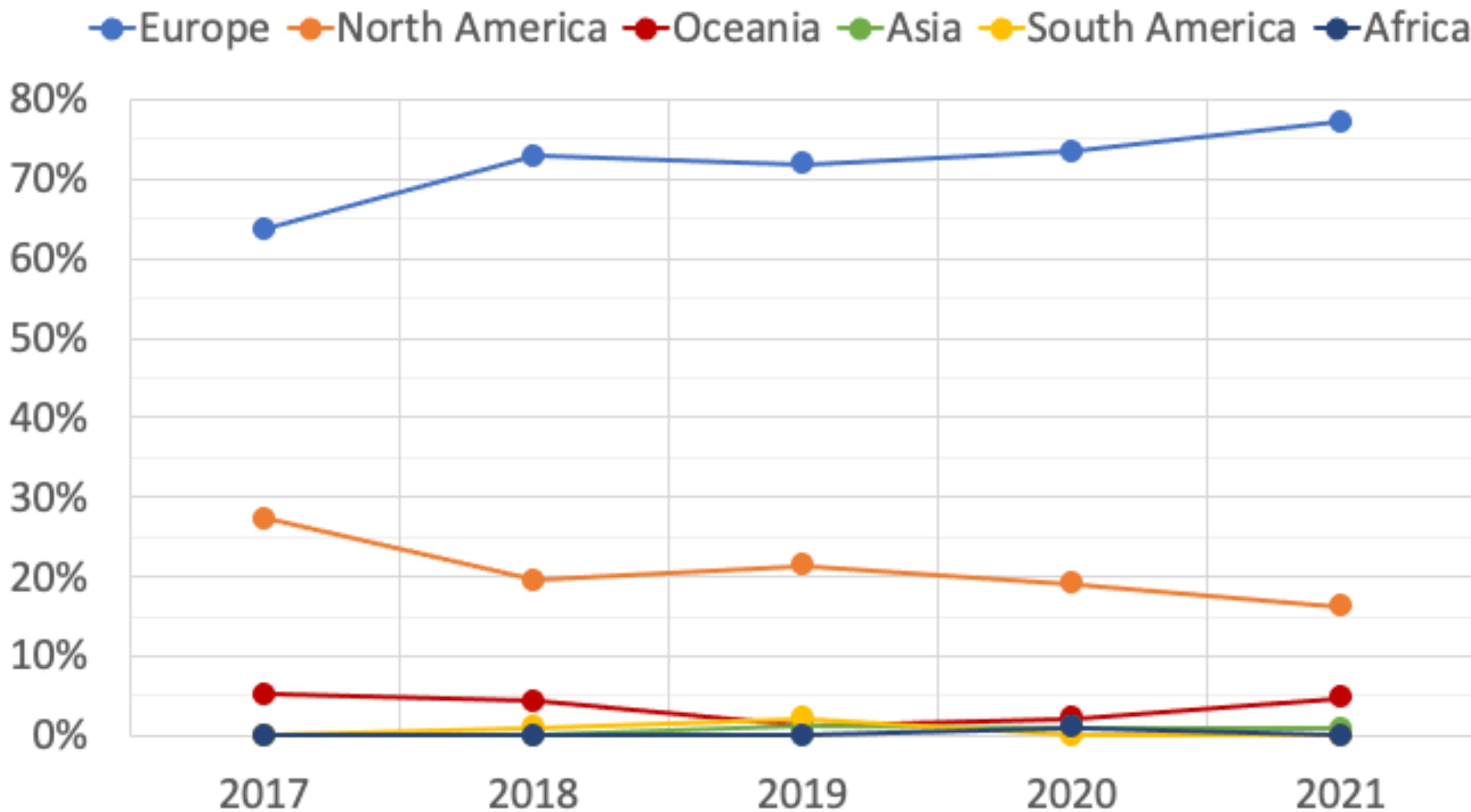




# easybuild User Survey

Spack  
survey (2020)

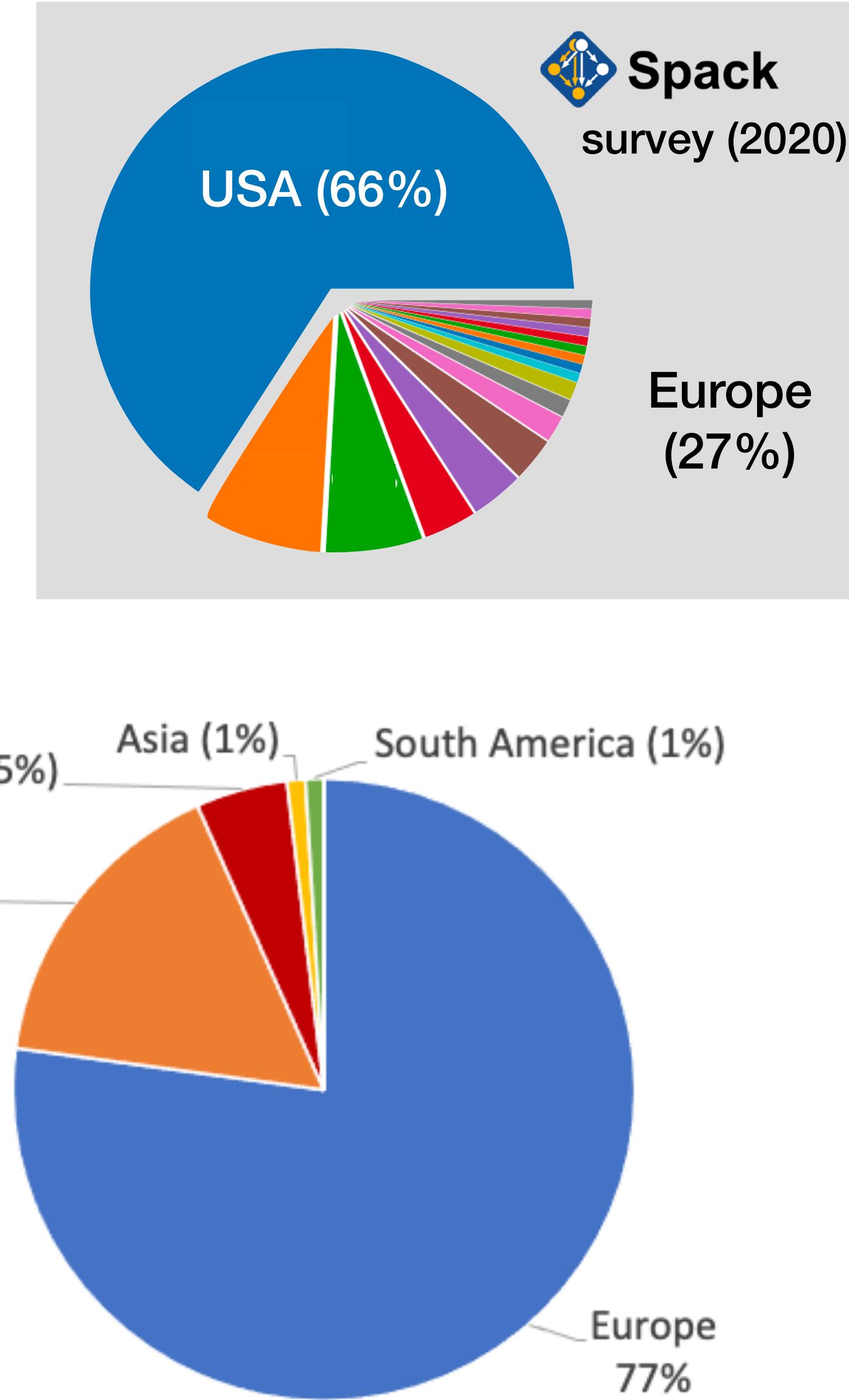
*In which part of the world are you located?*

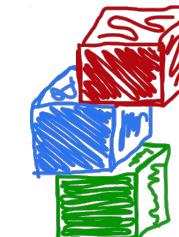


Slightly increasing trend for Europe, now > 75%.

Small downward slope for North America (Spack effect?)

Huge bias in community: less than 10% outside of Europe/US/Canada.

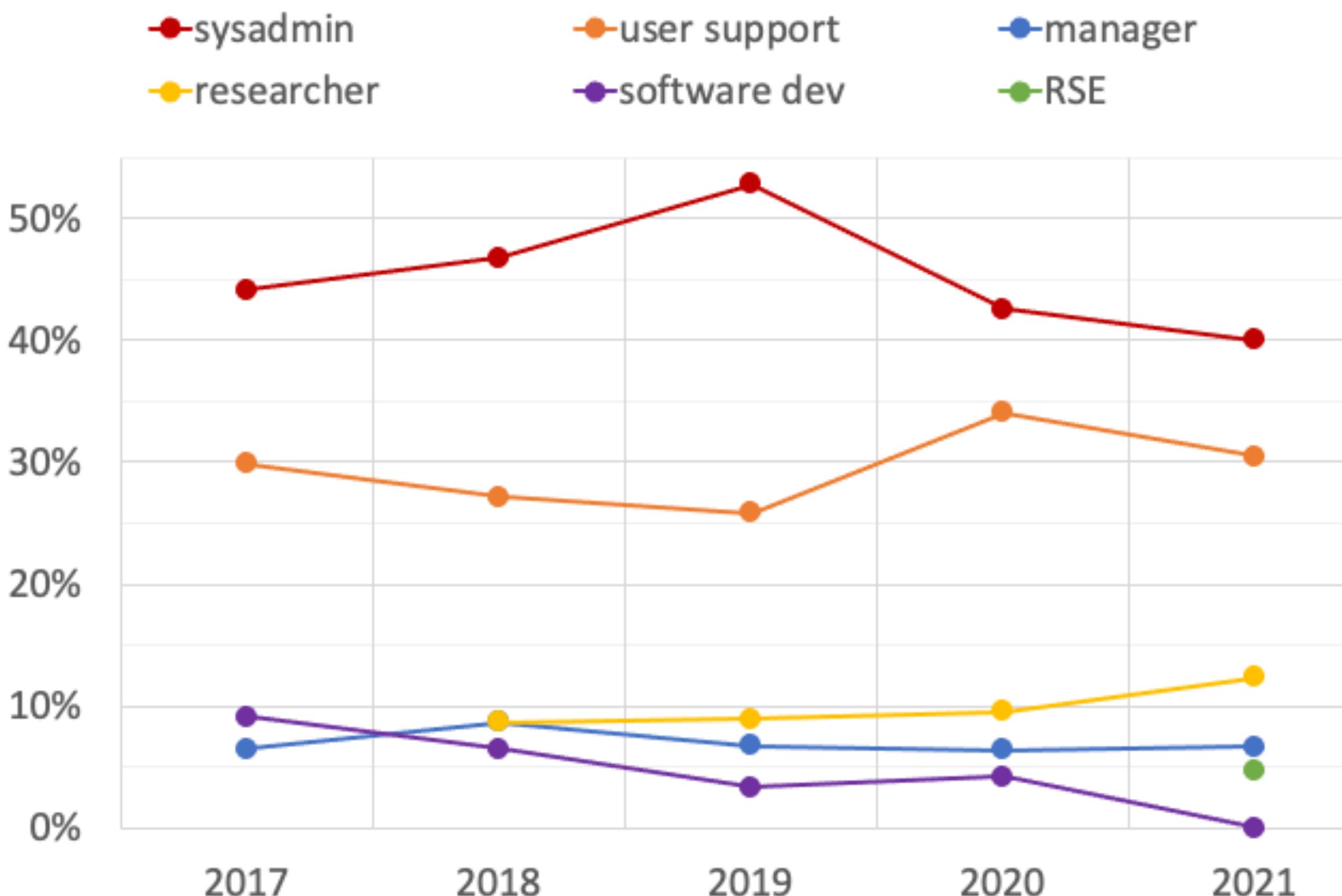




# easybuild User Survey

Spack  
survey (2020)

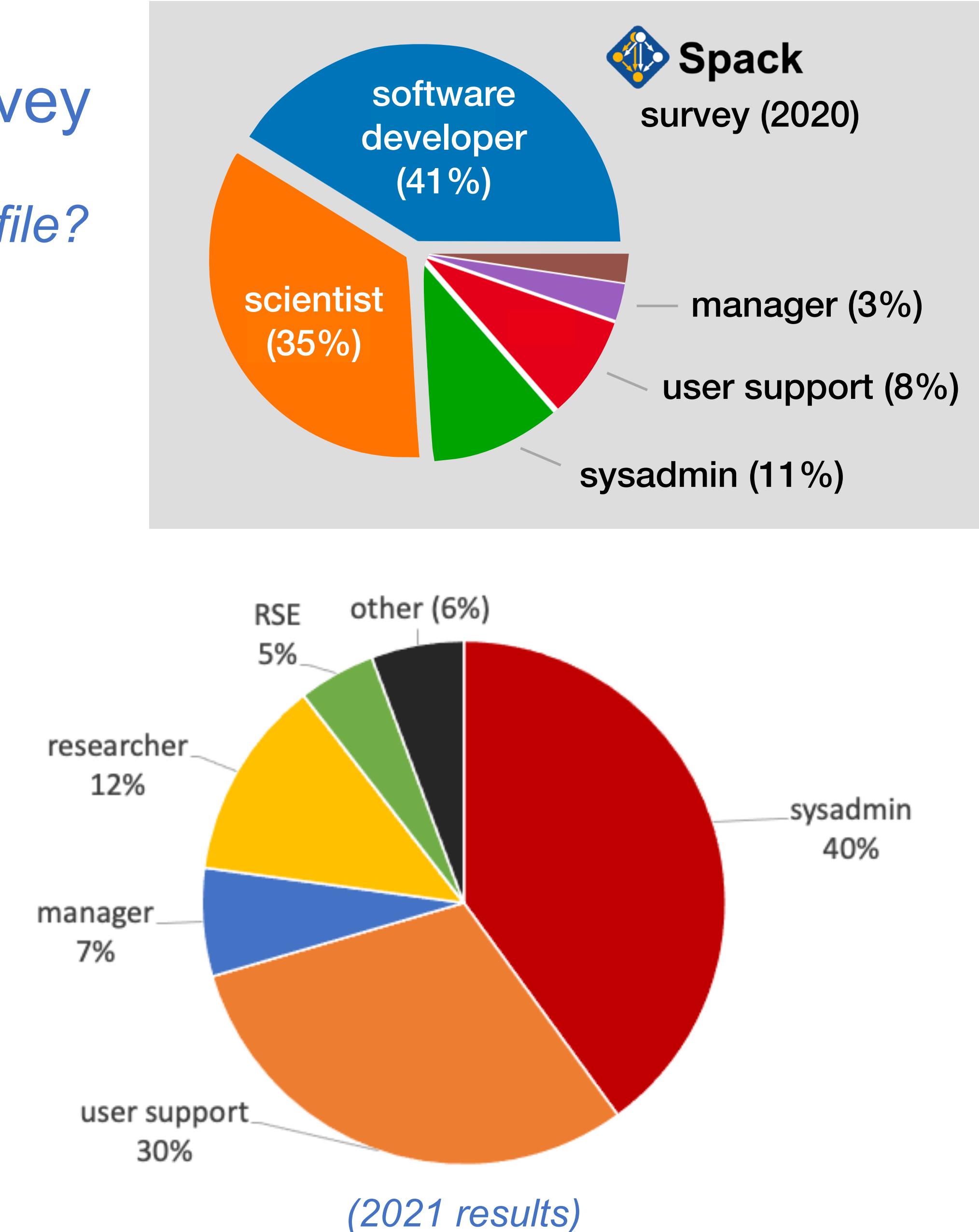
*What is your primary profile?*

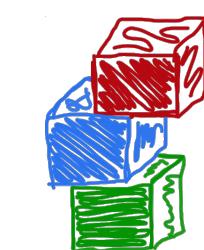


System administrators + user support: ~70%

Slight increasing trend for researchers.

In 2021 survey: nobody identified as a software developer (replaced by RSE?)

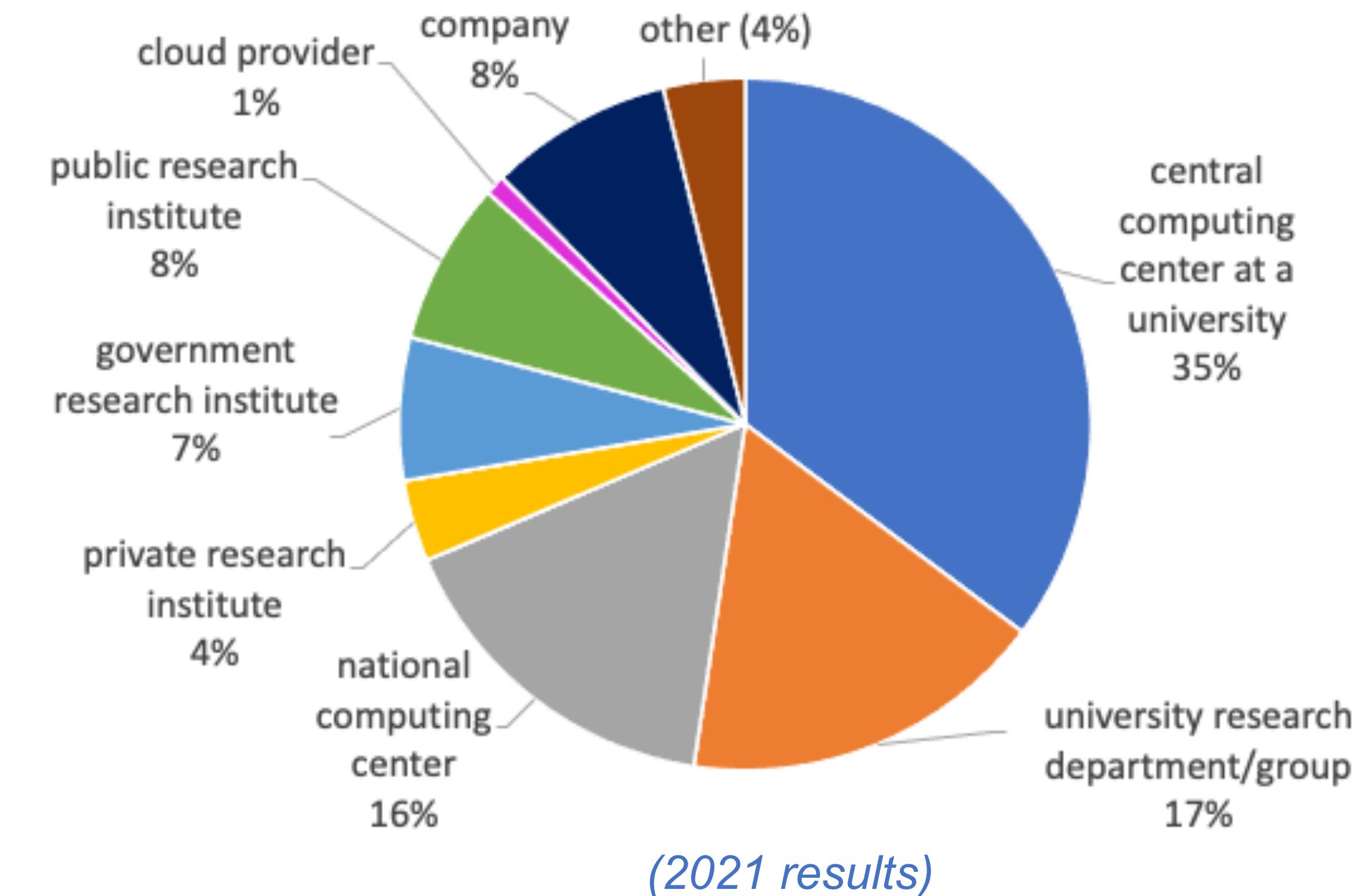
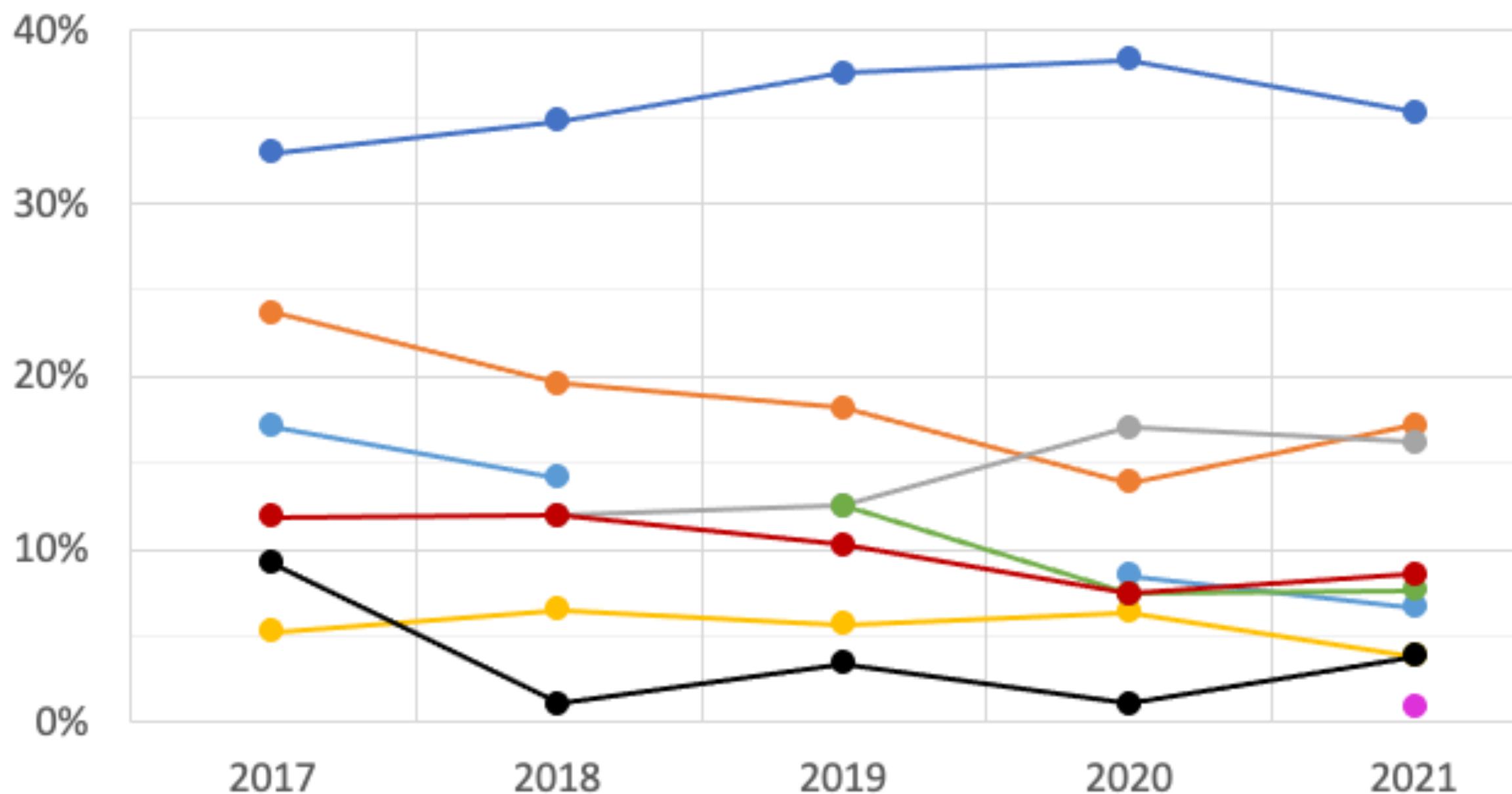




# easybuild User Survey

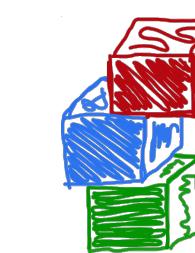
*What type of organisation do you work for?*

- central computing center at a university
- national computing center
- government research institute
- cloud provider
- other
- university research department/group
- private research institute
- public research institute
- company



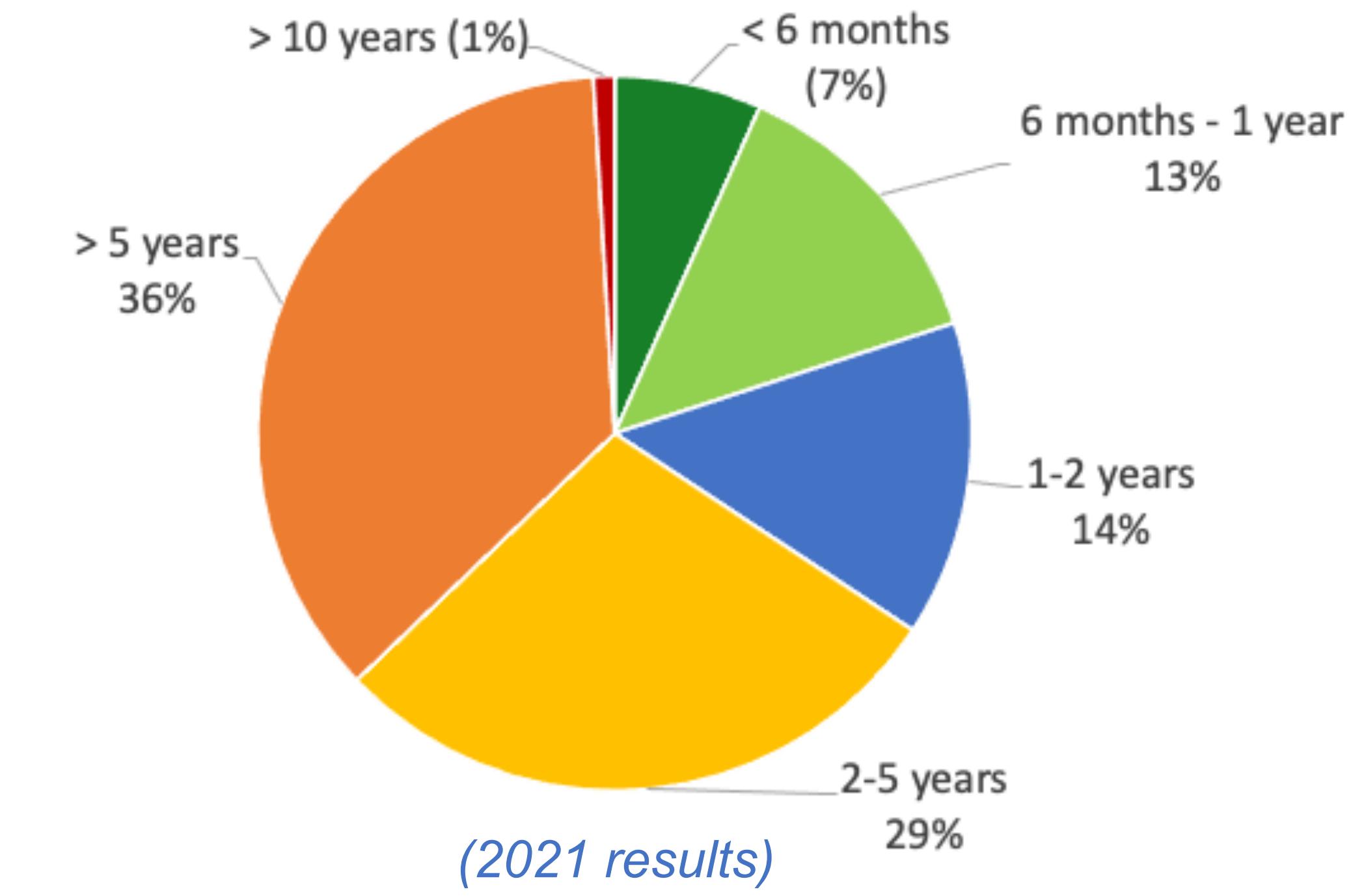
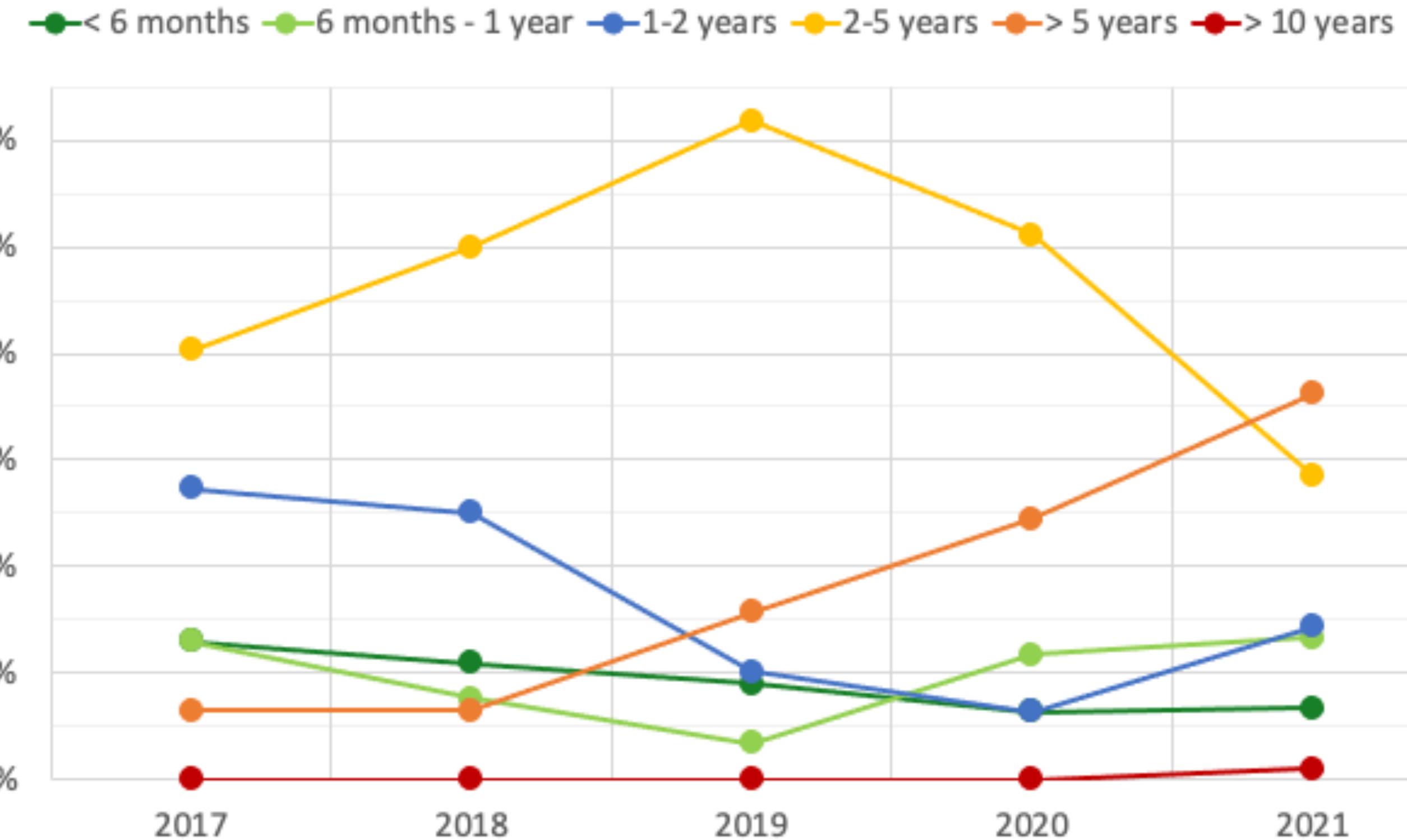
Over 50% working in a university.

New kid on the block in 2021: cloud provider (1%).



# easybuild User Survey

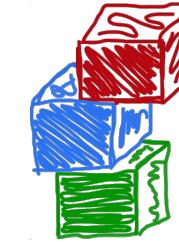
## *How long have you been using EasyBuild?*



Significant influx of new people in 2021: ~20% of current community!

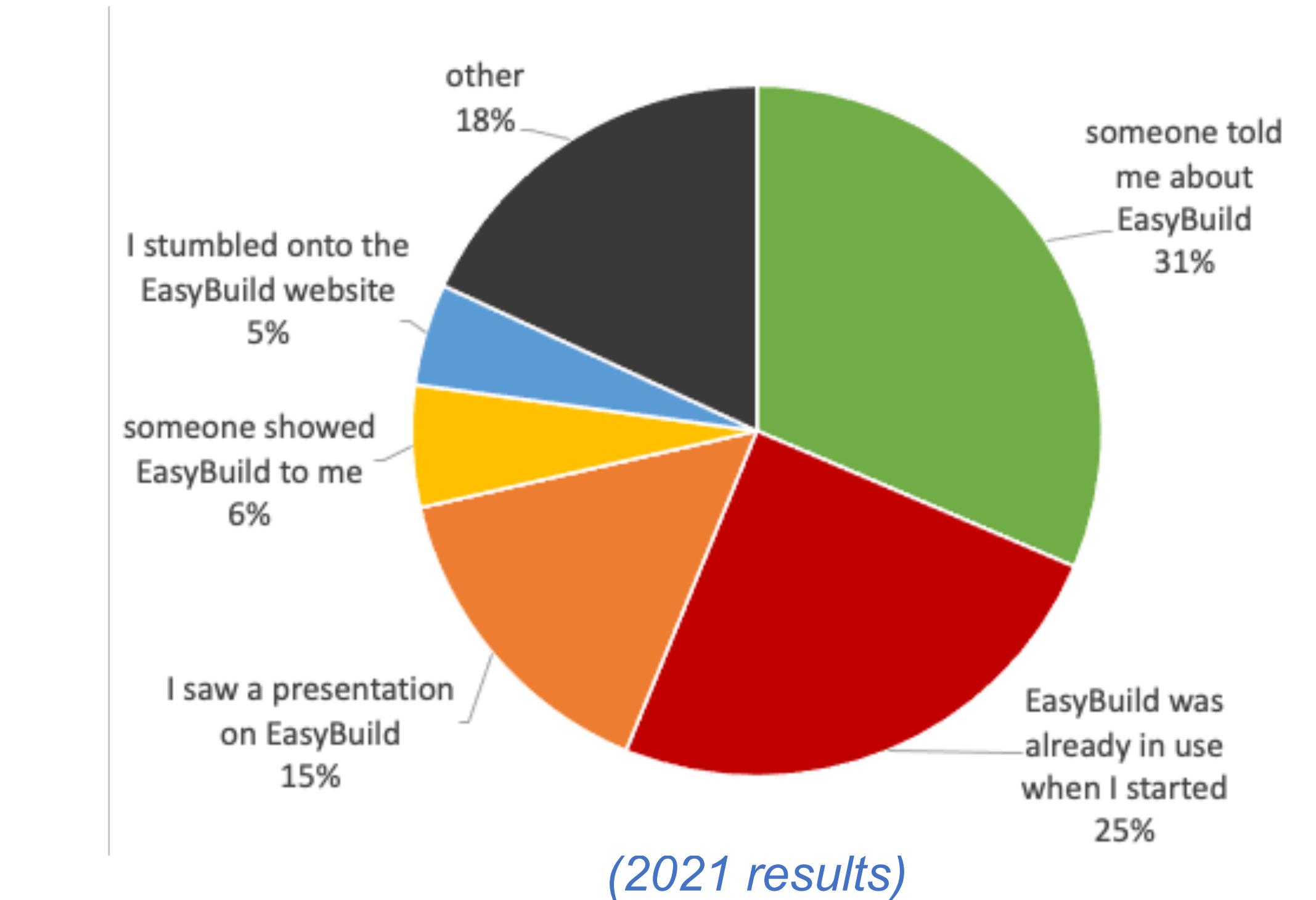
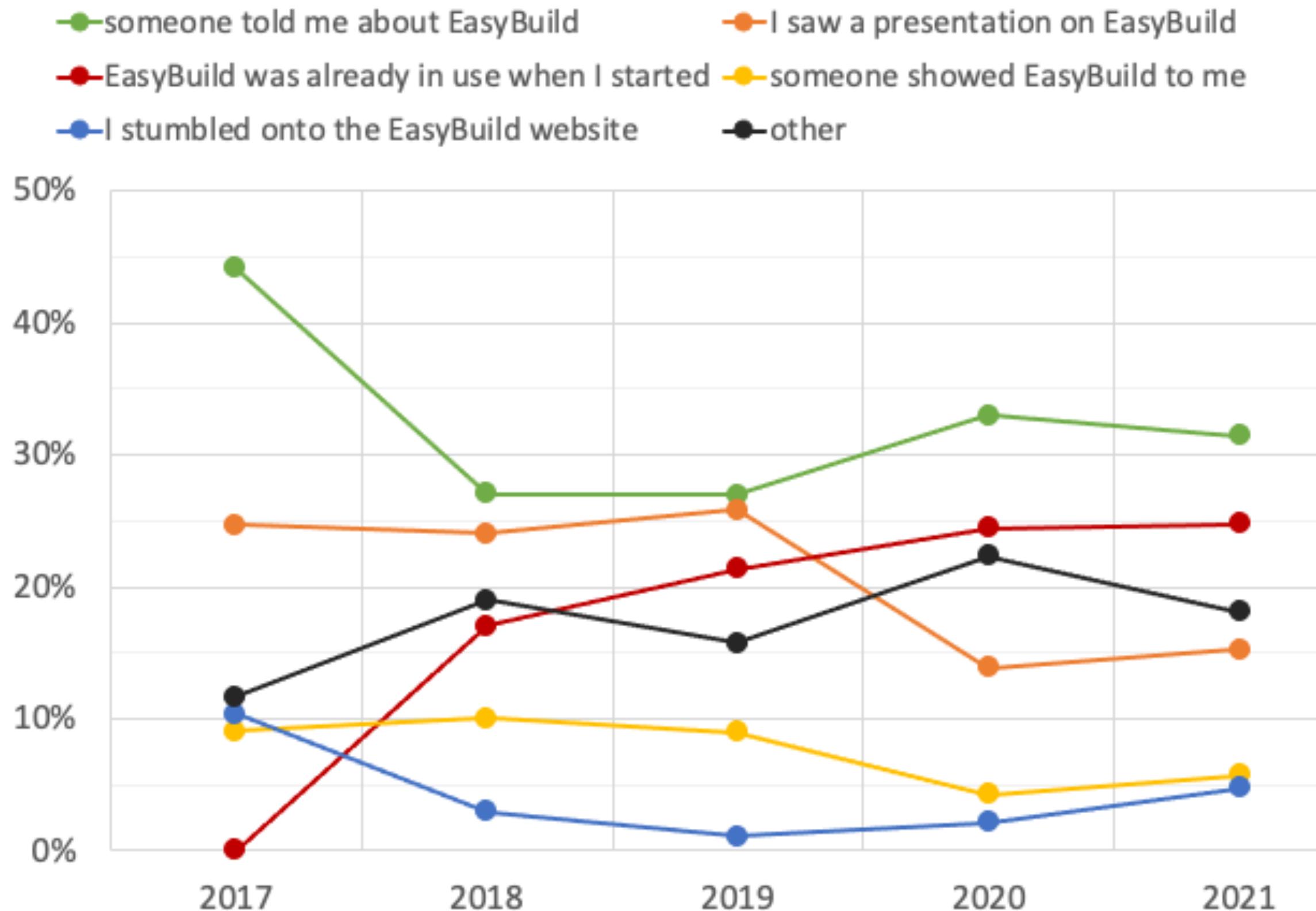
Decreasing ratio of "experienced" users (> 2 years): ~75% in 2020 to ~65% in 2021.

Steep increase of people with > 5 years of experience: people are happy with EasyBuild and stick to it?



# easybuild User Survey

## *How did you first learn about EasyBuild?*



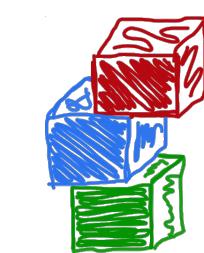
Word-of-mouth (colleagues, peers, talks, demos) remains dominant (~52%).

Increasing ratio of people learn about EasyBuild when starting a new job (now ~25%).

# 2022 is a special year for easybuild

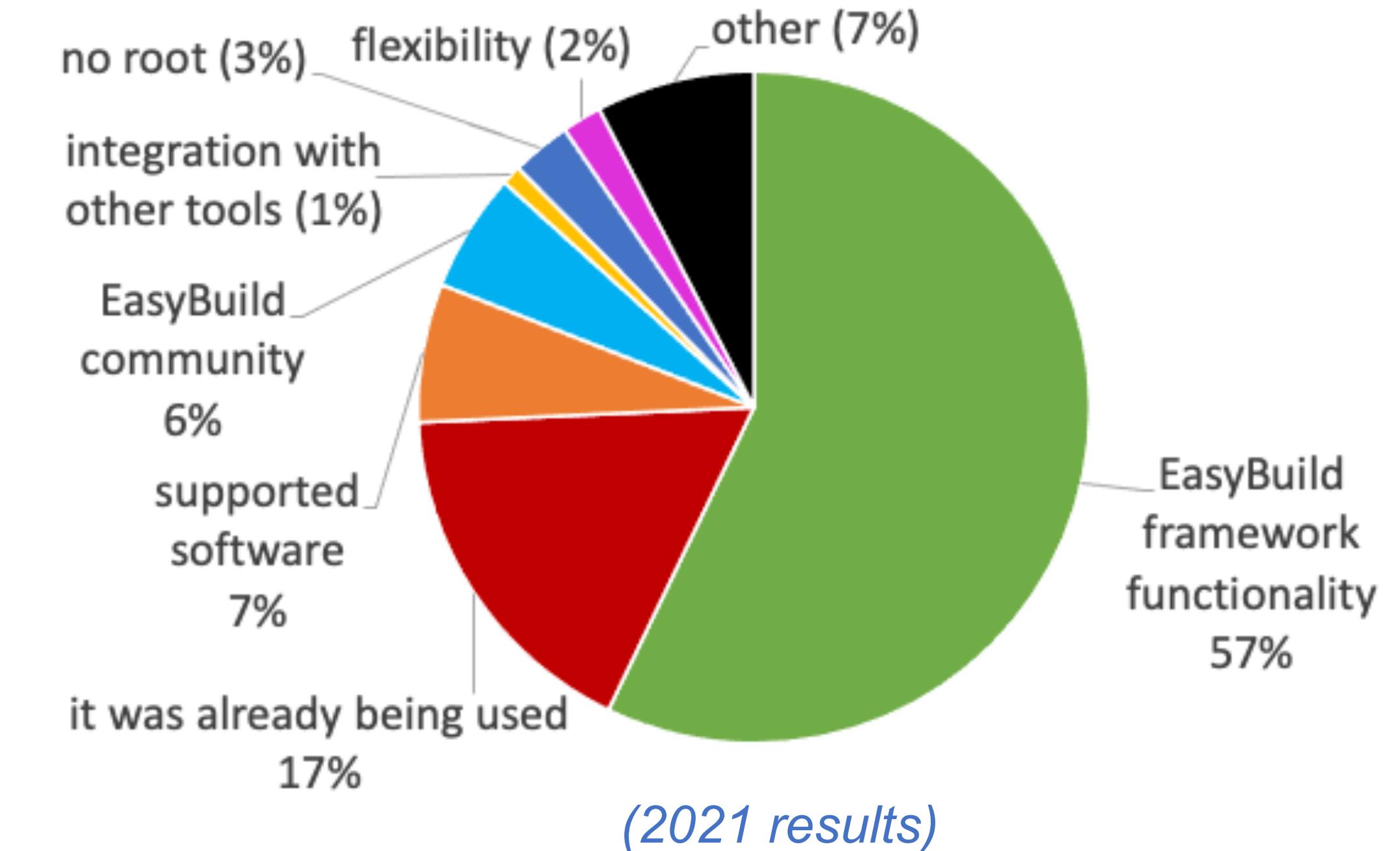
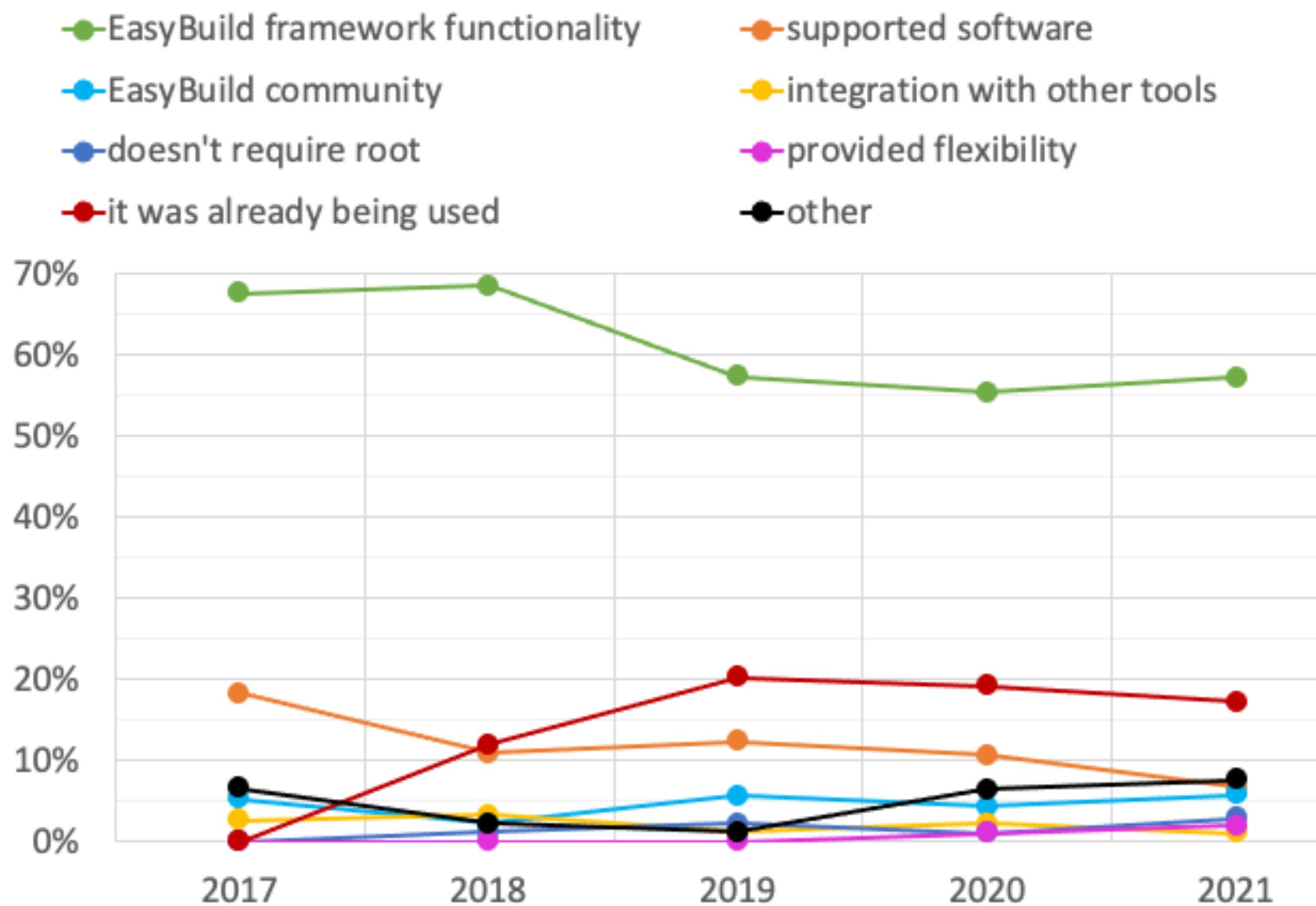
- **EasyBuild was first publicly released in 2012, so 10 years of (publicly available) EasyBuild!**
  - After several years of internal development at HPC-UGent
  - EasyBuild v0.5 released in April 2012 to "feel the water"
  - EasyBuild v1.0 released in Nov. 2012 (literally during SC12) after lots of feedback by early adopters
- **EasyBuild community has been growing every since!**
  - 11 EasyBuild hackathons (2012-2016), all across Europe + at TACC
  - 6 EasyBuild User Meetings (2016-2021)
  - "Getting Scientific Software Installed" Birds-of-a-Feather sessions at ISC and SC
  - Lots of presentations, tutorials, etc.
- **We're not going to let 10 years of EasyBuild pass by unnoticed, stay tuned...**





# easybuild User Survey

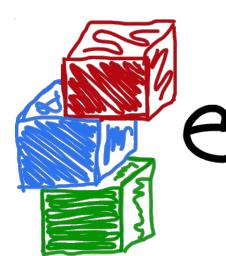
*What is the main aspect of EasyBuild that convinced you to start using it?*



Core functionality of EasyBuild remains biggest reason => **We should focus more on this?**

Supported software is way less convincing (easy to add support, or to use other way of installing).

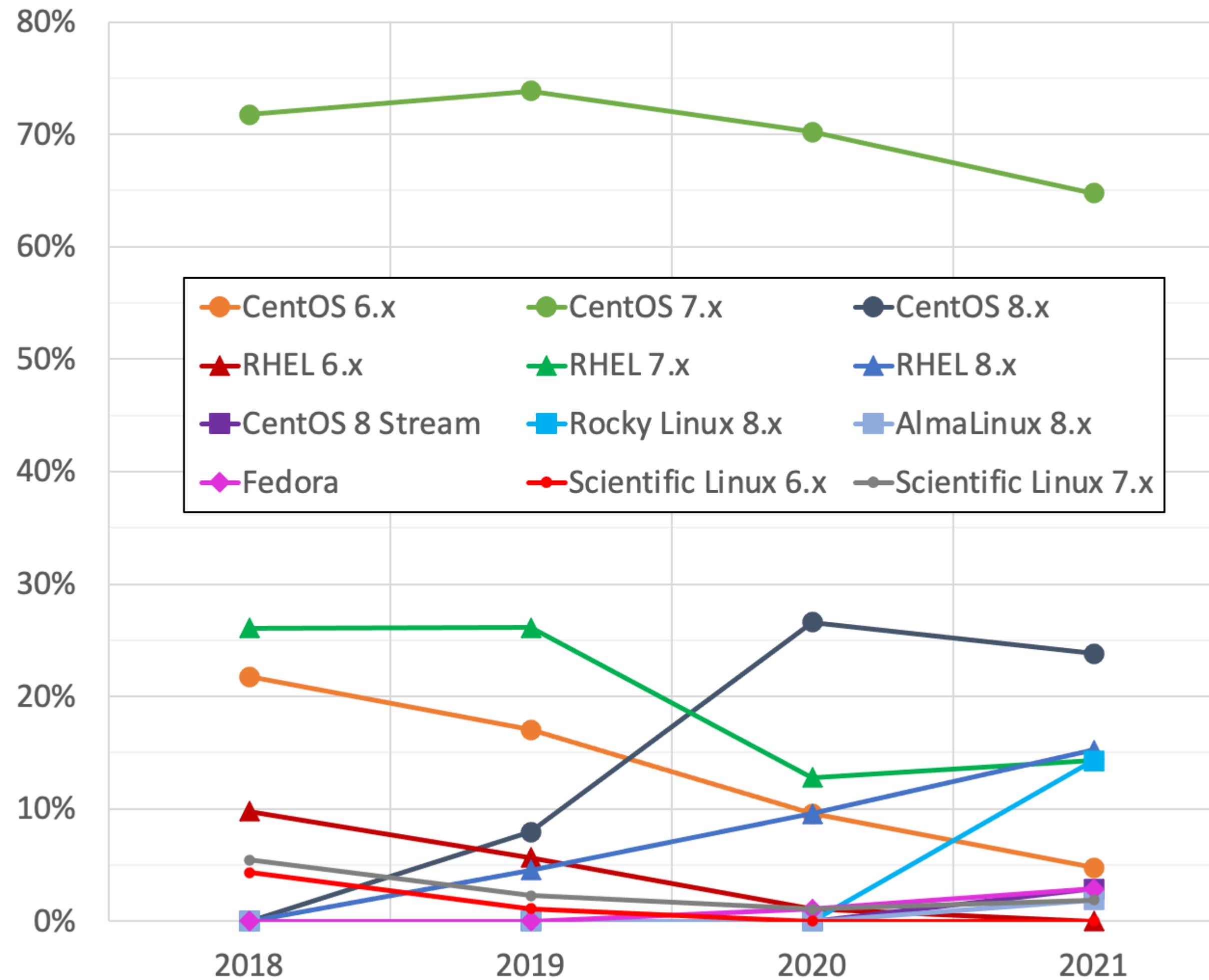
EasyBuild community does not get enough credit (in my view)



# easybuild User Survey



*On which operating system(s) do you use EasyBuild?*



(no OS stats available in 2017 survey results)

- RIP RHEL 6 + SL6 + CentOS 6 (well, almost, still ~5%...)
-  7.x vastly most popular, slowly declining: ~65%
-  CentOS 8.x already in decline (due to earlier EOL)
- RHEL 7 steady (~14%), RHEL 8 climbing (now ~15%)
-  Rocky Linux™ hitting 14% out of the blue!
- Little use of AlmaLinux or CentOS 8 Stream in HPC?

CentOS 6 EOL: Nov 2020

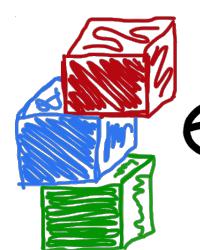
CentOS 7 EOL: June 2024

CentOS 8 EOL: Dec 2021

RHEL 6 EOL: Nov 2020

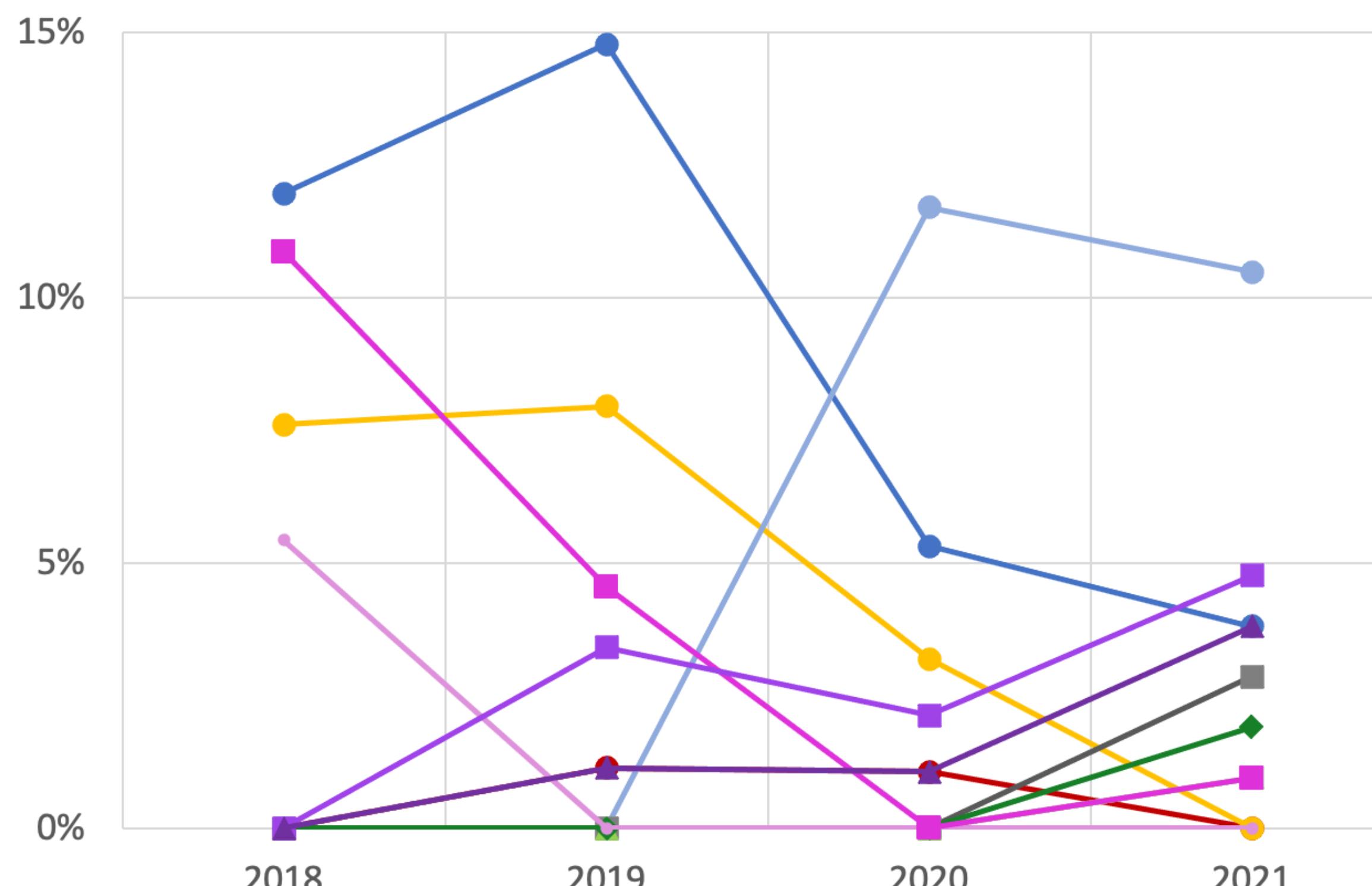
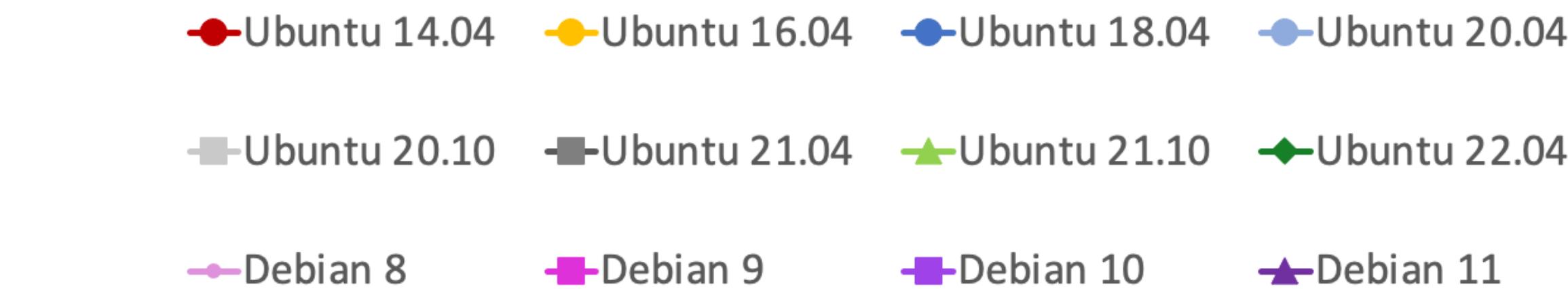
RHEL 7 EOL: June 2024

RHEL 8 EOL: May 2029



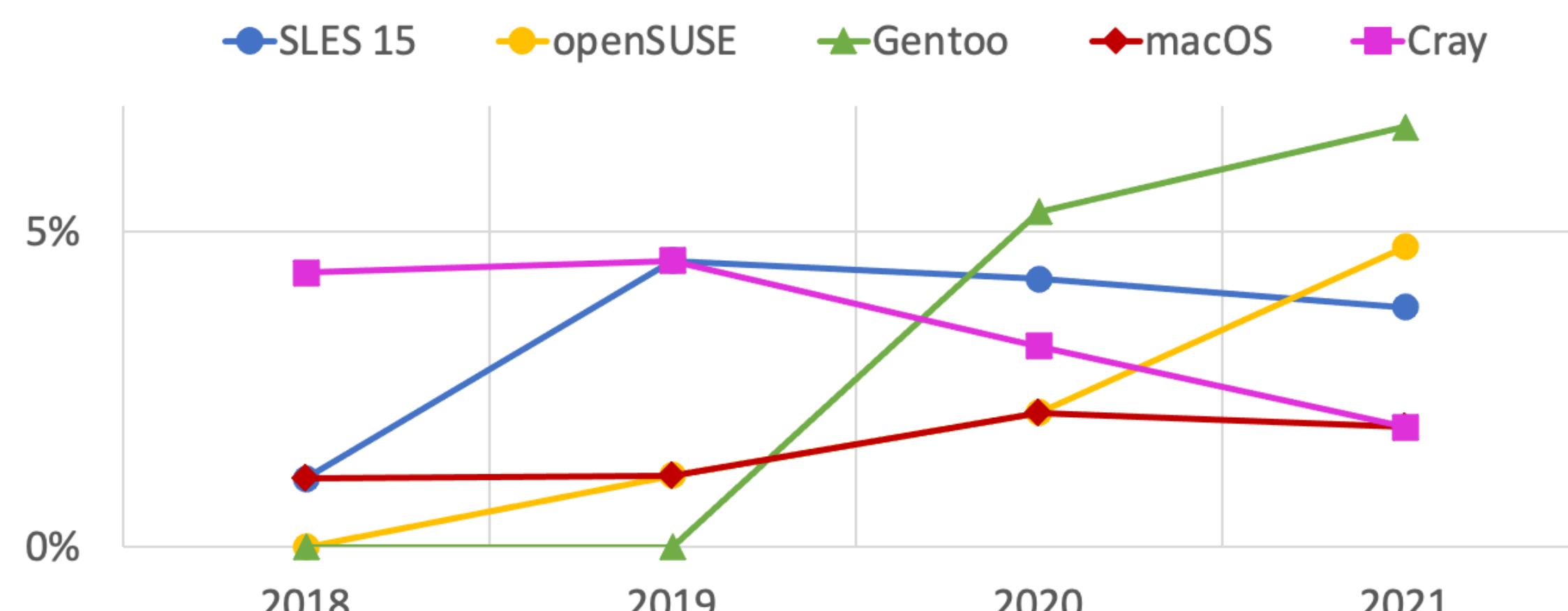
# easybuild User Survey

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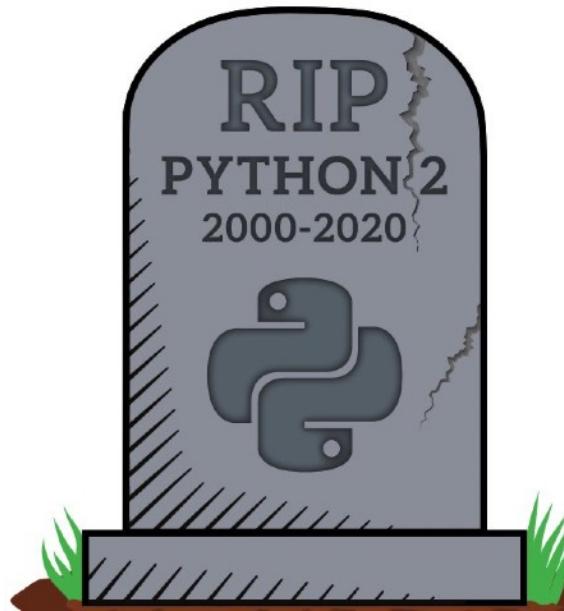
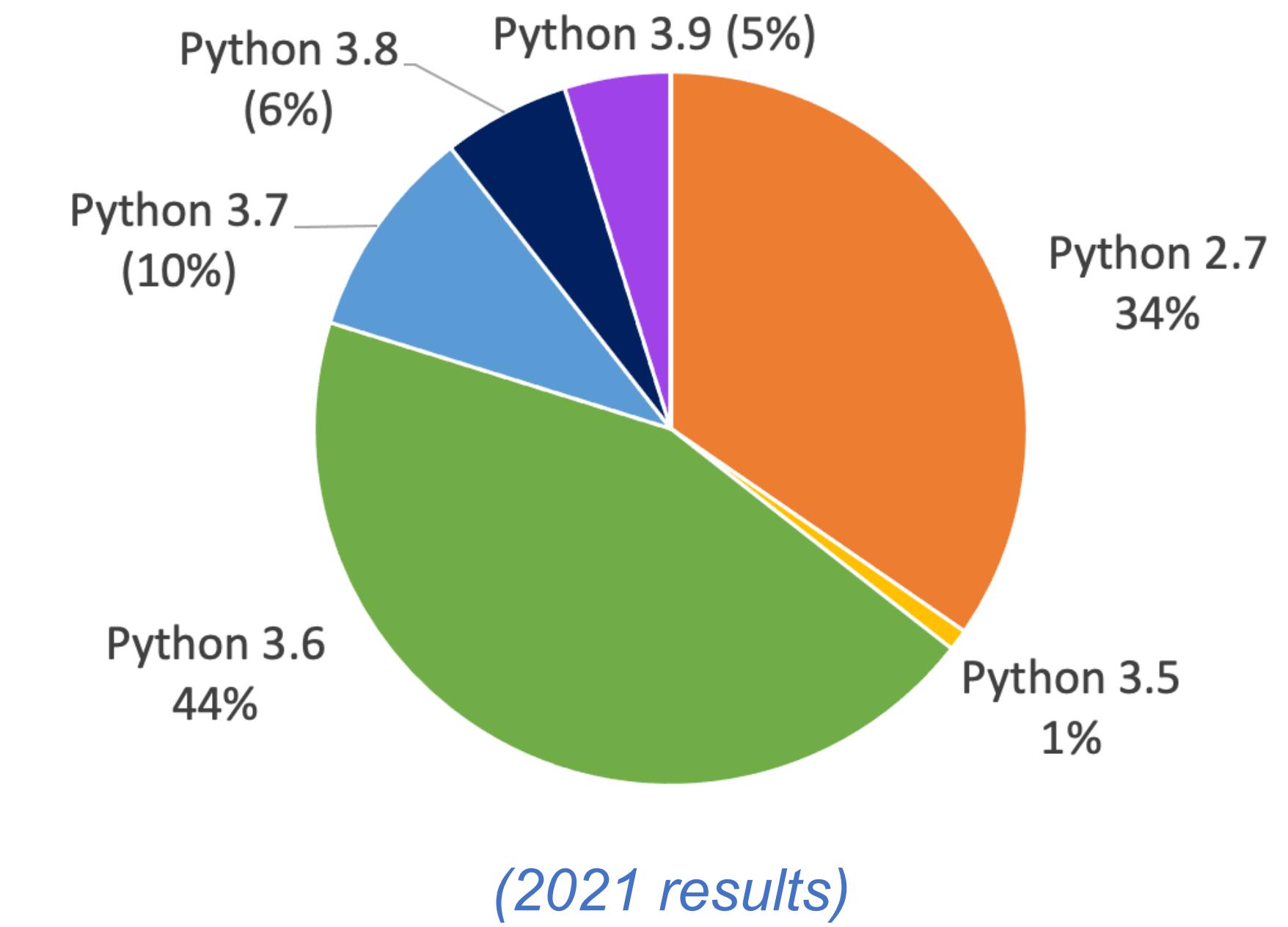
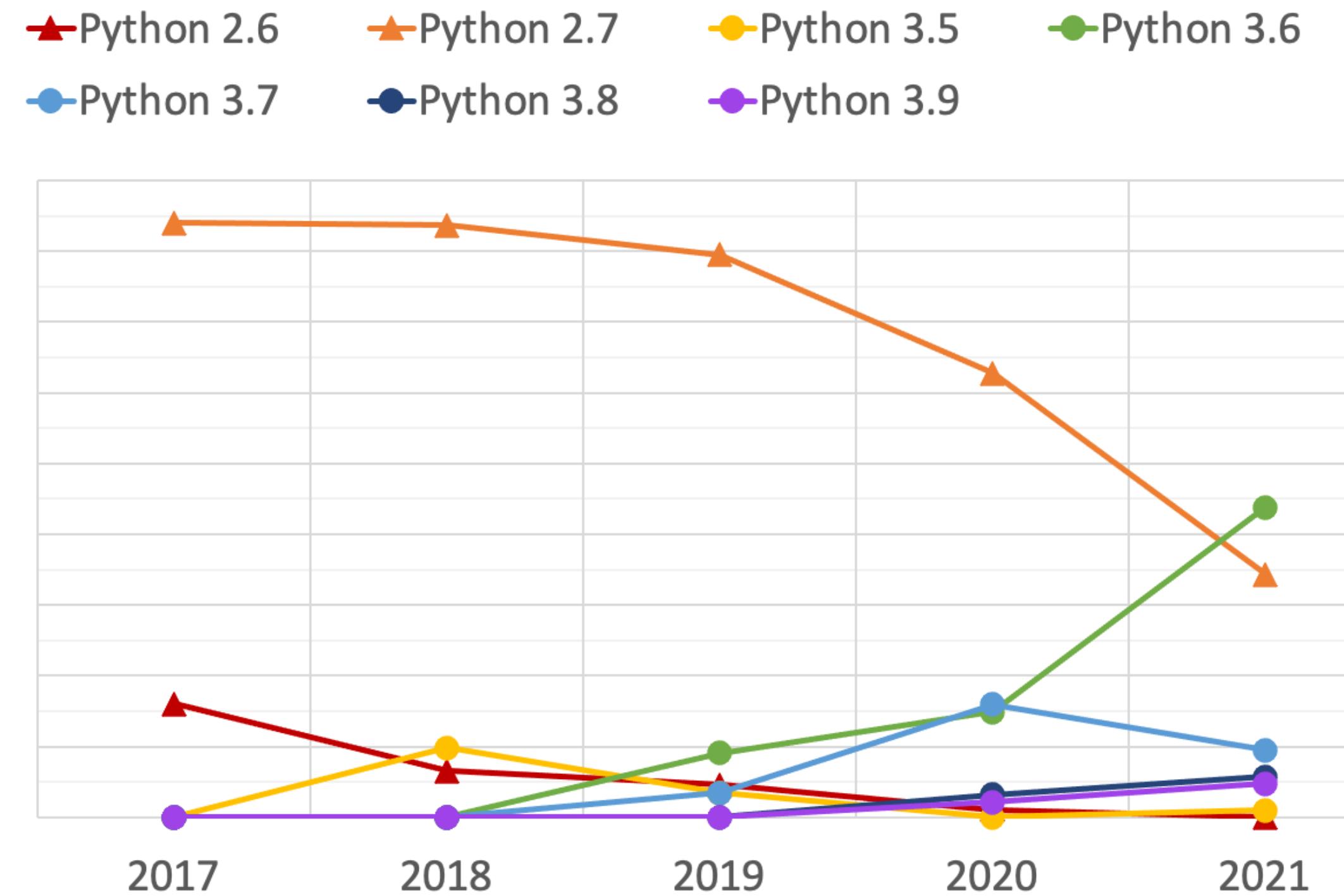


(no OS stats available in 2017 survey results)

- RIP Ubuntu 16.04, sharp decline for Ubuntu 18.04
- Ubuntu 20.04 most popular Debian-based: ~10%
- Shattering for recent Ubuntu versions (but < 5%)
- **Gentoo on the rise** (Compute Canada, EESSI): ~7%
- Cray gradually declining, OpenSUSE on the rise (?!)



## Which Python version do you usually use to run EasyBuild?

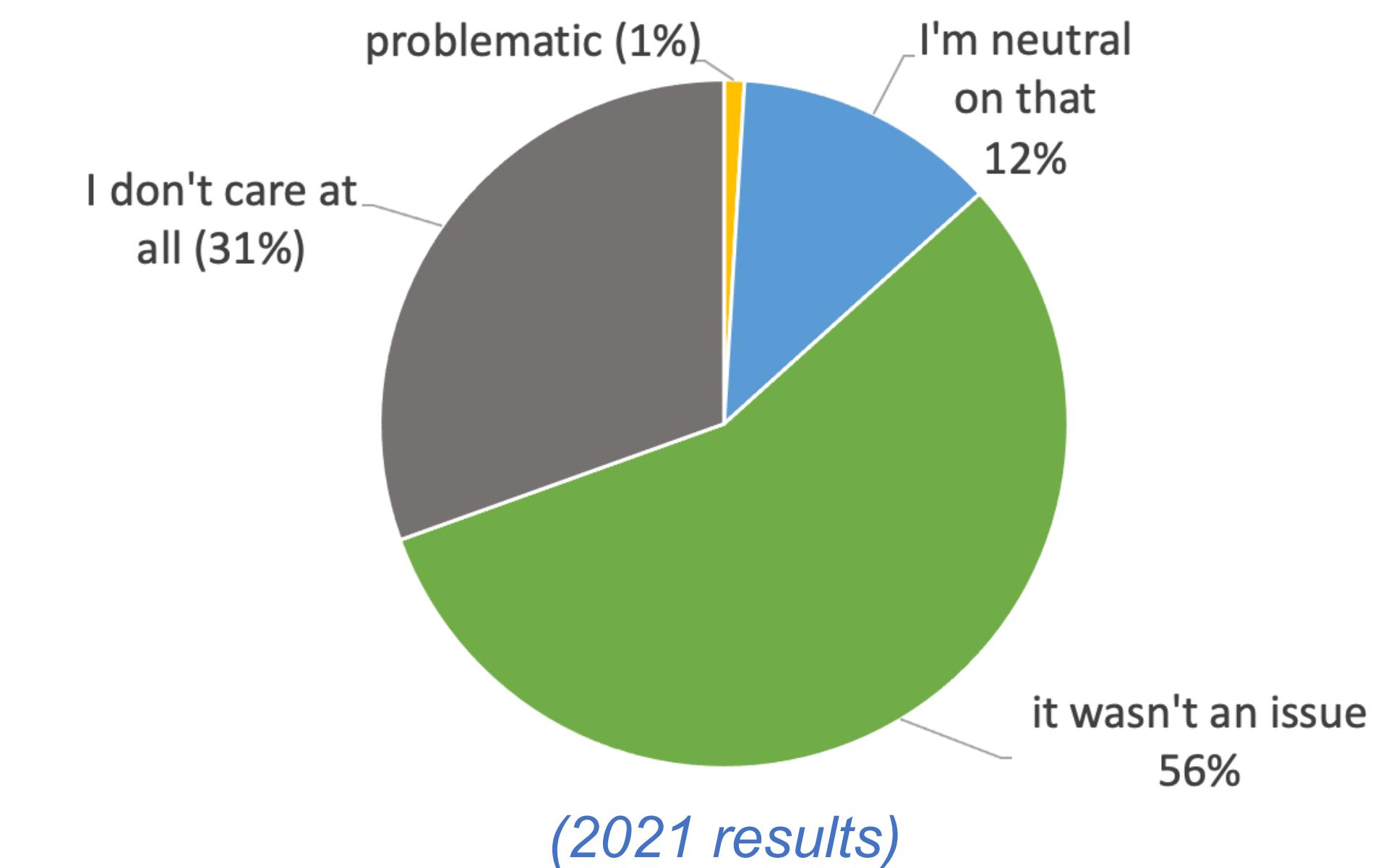
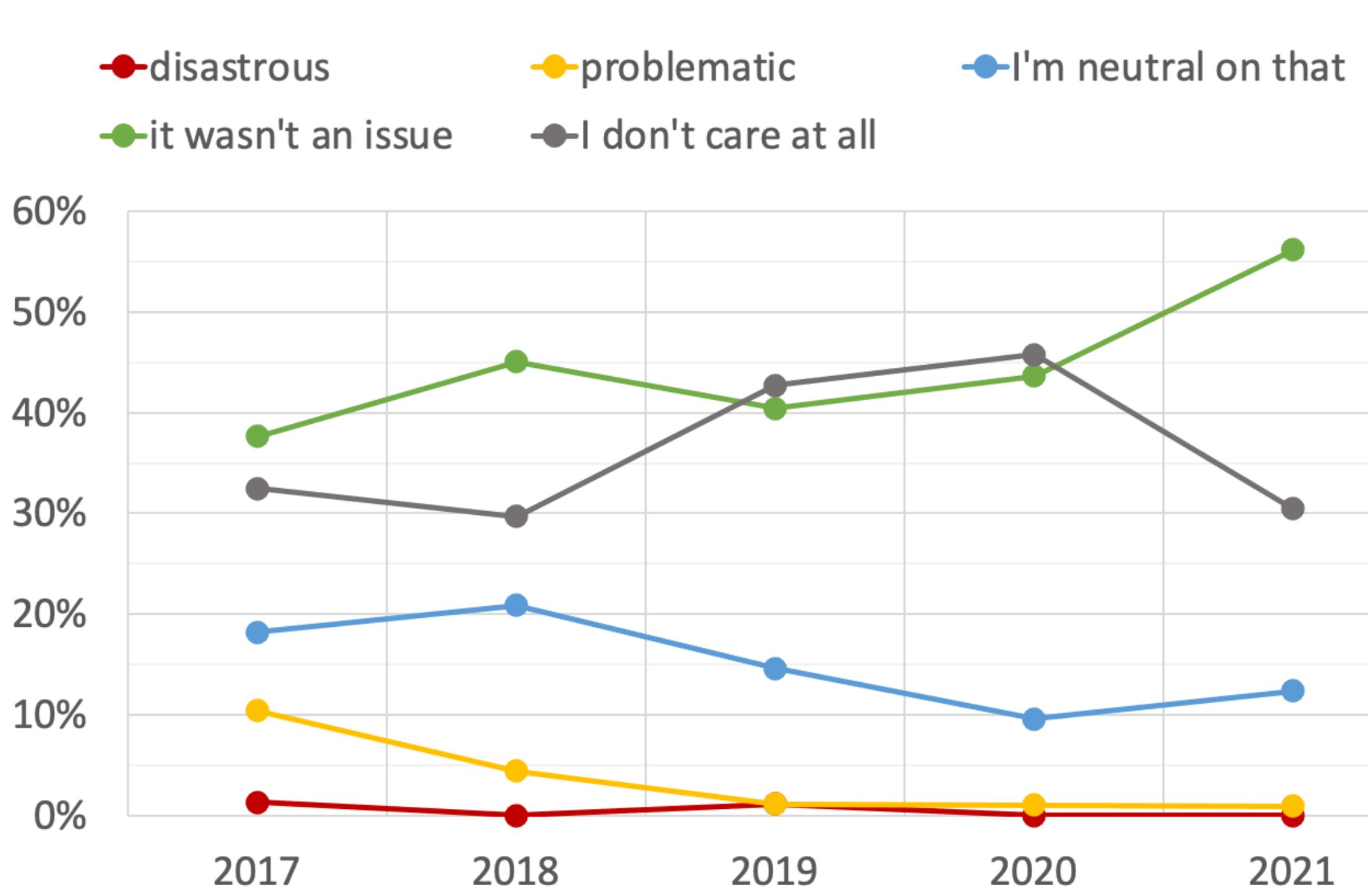


Sharp decline for Python 2.7 (EOL 1 Jan 2020, last release April 2020 😢)

Python 3 now dominant for the first time (2020: Python 2.7 at 64%, now 35%)

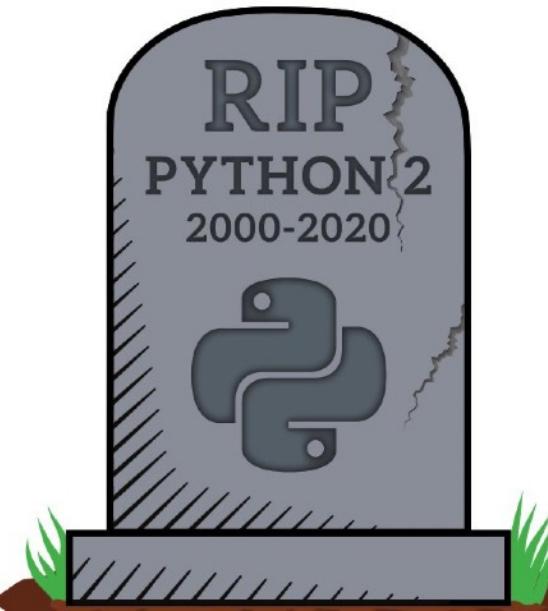
Python 3.6 most popular (but officially already EOL since Dec'21... 😱)

*Support for running EasyBuild on top of Python 2.6 will be removed / was removed.  
How troublesome would that be / was that for you?*

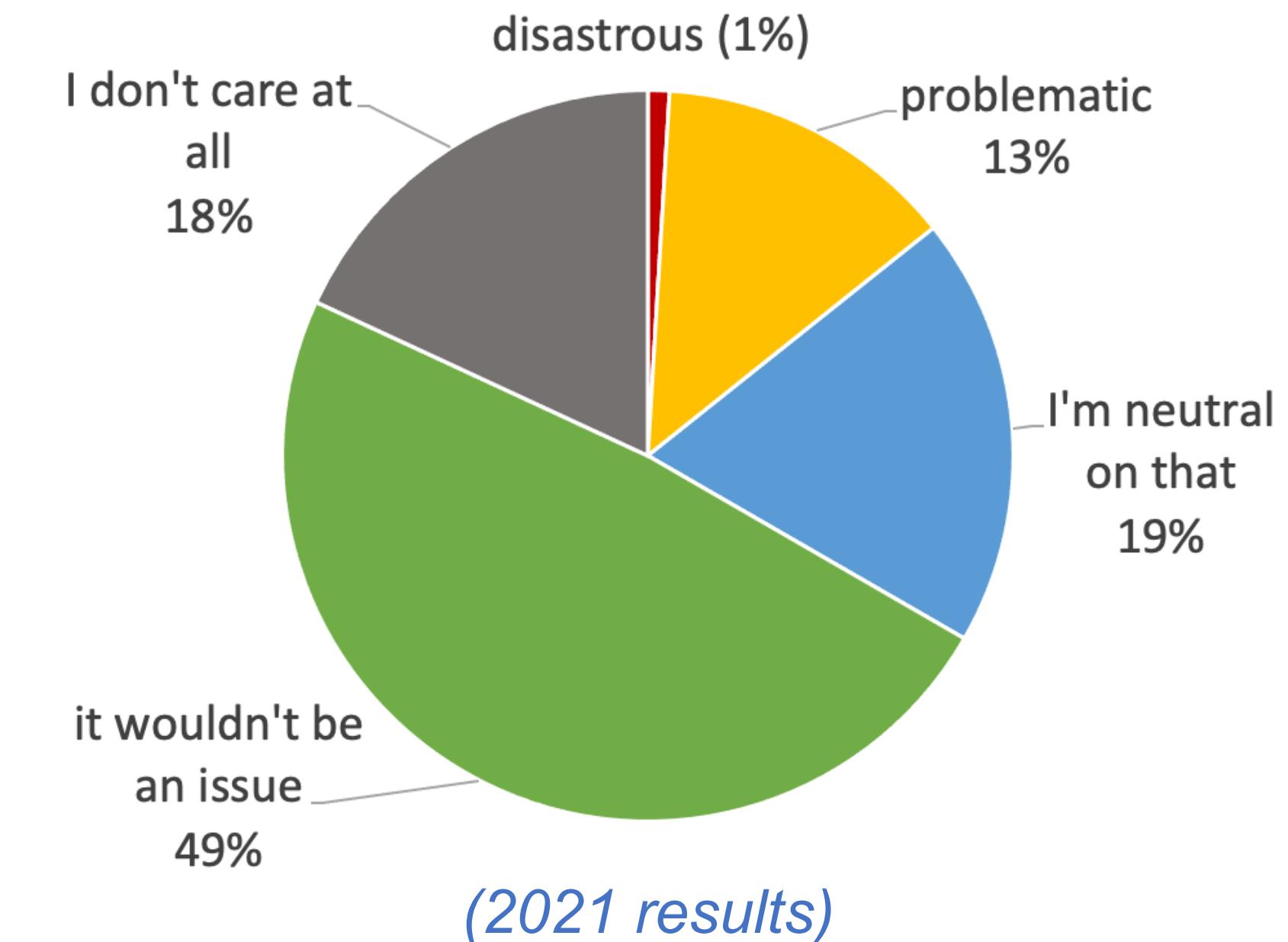
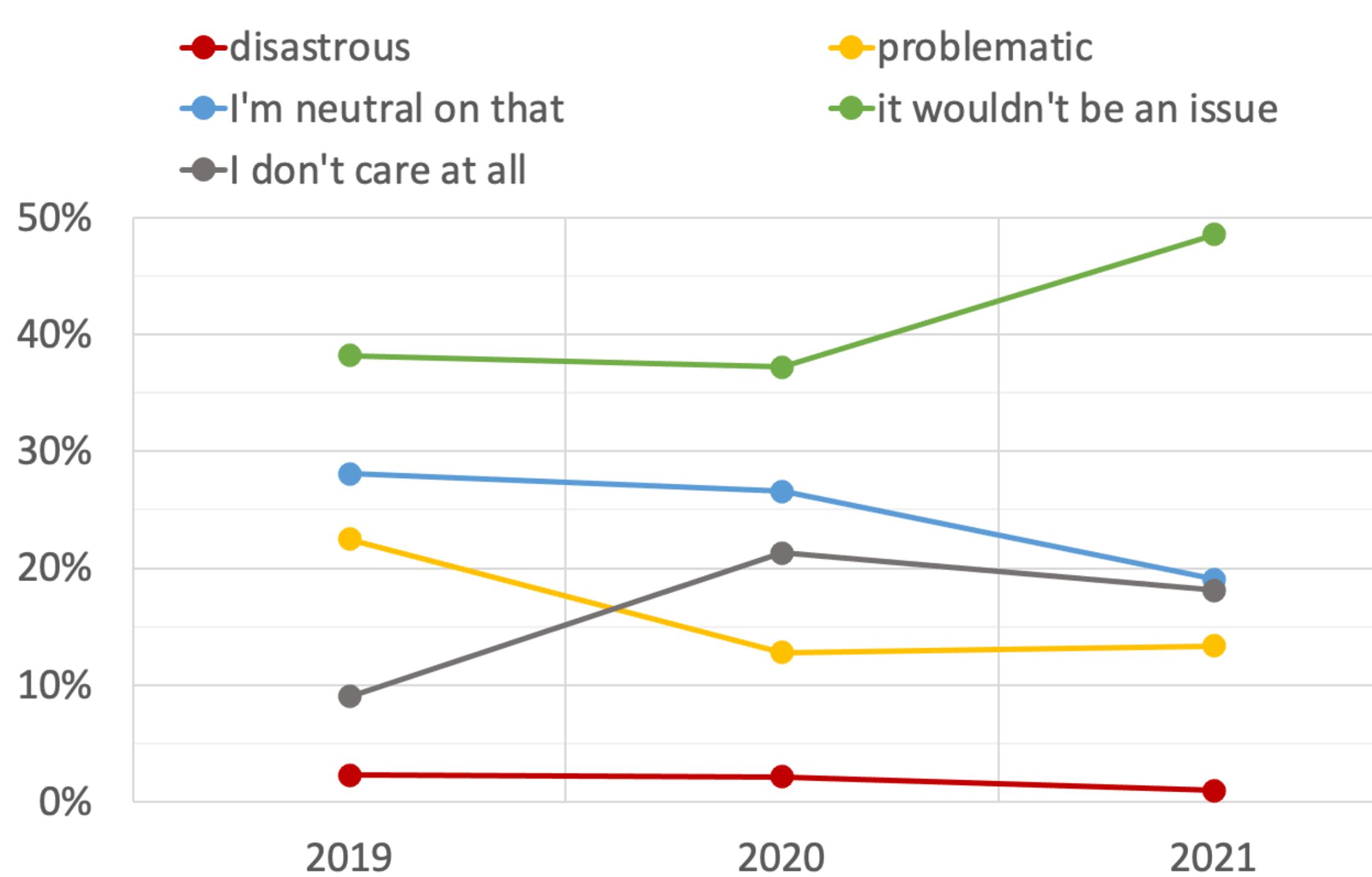


Support for using Python 2.6 was deprecated in EasyBuild v4.1.0 (Dec'19),  
removed in EasyBuild v4.4.0 (June 2021).

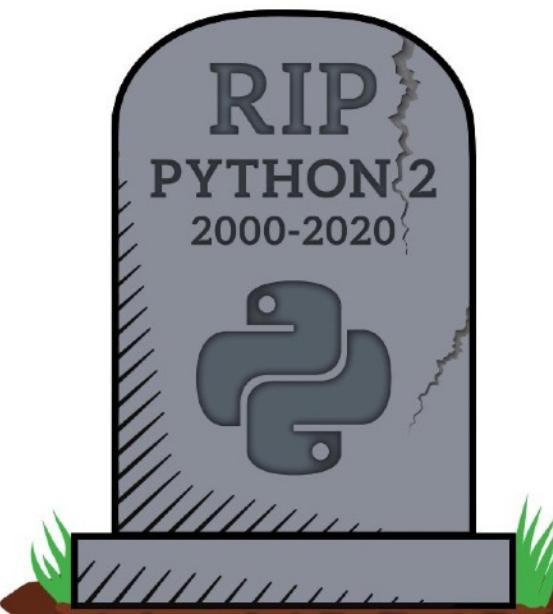
Impact on EasyBuild community seems to have been minimal to non-existent...



## *How troublesome would it be for you if EasyBuild becomes incompatible with Python 2.7?*



EasyBuild community is more and more open to dropping Python 2.7 support,  
only ~15% still finds that problematic or disastrous (but would it be really?).



**Time to deprecate support for Python 2.7?**



# Using Python 3 to run EasyBuild

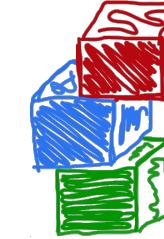
<https://docs.easybuild.io/en/latest/Python-2-3-compatibility.html>

- eb script determines which python command will be used to run EasyBuild
- By default considers python, python3, python2 (in that order)
- You can specify which command should be used via \$EB PYTHON:

```
export EB PYTHON=python3.6
```

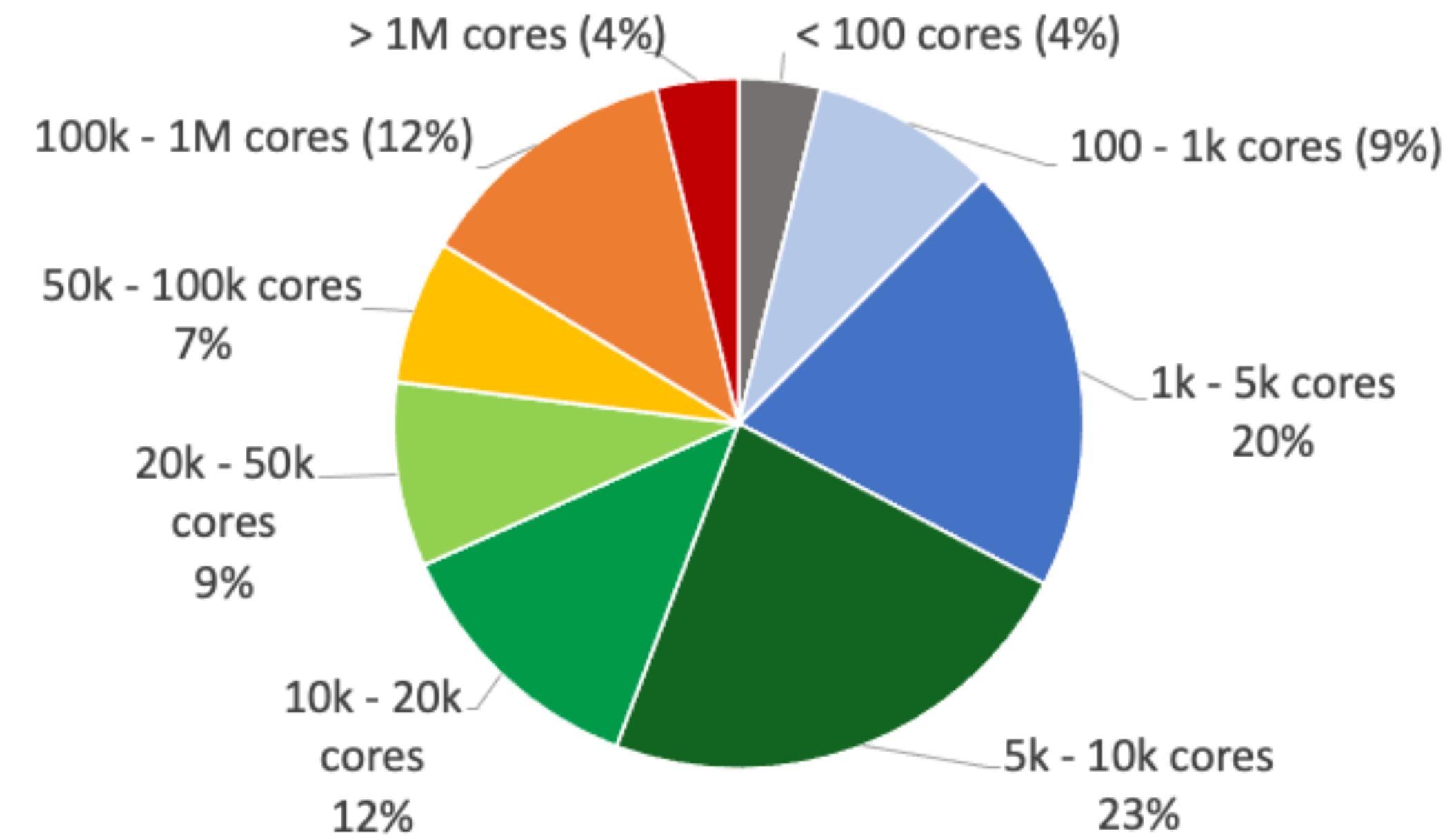
```
eb --show-system-info
```

- Use this to opt-in to using Python 3 to run EasyBuild if python is Python 2 !
- Use "EB VERBOSE=1 eb ..." to get report on what was considered...

 easybuild User Survey

new survey question!

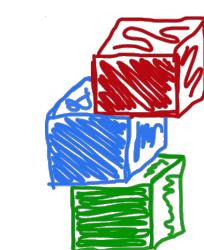
*What's the aggregate core count for the HPC systems you manage, support, or use?*



EasyBuild is used on both (very) small to (very) big systems...

Nice spread across systems of different sizes.

~55% in range of 1,000-20,000 cores

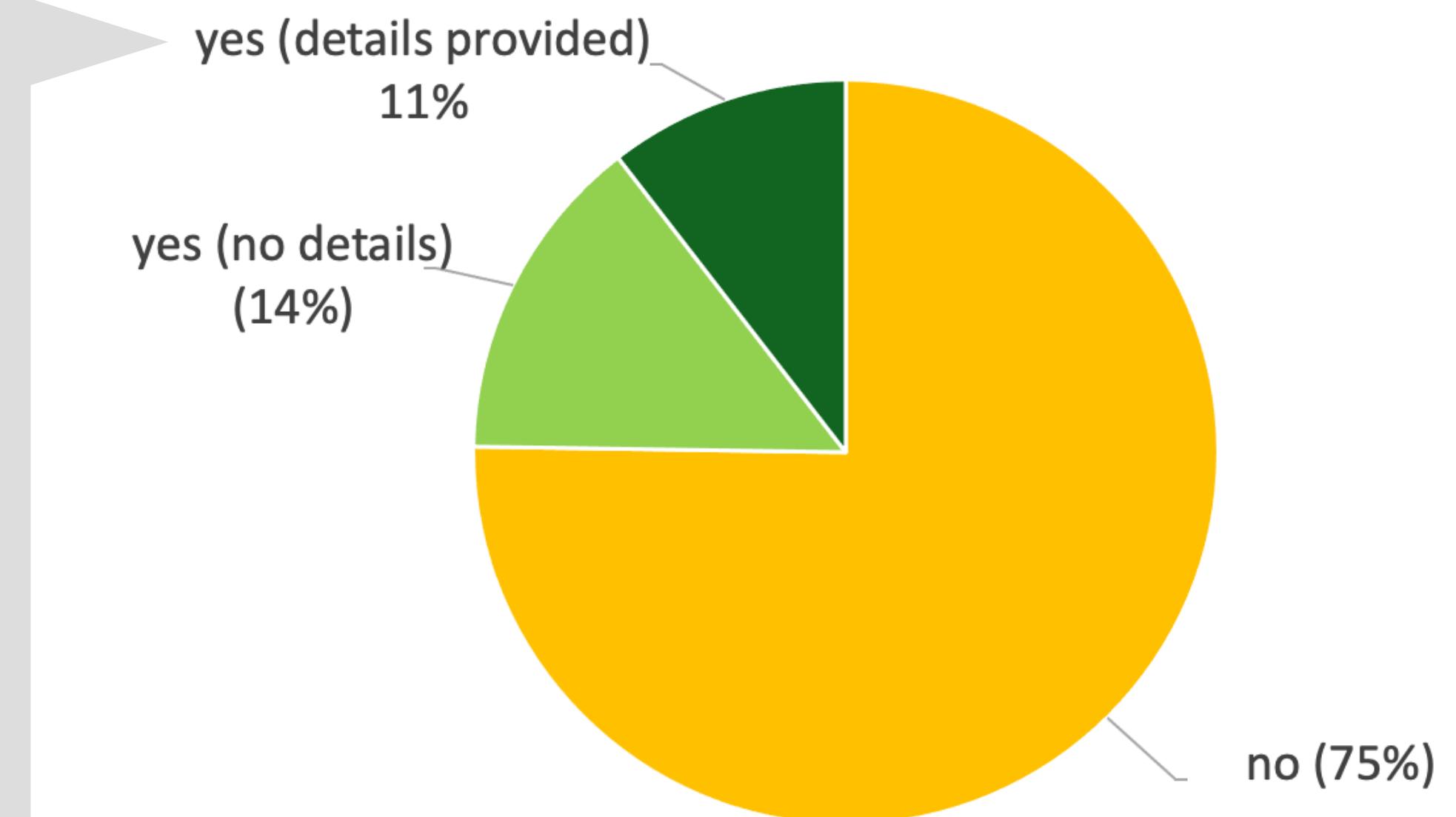


# easybuild User Survey

new survey question!

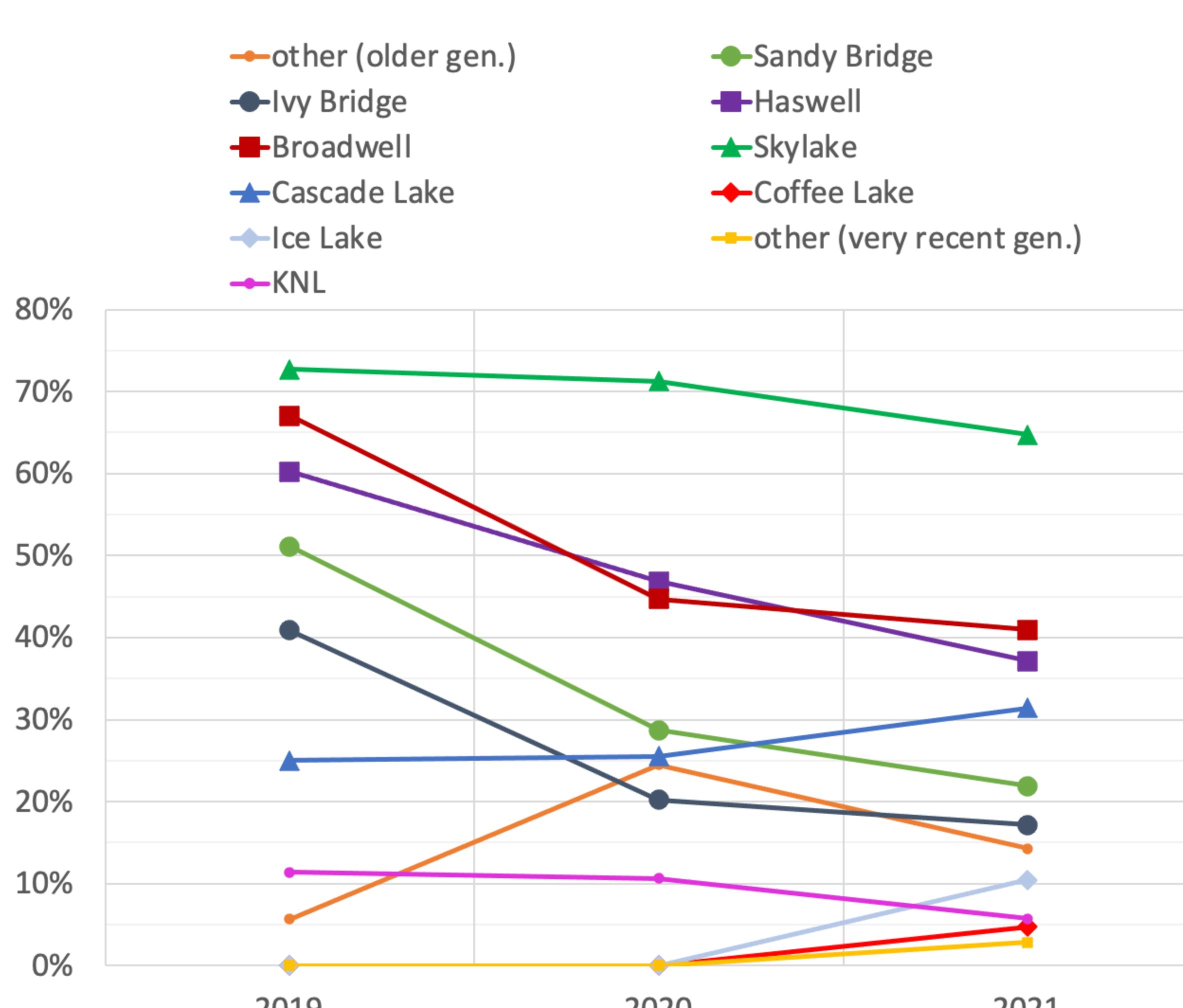
*Are you using EasyBuild on a system that's in the current Top500 list (Nov'21)?*

- #8 **JUWELS Booster Module** @ JSC
- #18 **Marconi-100** @ CINECA
- #20 **Piz Daint** @ CSCS
- #52 **JURECA** @ JSC
- #76 **LUMI-C** (LUMI CPU partition)
- #77 **JUWELS Module 1** @ JSC
- #83 **Narval** @ Compute Canada
- #88 **Cobra** @ Max Planck
- #91 **Raven** @ Max Planck
- #127 **Niagara** @ Compute Canada
- #137 **Cedar (GPU)** @ Compute Canada
- #210 **Grace** @ Texas A&M
- #220 **Cedar (CPU)** @ Compute Canada
- #288 **Béluga** @ Compute Canada
- #313 **Snellius Phase 1 CPU** @ SURF
- #401 **Snellius Phase 1 GPU** @ SURF
- ex-Top500:
  - **Marconi** @ CINECA



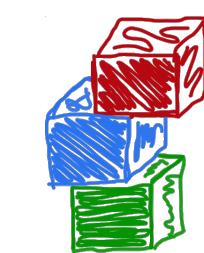
25% of survey participants is using EasyBuild on a Top500 system  
(mix of end users and user support teams/sysadmins for named systems)

## *For which processor families are you installing software using EasyBuild? (Intel)*



- Skylake still (vastly) most popular at ~65%, declining...
- Also (slowly) declining: Haswell / Broadwell (~40%)
- Ivy Bridge, Sandy Bridge (**still** at ~20%)
- On the rise (slowly): Cascade Lake (31%), Ice Lake (10%), Coffee Lake (5%) (+ more recent: 3%)
- Still a significant portion older than Sandy Bridge (~15%)...

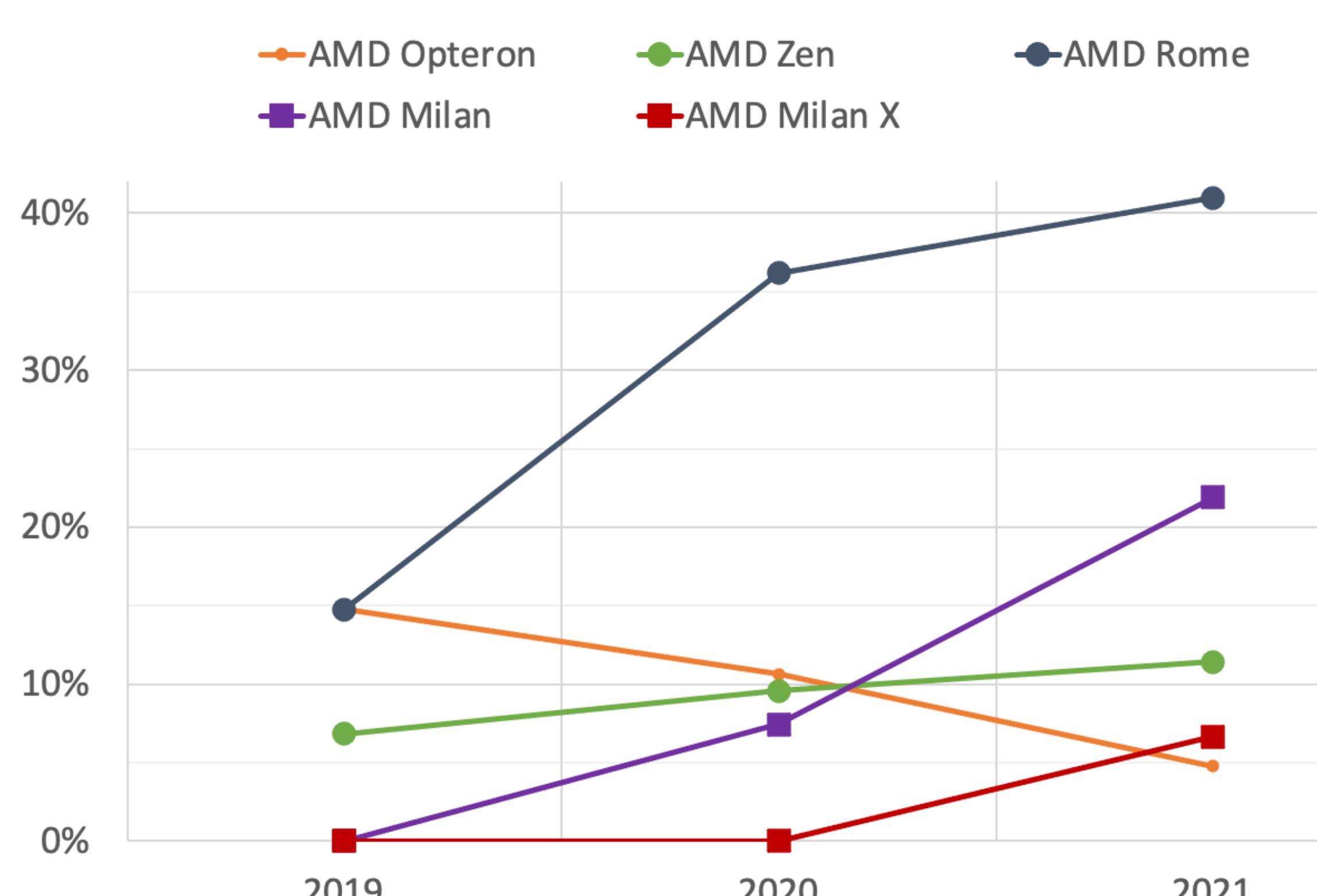
(no CPU stats available in 2018 or earlier survey results)



# easybuild User Survey

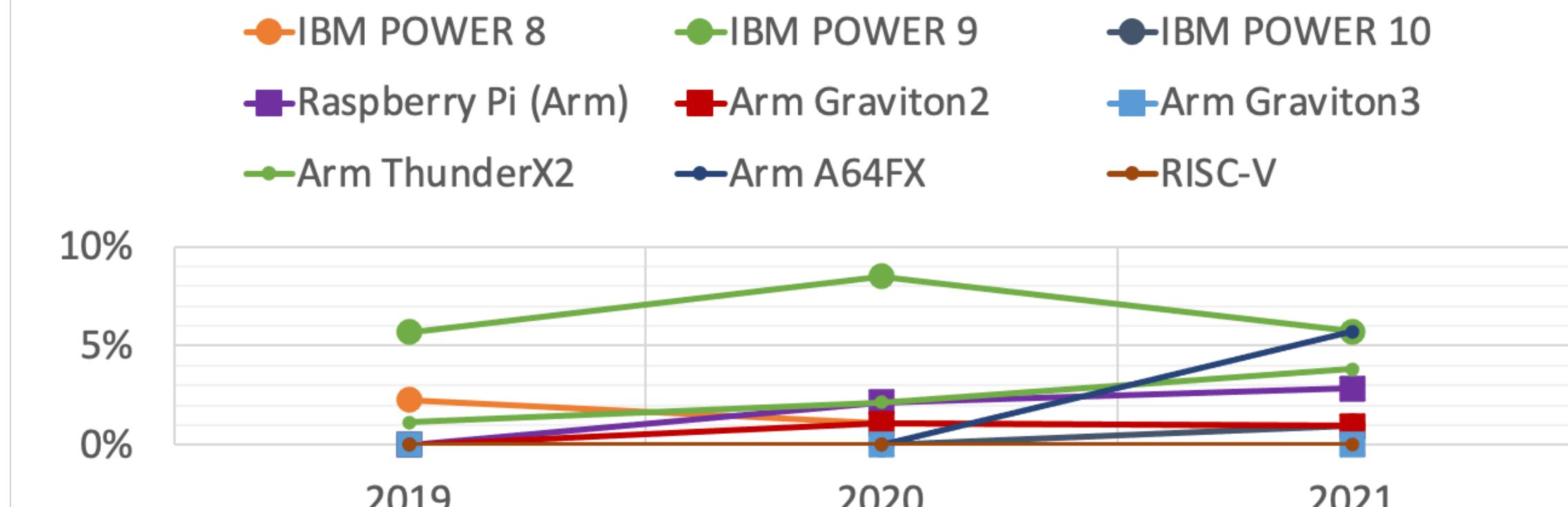
*For which processor families are you installing software using EasyBuild? (non-Intel)*

- AMD Rome (Zen2) quickly becoming popular at 41%, only beaten by Intel Skylake



- AMD Milan + Milan X (Zen3) quickly rising too

- IBM POWER 9 is still around, diving back towards 5%
- A64FX (like in Fujitsu) most popular Arm CPU at 6%, followed by ThunderX2 and Raspberry Pi
- No RISC-V (yet)



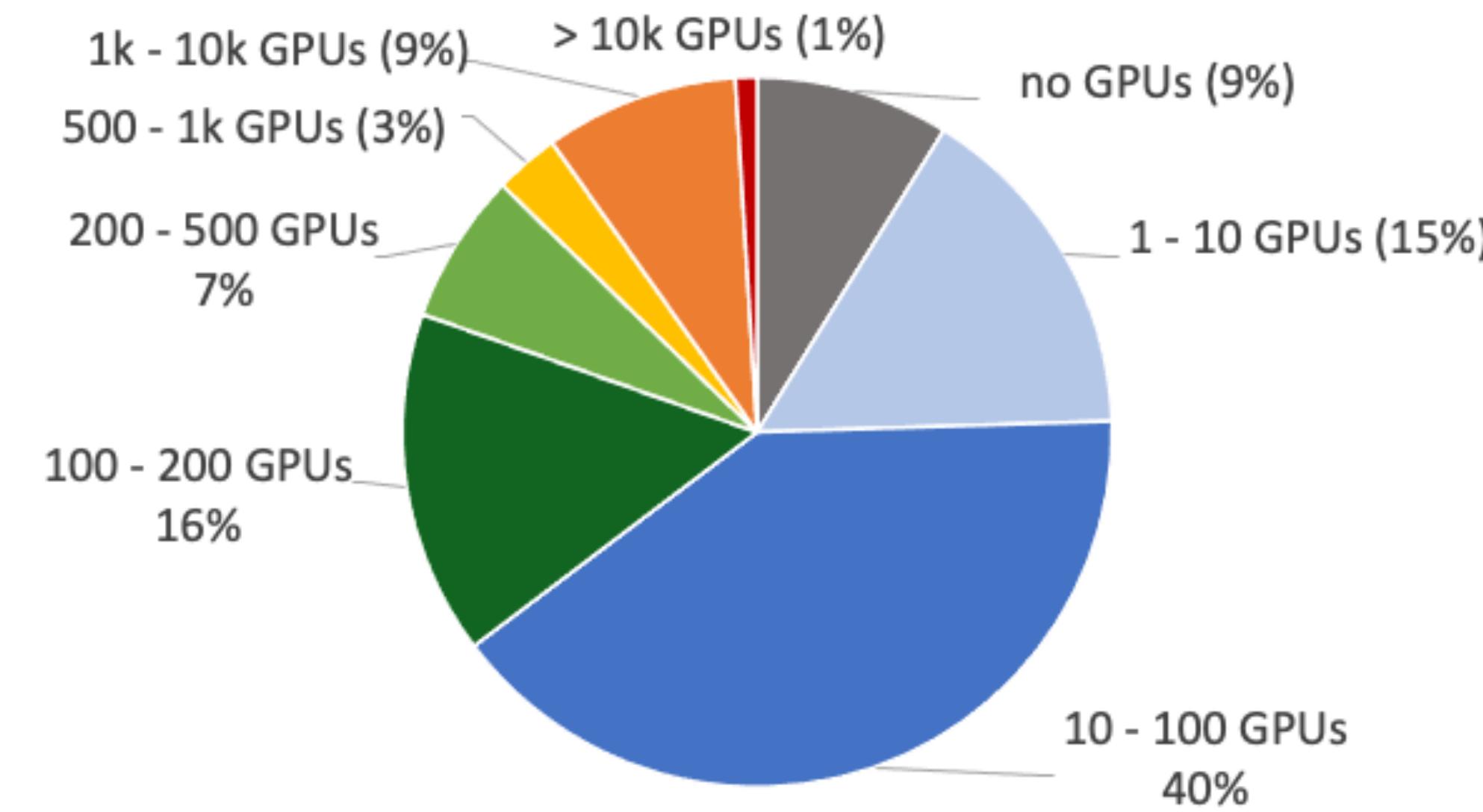
(no CPU stats available in 2018 or earlier survey results)



# easybuild User Survey

new survey question!

*What's the aggregate GPU count for the HPC systems you manage, support, or use?*



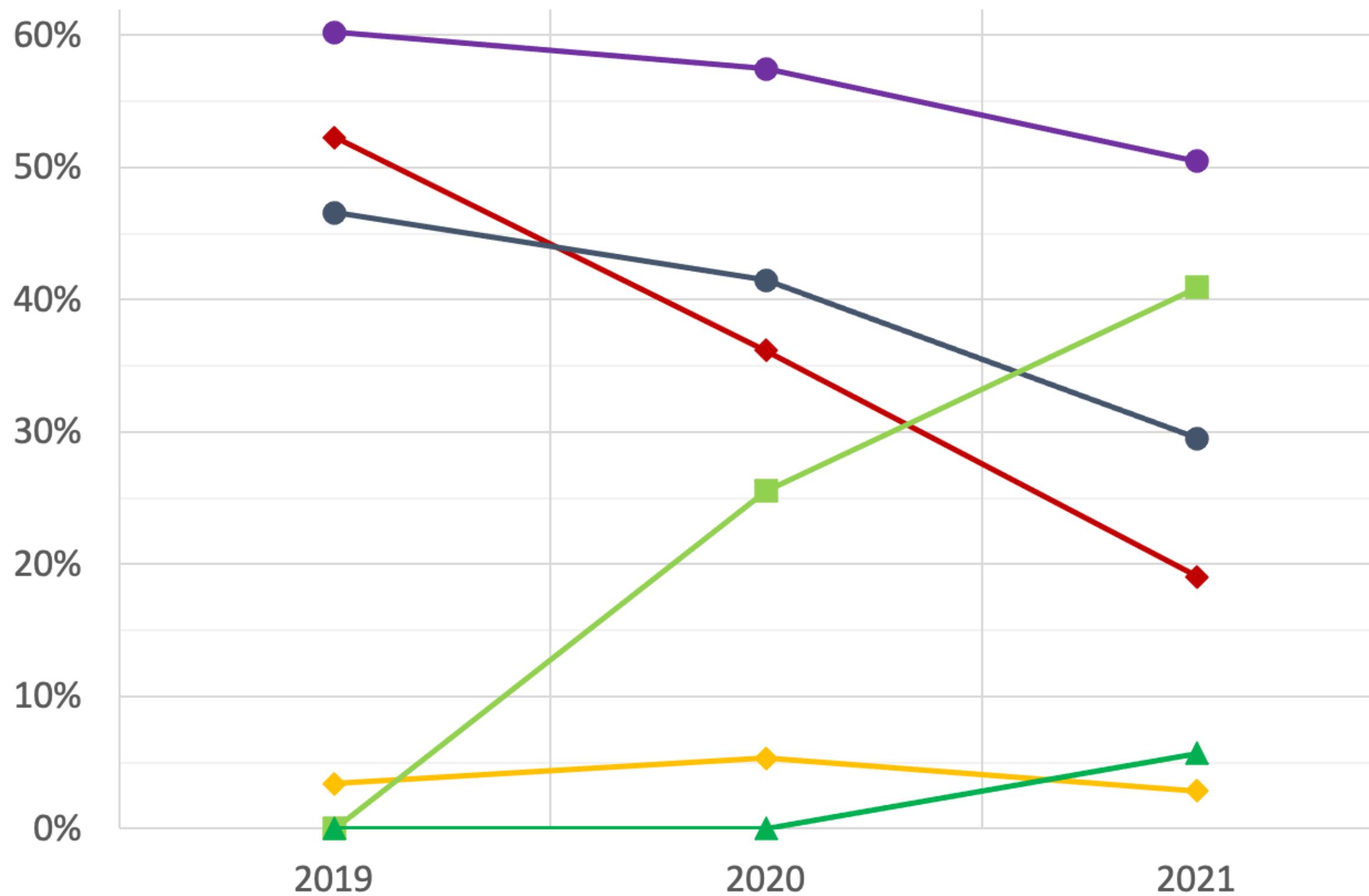
91% has at least some GPUs (that was likely very different a couple of years ago...)

Most sites have a relatively modest amount of GPUs (~56% in 10 - 200 range)

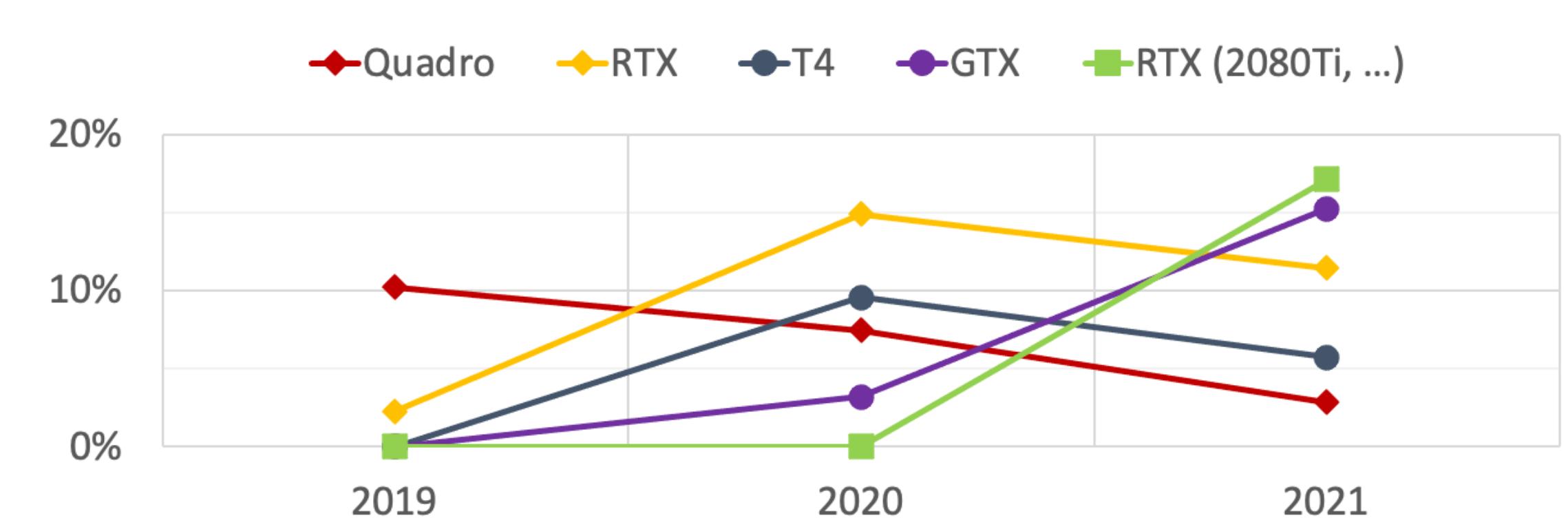
Handful of sites take it to the extreme (~10% has over 1,000 GPUs!)

## *For which accelerators are you installing software using EasyBuild?*

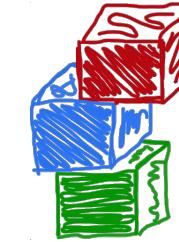
◆ Kepler  
● Pascal  
■ Ampere (A30, A100)  
◆ Maxwell  
● Volta  
▲ Ampere (A10, A16, A40)



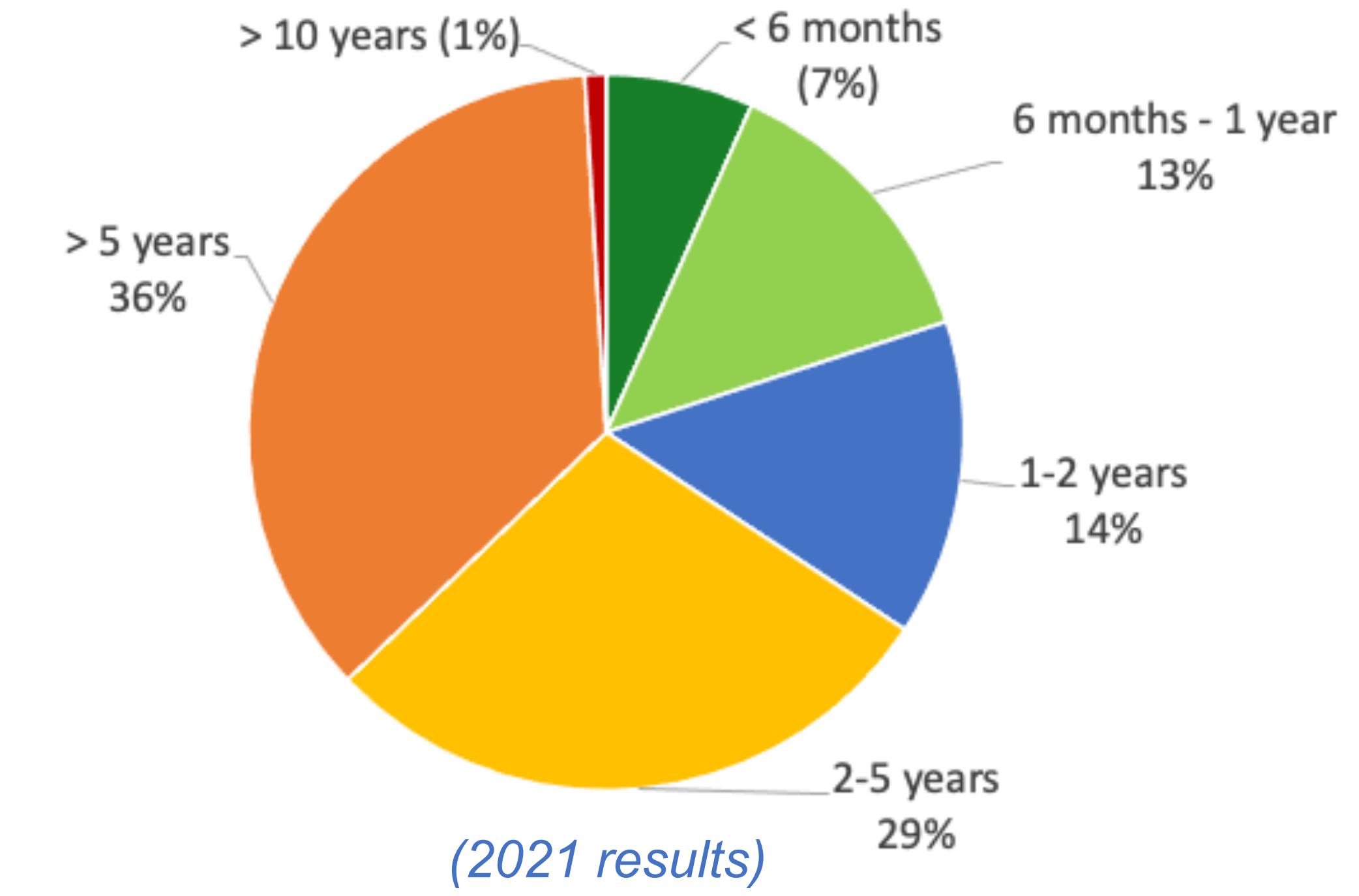
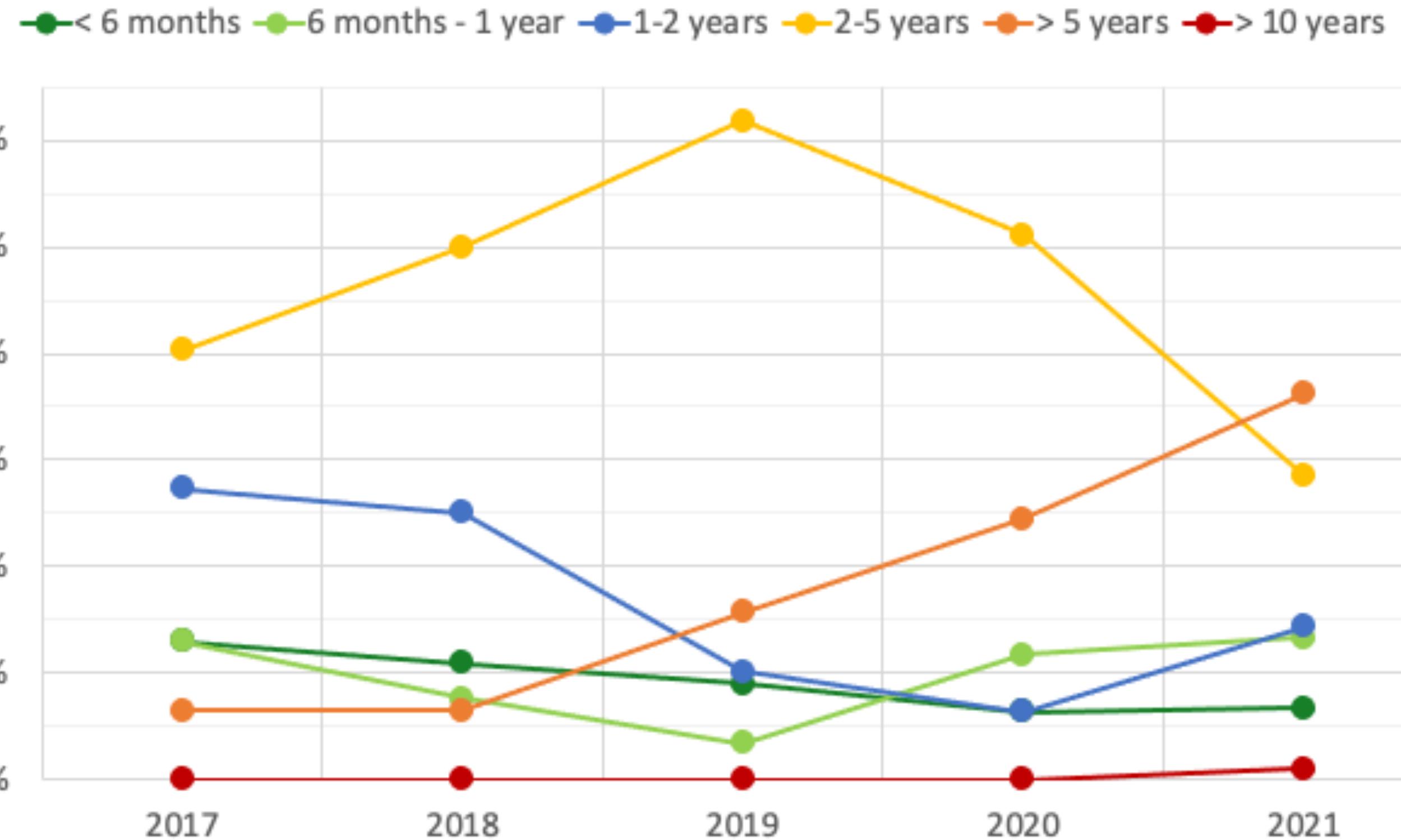
- Volta (V100) still most popular at ~50%
- Ampere (A100, A30) quickly rising, now at ~41%
- Kepler (~19%), Pascal (~30%) being phased out?
- RTX family and other Ampere GPUs also gaining interest
- AMD and Intel GPUs all (well) below 5% (not shown in graphs)



(no CPU stats available in 2018 or earlier survey results)

 easybuild User Survey

*How long have you been using EasyBuild?*



Significant influx of new people in 2021: ~20% of current community!

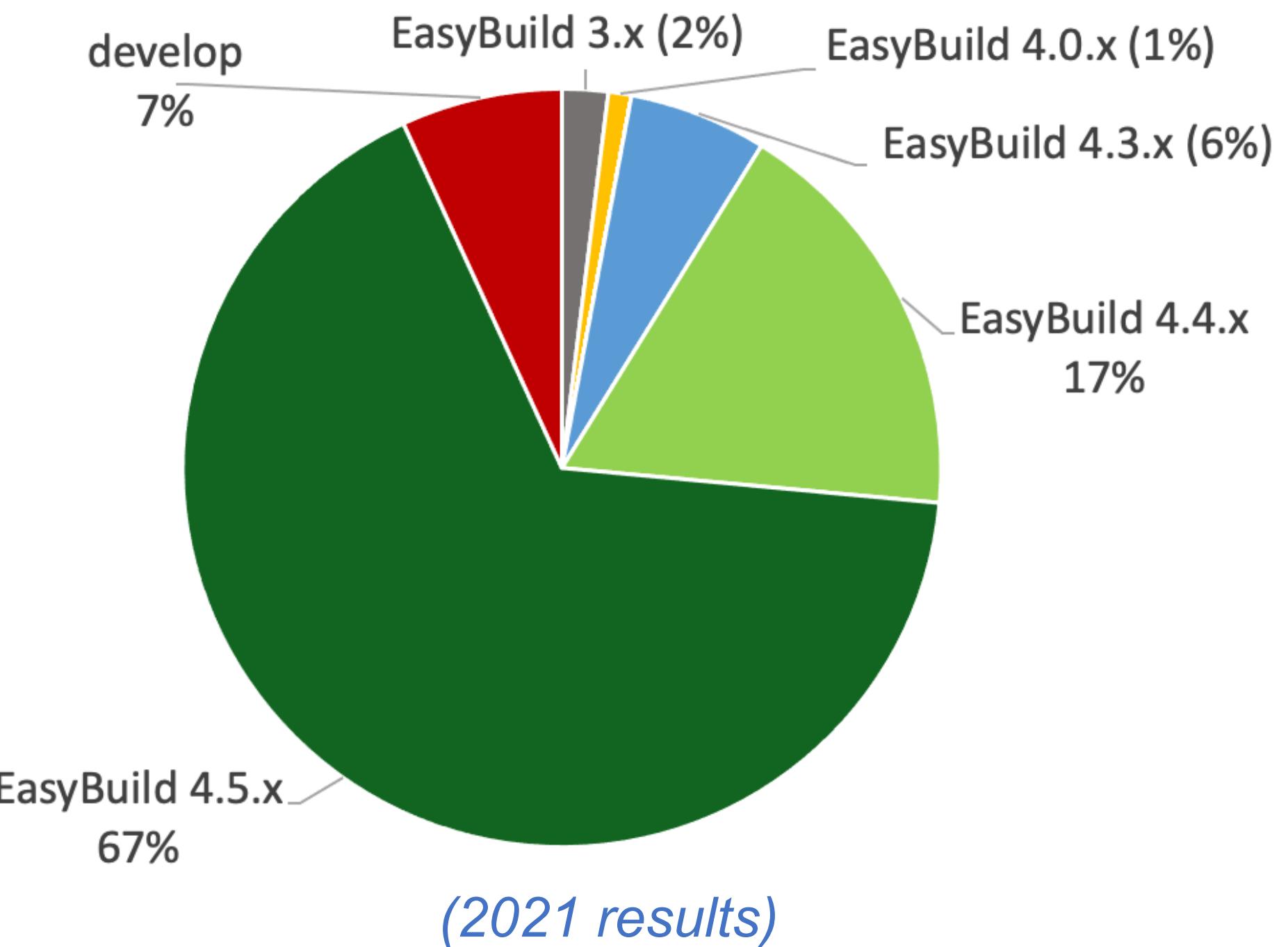
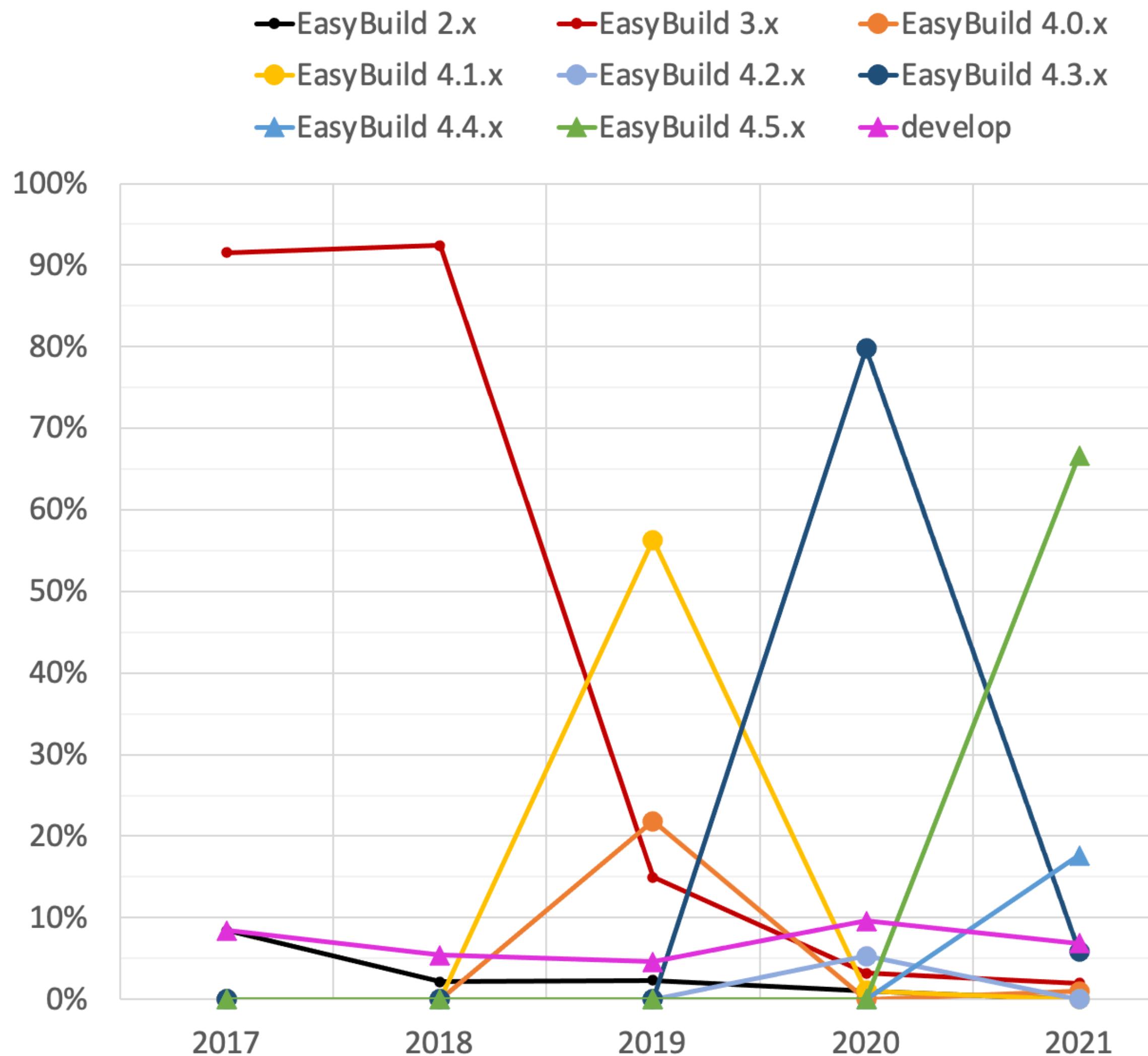
Decreasing ratio of "experienced" users (> 2 years): ~75% in 2020 to ~65% in 2021.

Steep increase of people with > 5 years of experience: people are happy with EasyBuild and stick to it?



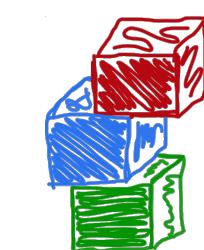
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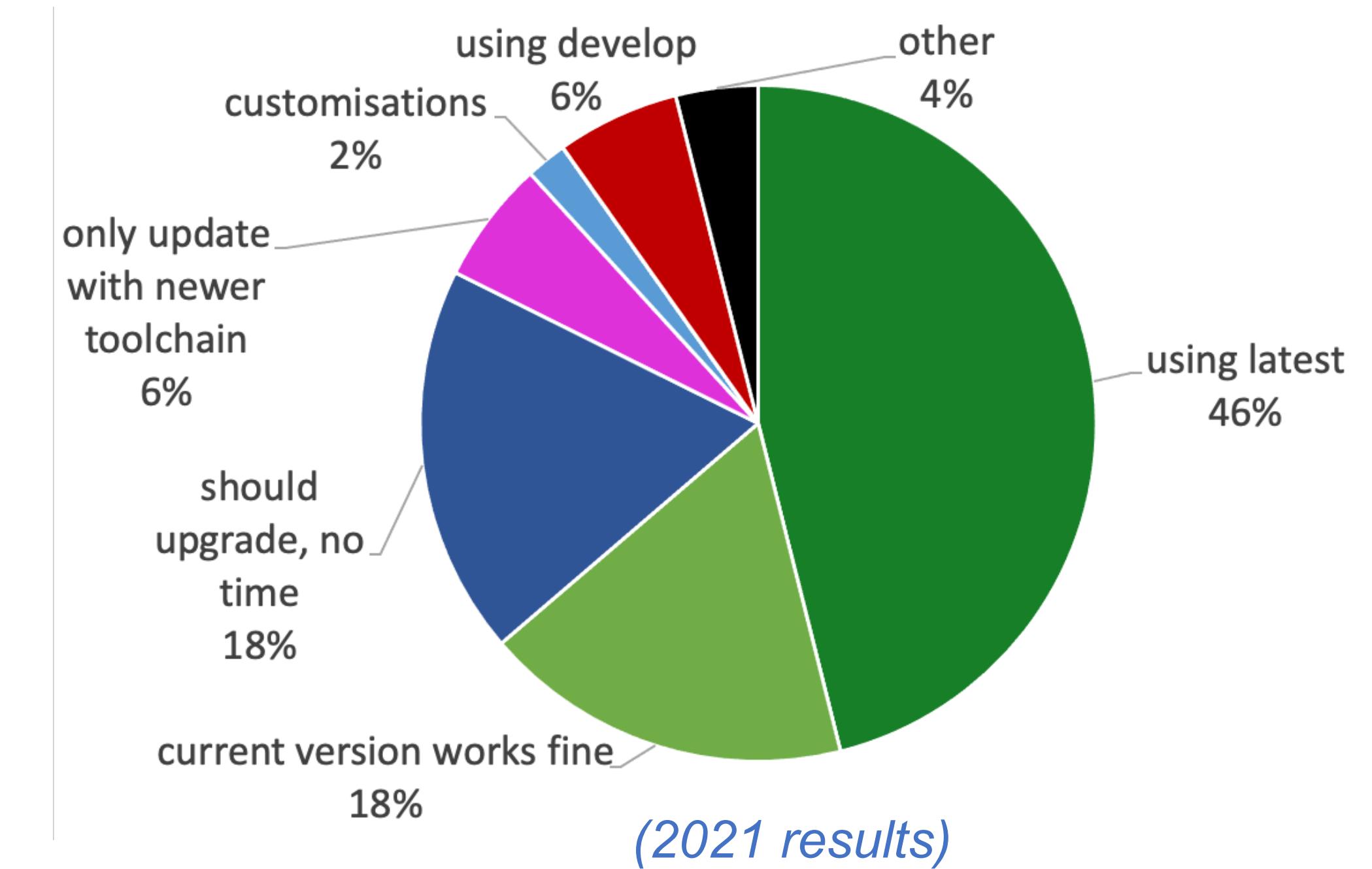
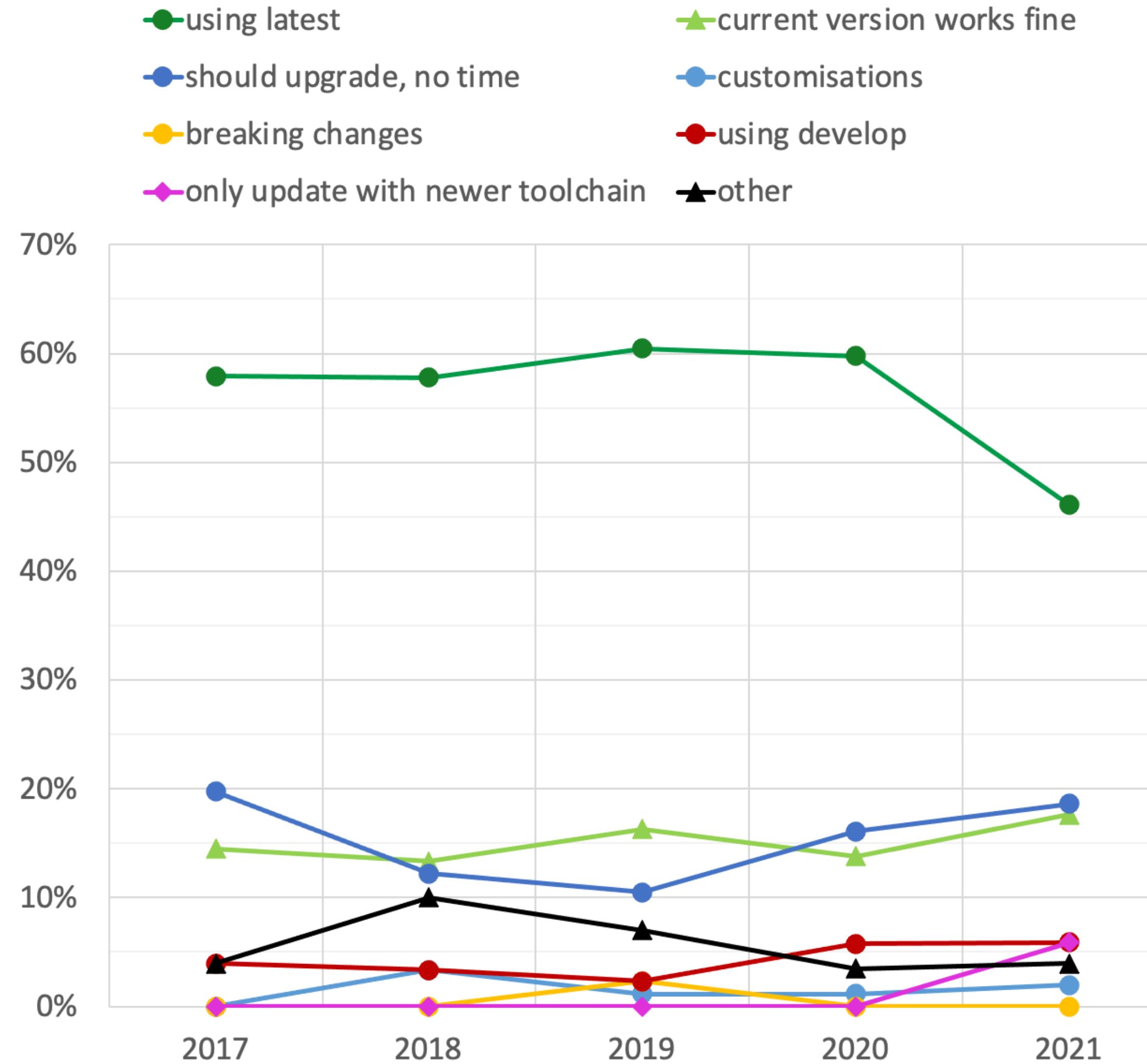
Community tends to mostly keep up with releases

Small minority using develop branch (<10%)



# easybuild User Survey

*If you're not using the latest release, why not?*



Vast (but shrinking) majority uses latest version

Different reasons for not updating (yet): works fine, no time

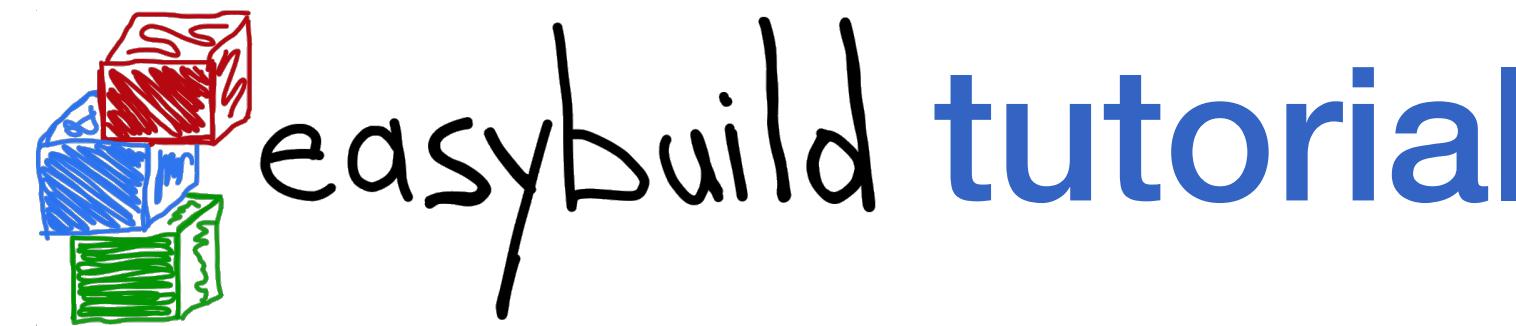
"Only update with newer toolchain" is new for 2021 survey

# Highlights of 2021



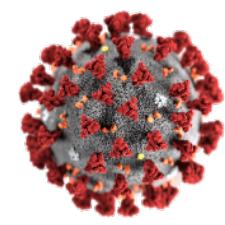
- Persistent growth of EasyBuild community: more users, contributions, contributors, ...
- Continued growth in contributions (and managing to keep up with them, sort of...)
- Over 2,500 different supported software packages (excl. versions): ~20% increase in 2021
- 3 EasyBuild Tech Talks: FlexiBLAS, AMD Rome/Milan, MPItrampoline
- **EasyBuild selected as software installation tool for LUMI**
- Dedicated (extensive) EasyBuild tutorial for LUMI User Support Team (LUST)



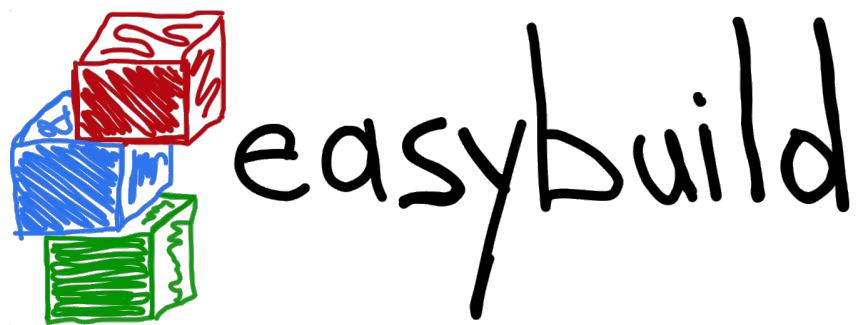


<https://easybuilders.github.io/easybuild-tutorial>

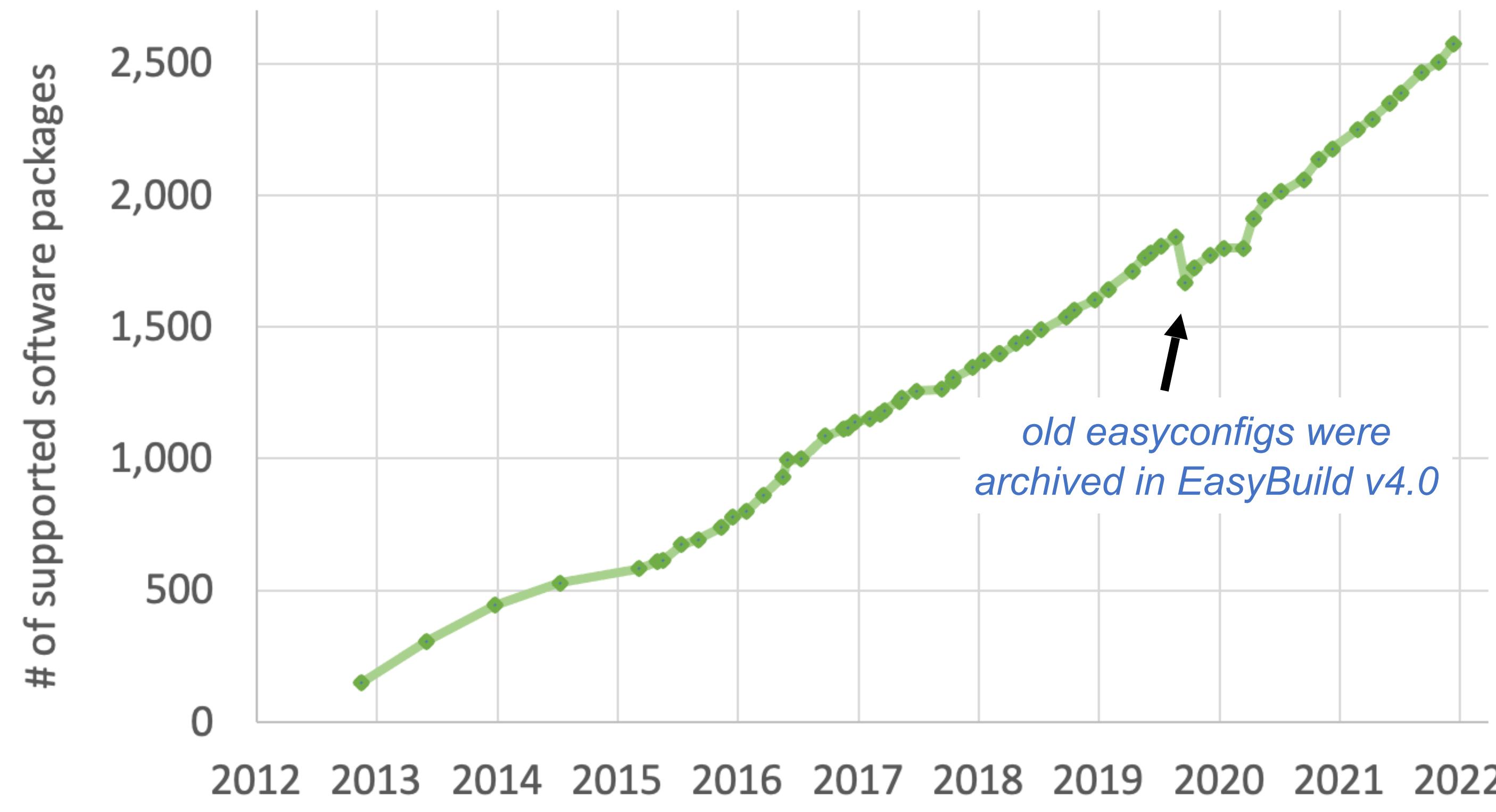
- EasyBuild tutorial accepted at ISC'20 was done as self-organised tutorial in 2020
  - Via YouTube + Slack, over 100 registrations!
- Dedicated (extensive) EasyBuild tutorial for LUMI User Support Team (LUST)
  - Tutorial materials + recordings at <https://easybuilders.github.io/easybuild-tutorial/2021-lust>
- **First official EasyBuild tutorial at ISC'21 \o/**
  - Half-day tutorial (3.5h), ~25-30 attendees
  - Tutorial materials + recording available at <https://easybuilders.github.io/easybuild-tutorial/2021-isc21>
- Tutorial re-submitted for ISC'22 as full-day tutorial (incl. use cases at JSC, LUMI, EESSI)



# Supported software

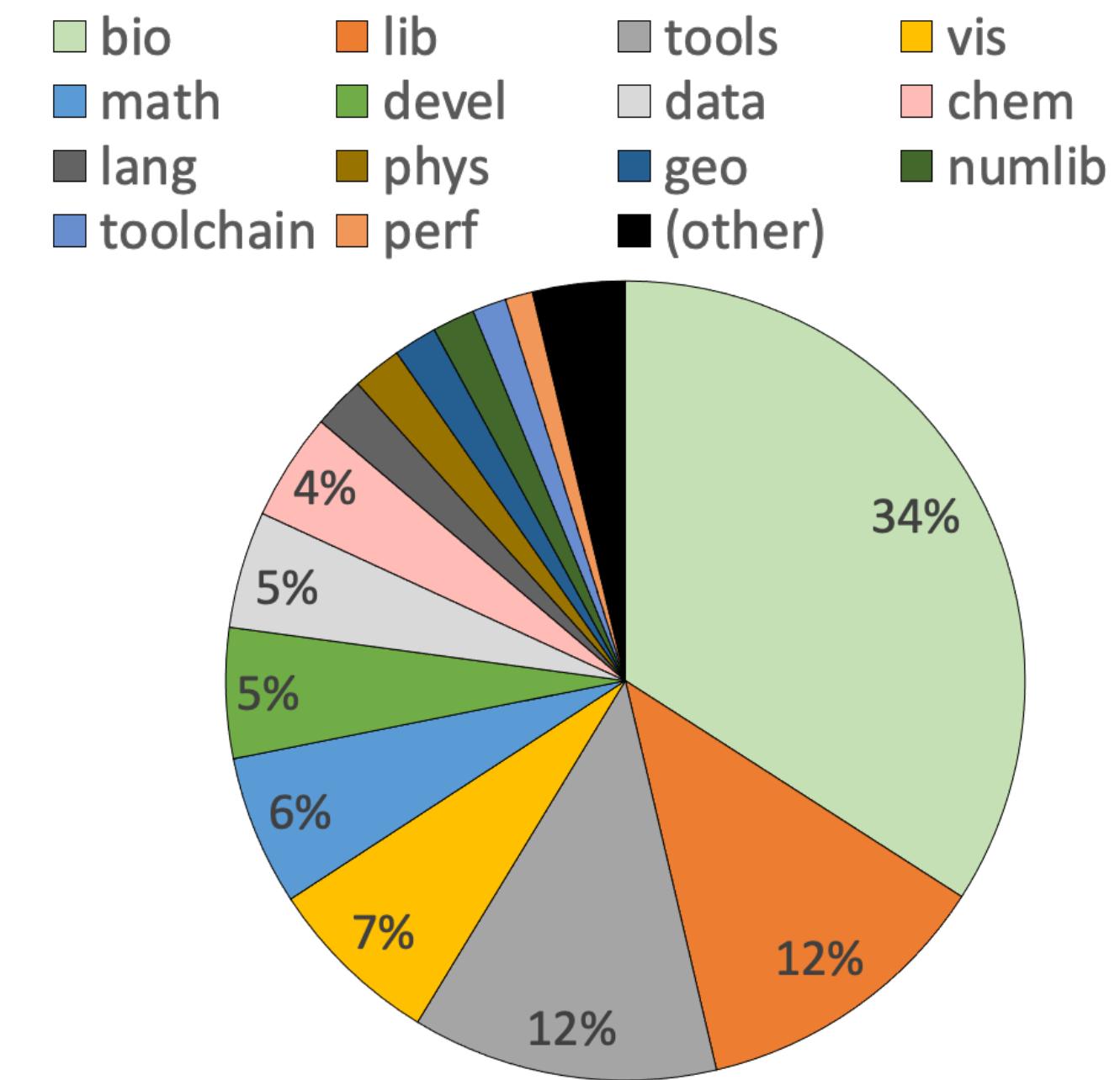


## Evolution of number of supported software packages (without extensions)

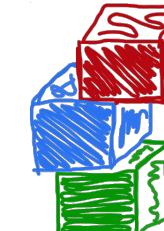


Over 2,500 different software supported by EasyBuild v4.5.1 (plus ~2,000 extensions)

Stable upward trend, no sign of slowing down...



- 1/3rd of supported software is bioinformatics
- 25% is (generic) libraries & tools

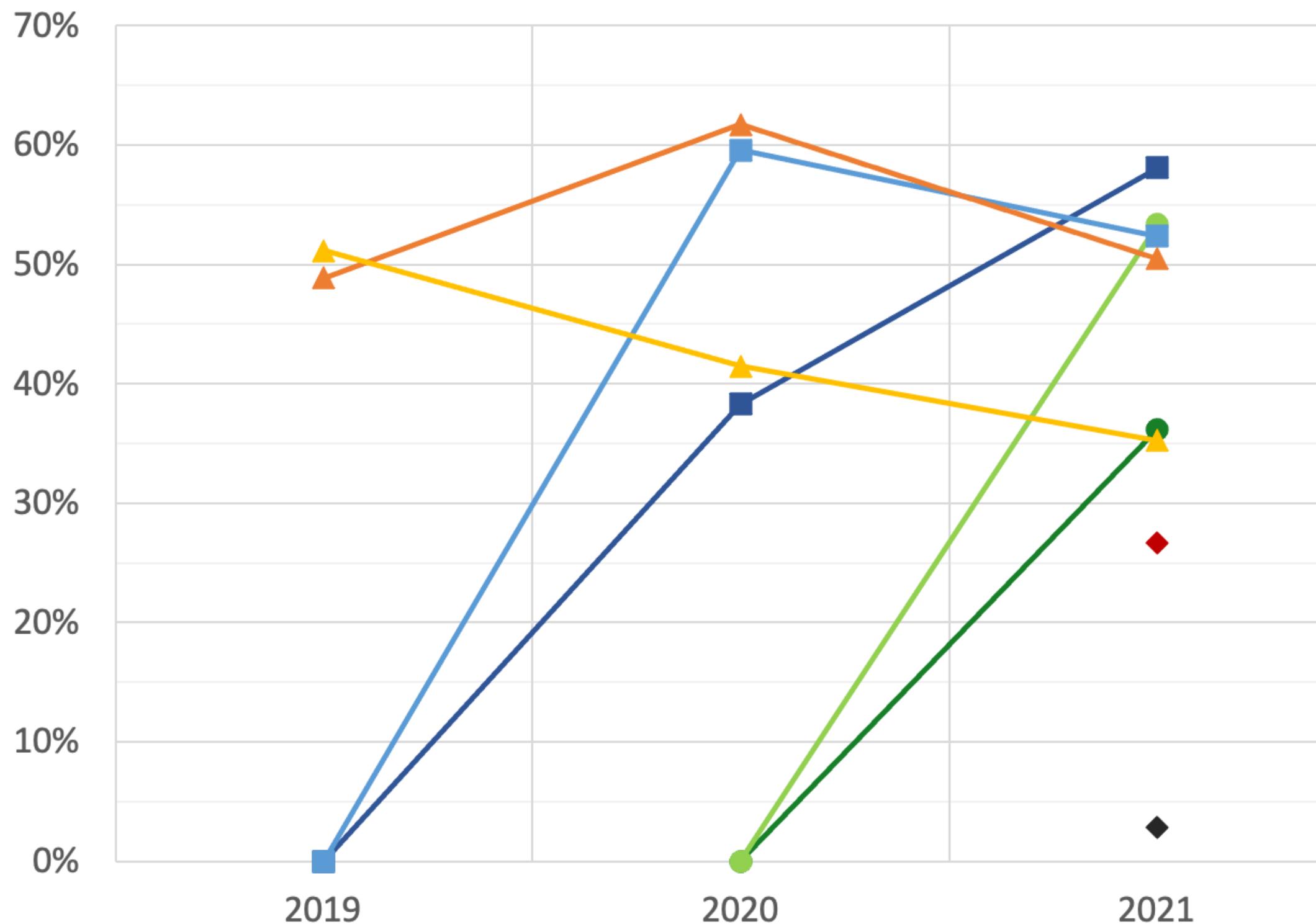


# easybuild User Survey

Which (full) toolchain(s) do you use?

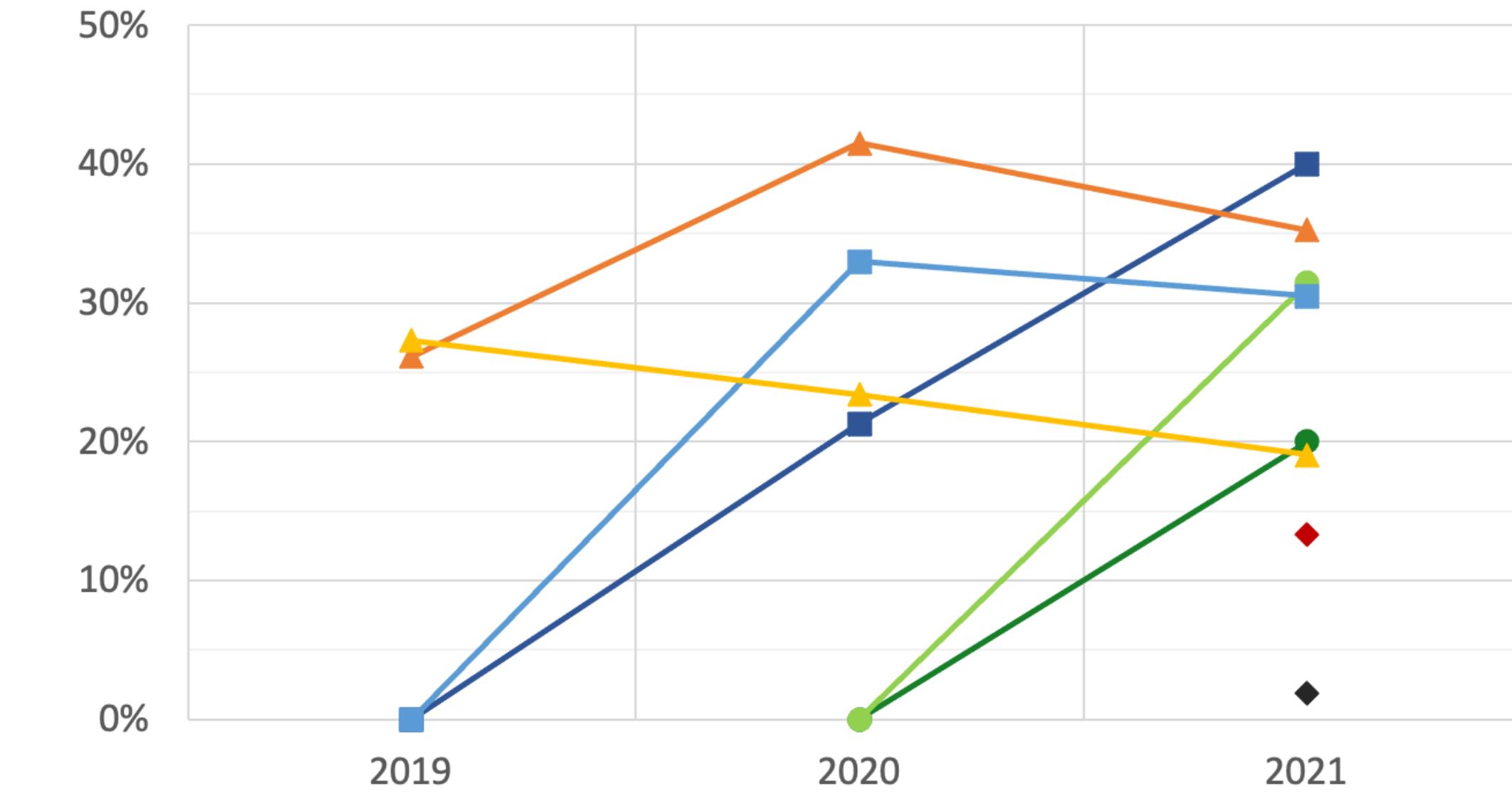
*foss \* common toolchains*  
[https://docs.easybuild.io/en/latest/  
common-toolchains.html](https://docs.easybuild.io/en/latest/common-toolchains.html)

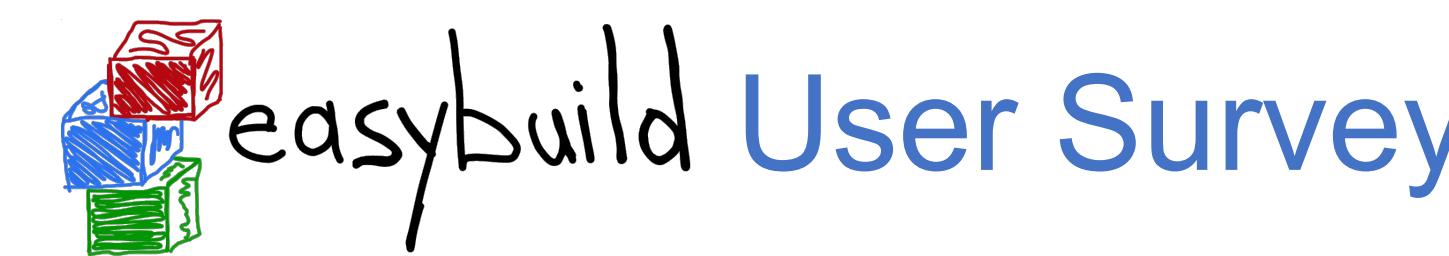
- foss/2021b
- foss/2020b
- ▲ foss/2019b
- ◆ 2018b + older (deprecated!)
- foss/2021a
- foss/2020a
- ▲ foss/2019a
- ◆ foss (other version)



Significant (and quick) uptake of foss versions  
Slow decline for previous foss versions (2019a-2020a)  
~27% still using a deprecated foss version (~13% for fosscuda)

- foss/2021b + CUDA
- fosscuda/2020b
- ▲ fosscuda/2019b
- ◆ 2018b + older (deprecated!)
- foss/2021a + CUDA
- fosscuda/2020a
- ▲ fosscuda/2019a
- ◆ fosscuda (other version)

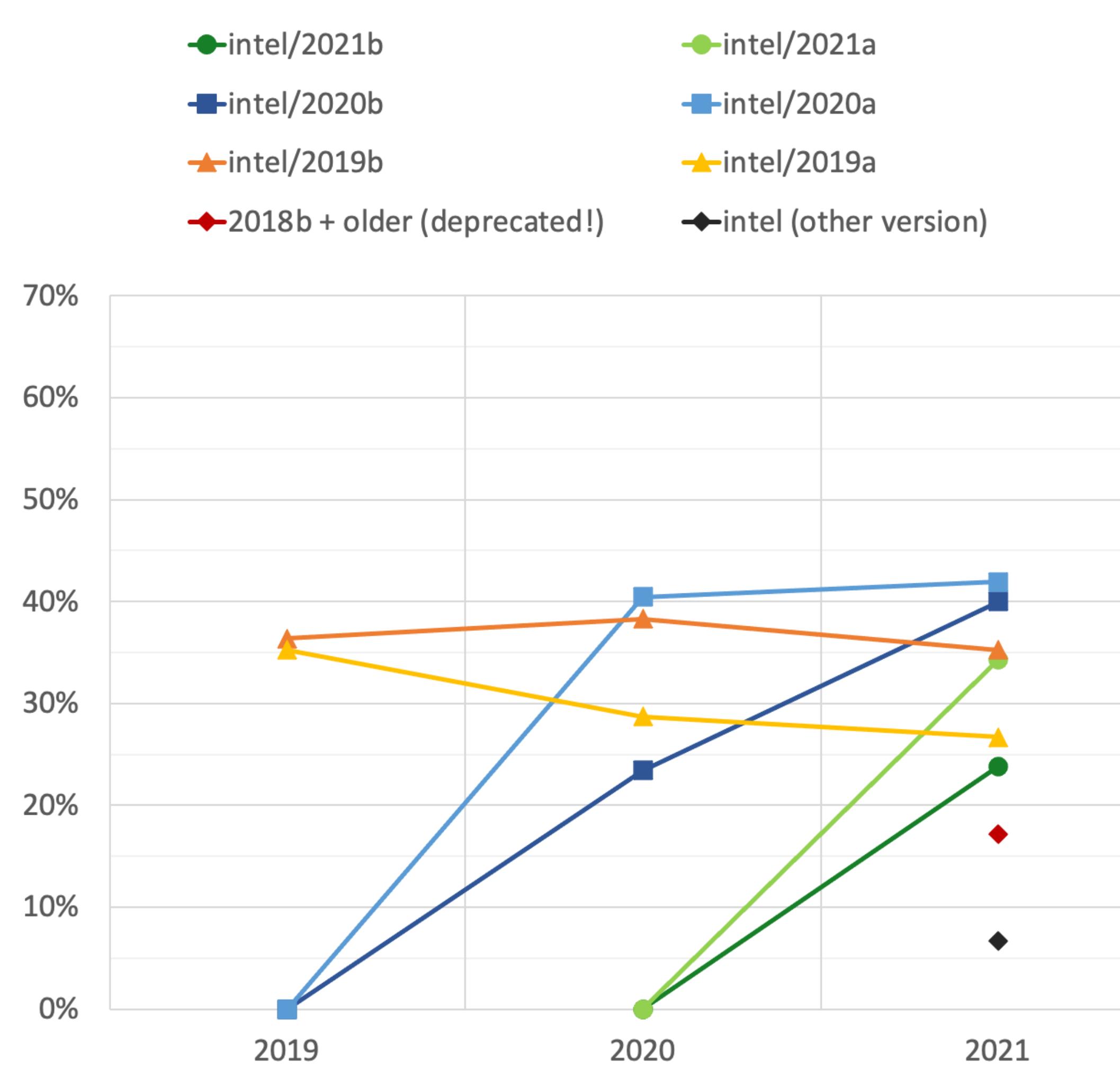




# User Survey

Which (full) toolchain(s) do you use?

intel\* common toolchains  
<https://docs.easybuild.io/en/latest/common-toolchains.html>

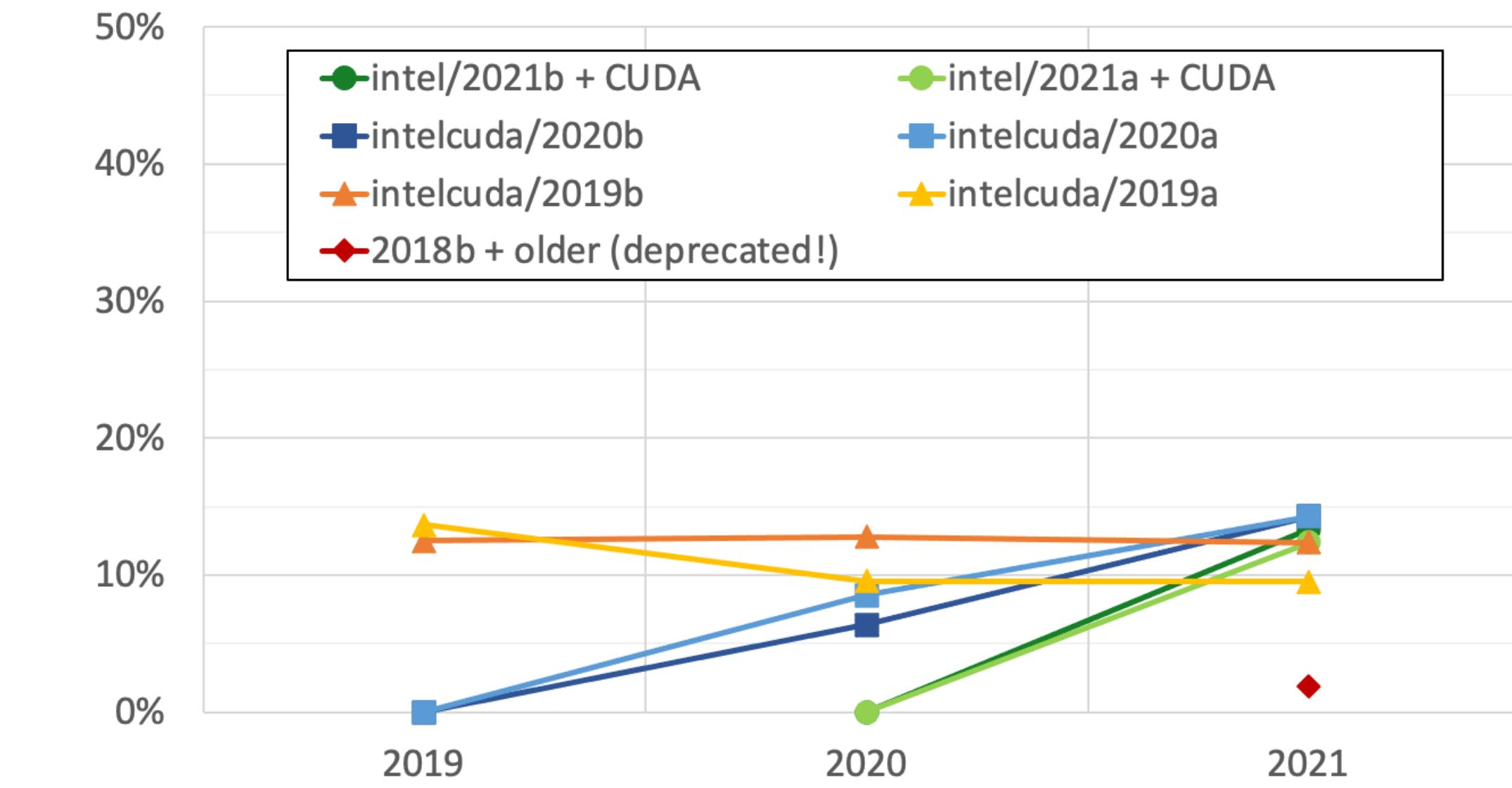


Slightly lower uptake of intel toolchain (vs foss)

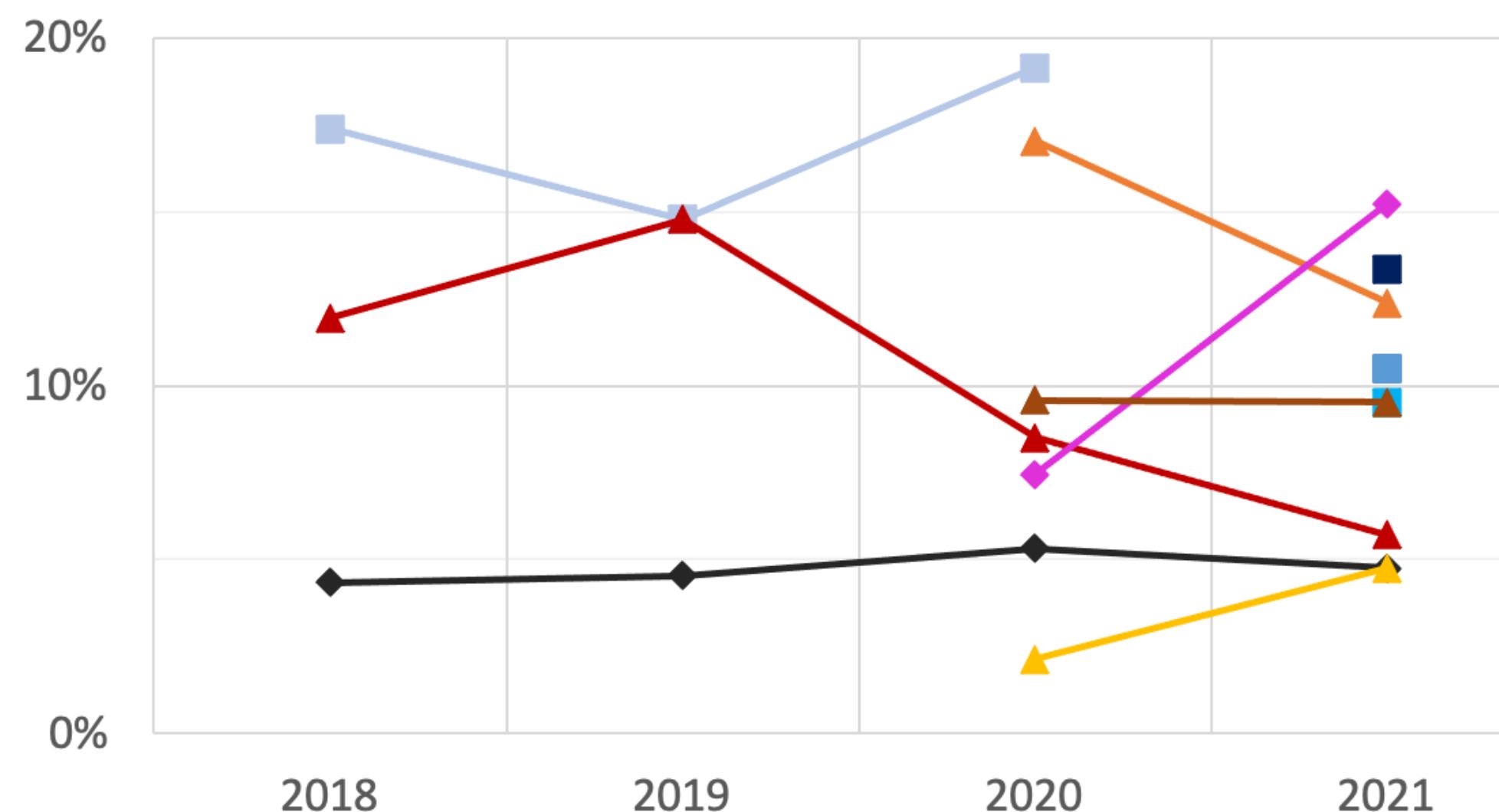
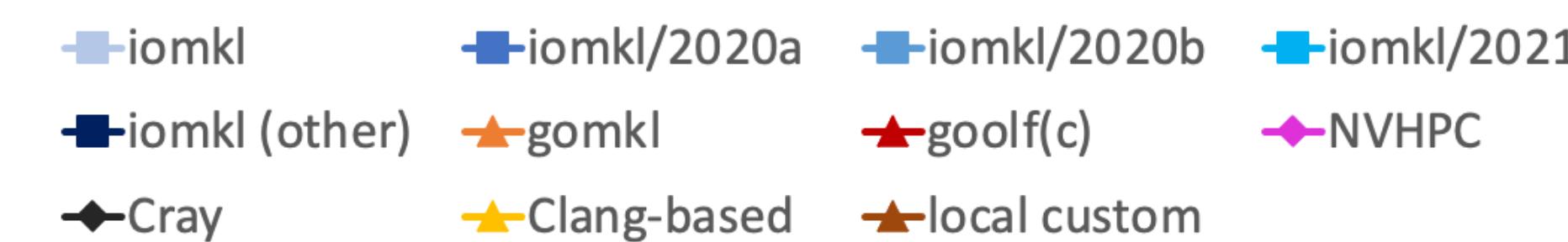
May change now intel toolchain doesn't require license anymore?

**~17% still using deprecated intel version**

Use of intel toolchain in combination with CUDA is low



## *Which (full) toolchain(s) do you use?*



Increasing diversity in other toolchains: iomkl, NVHPC, Clang-based

iomkl results difficult to interpret ("iomkl" shattered into specific versions)

iomkl/2020a and iomkl/2020b both at ~10.5%

iomkl/2021a at ~9.5%

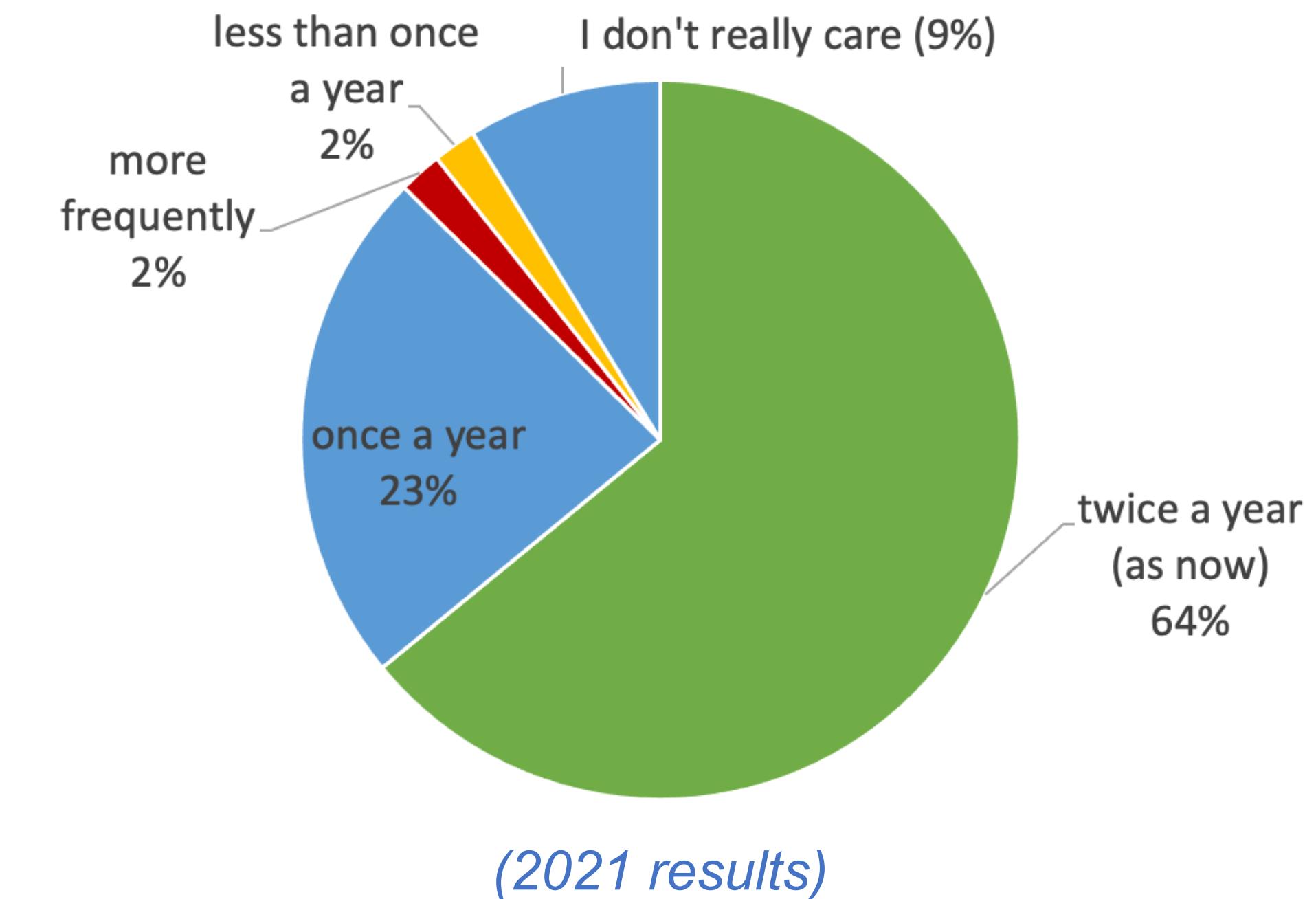
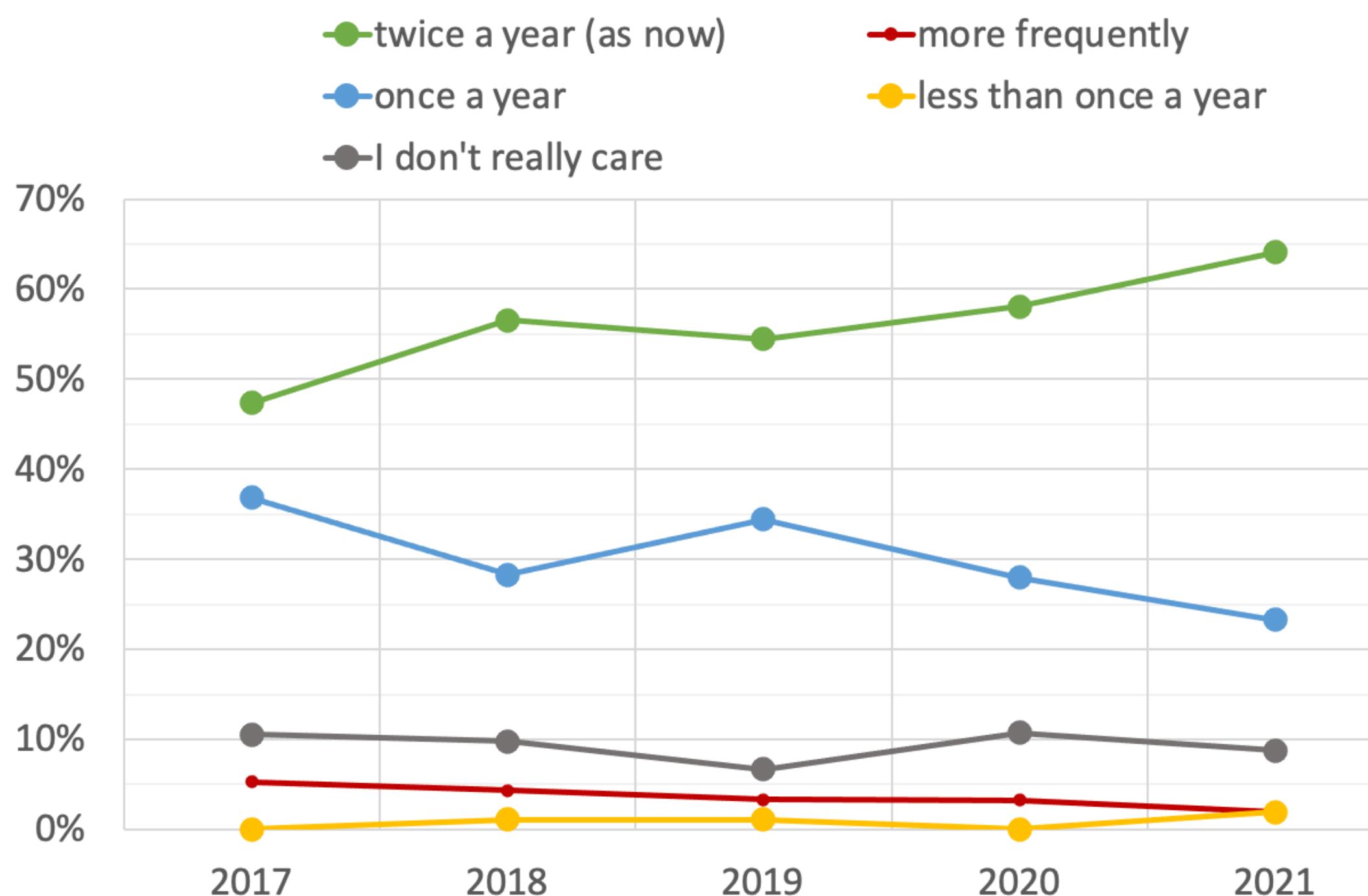
NVHPC usage doubles to > 15%

Stable use of custom toolchains integrated with CrayPE (mostly CSCS?)

Not included (< 5%): iomklc, gimkl, gobff, gomklc, gmvolf, ictce, AOCC, ...

(more details on these toolchains: `eb --list-toolchains` or <https://docs.easybuild.io/en/latest/version-specific/toolchains.html>

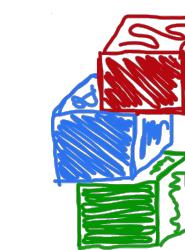
## *How frequently should the common toolchains be updated?*



Support for current update cycle (twice a year) is growing

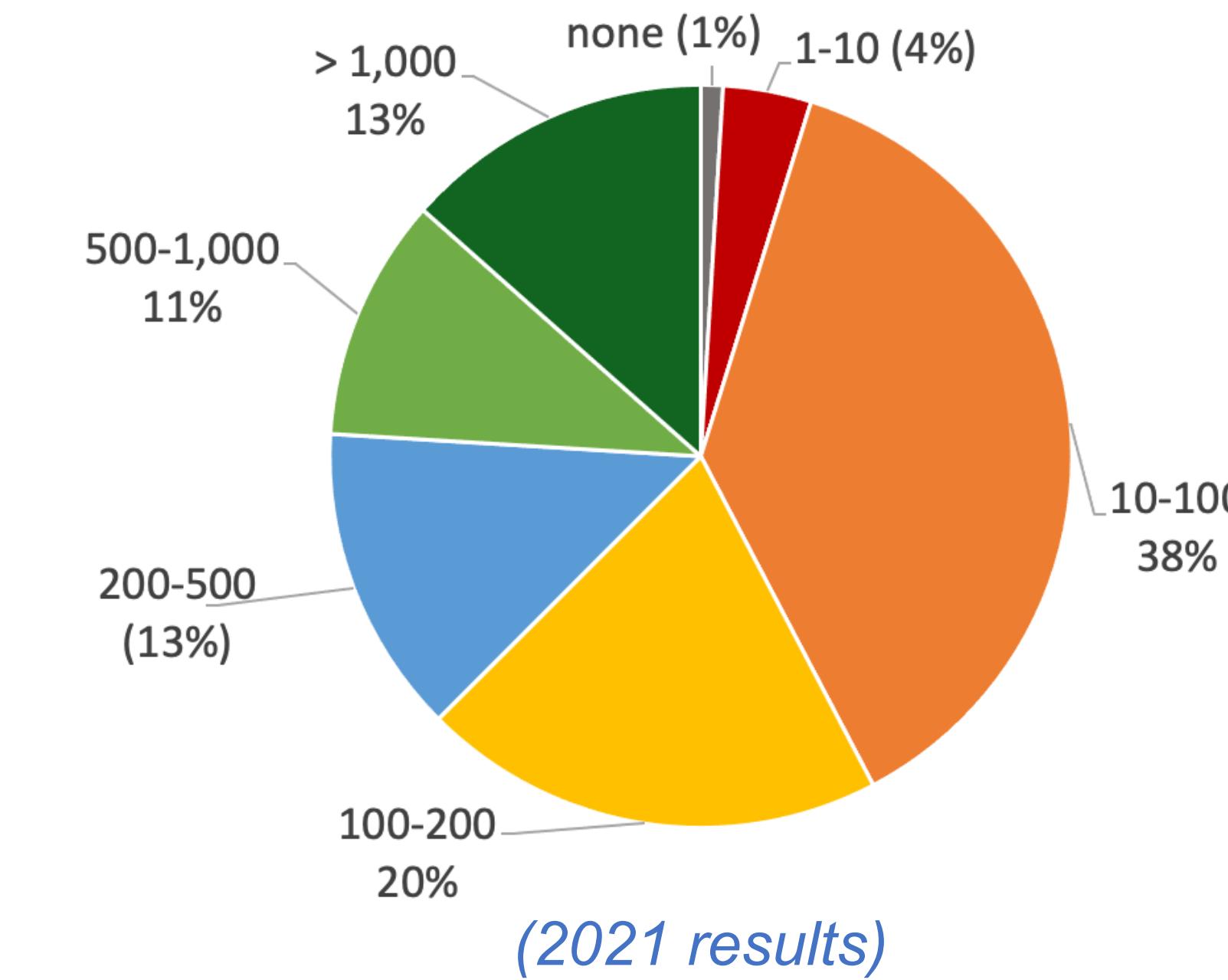
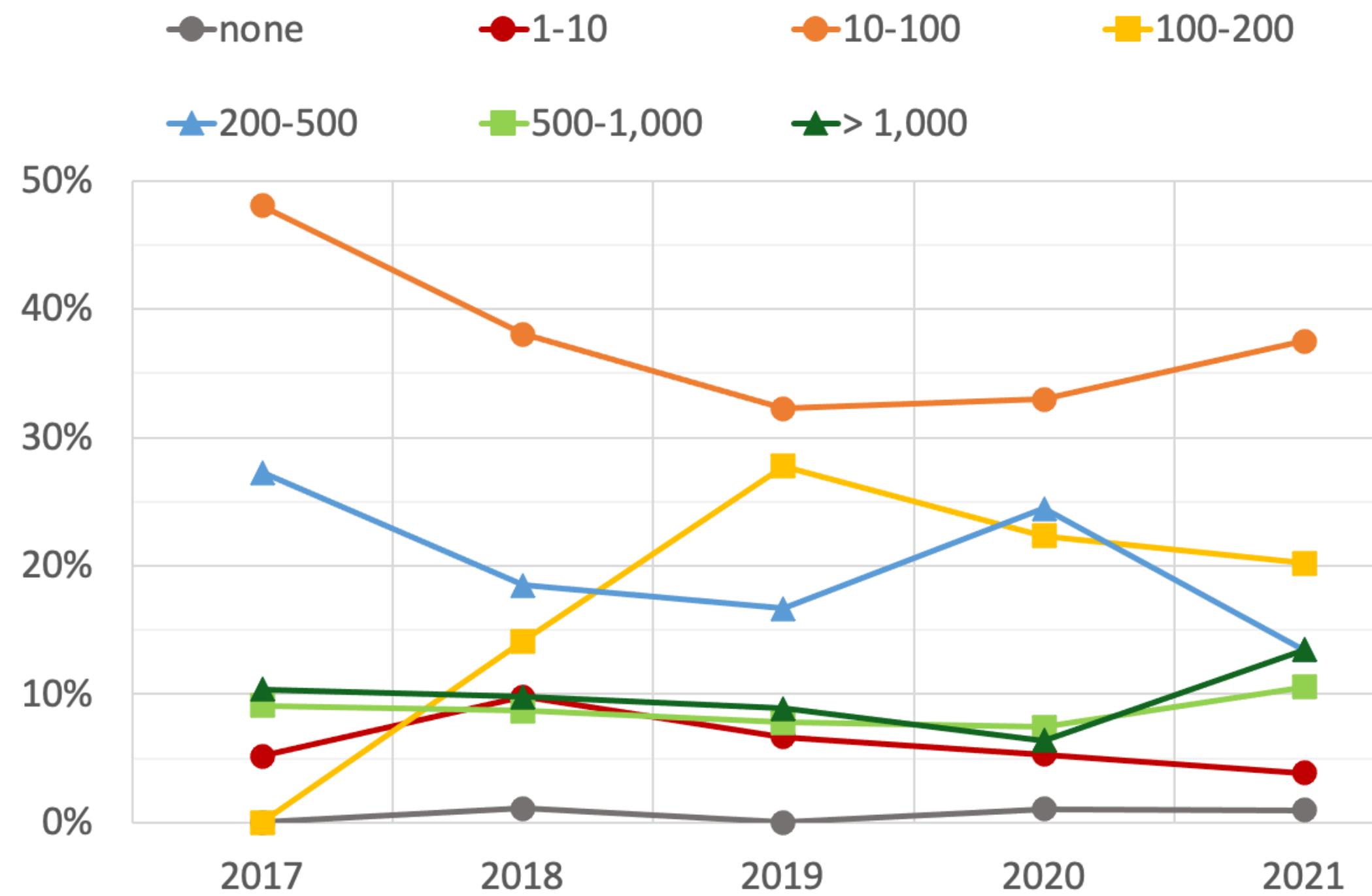
> 20% would be happy with just once a year (would they really be?)

More frequently isn't really feasible...



# easybuild User Survey

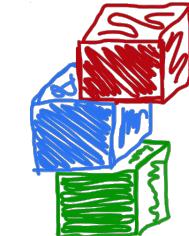
*How many software installations did you perform in the last year using EasyBuild?*



~42% only does less than 100 installations per year with EasyBuild?

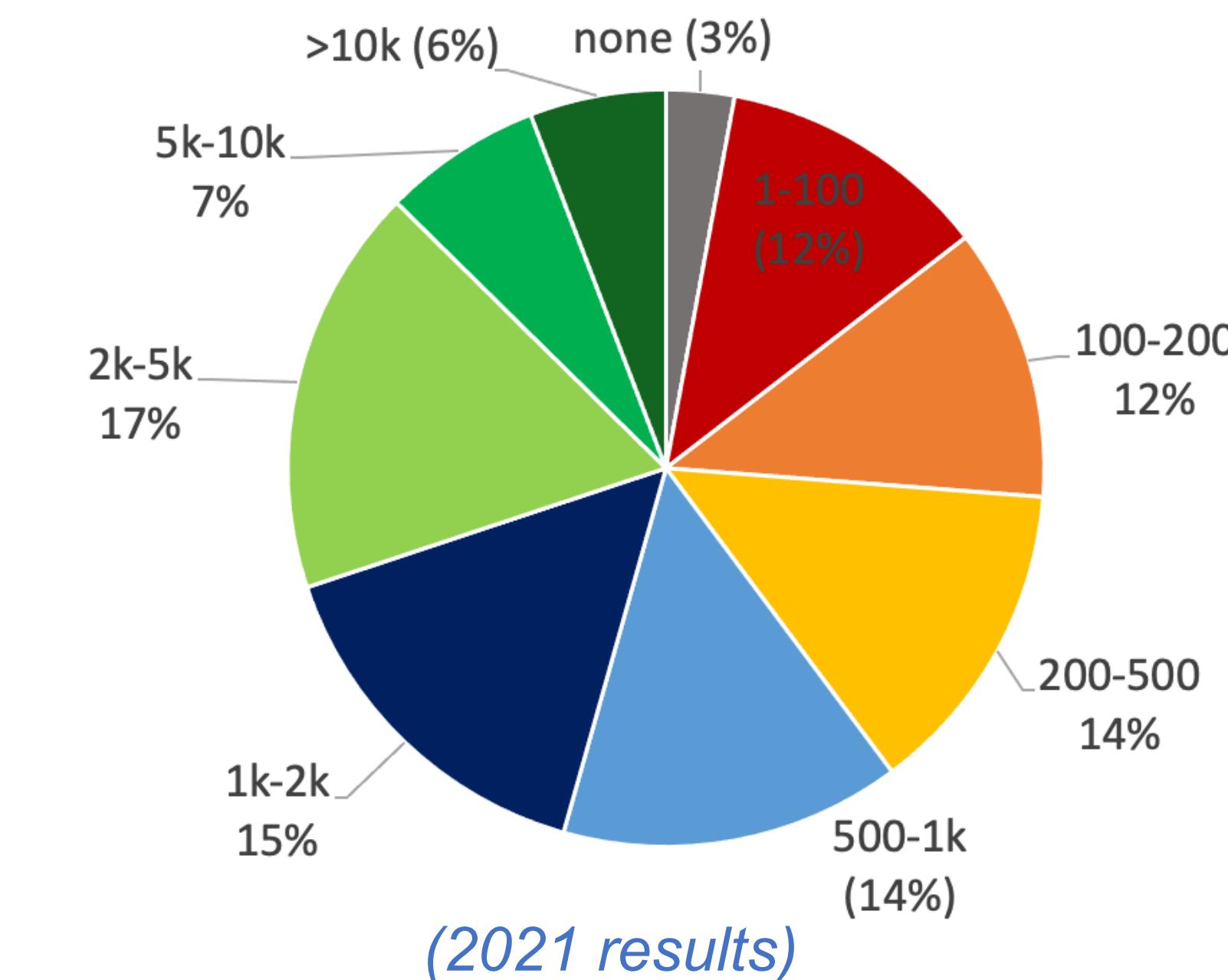
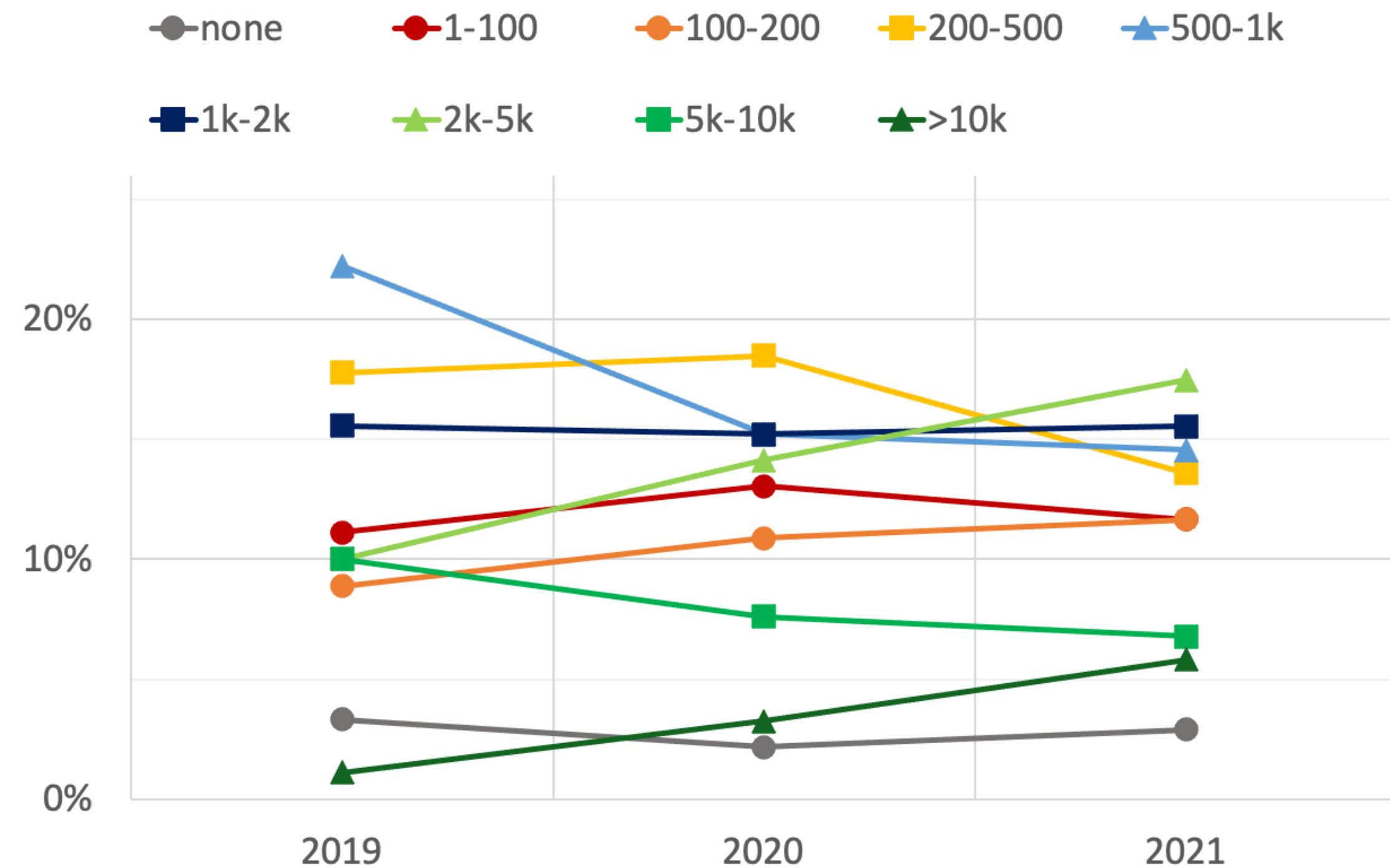
~24% does 500 or more installations per year

Results may be skewed by interpretation: include dependencies, multiple systems, etc.



# easybuild User Survey

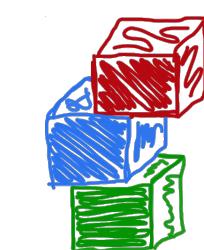
*How many software installations/modules installed with EasyBuild do you currently have in production (in total, across different systems)?*



Very varied / stable results, no clear "winner"

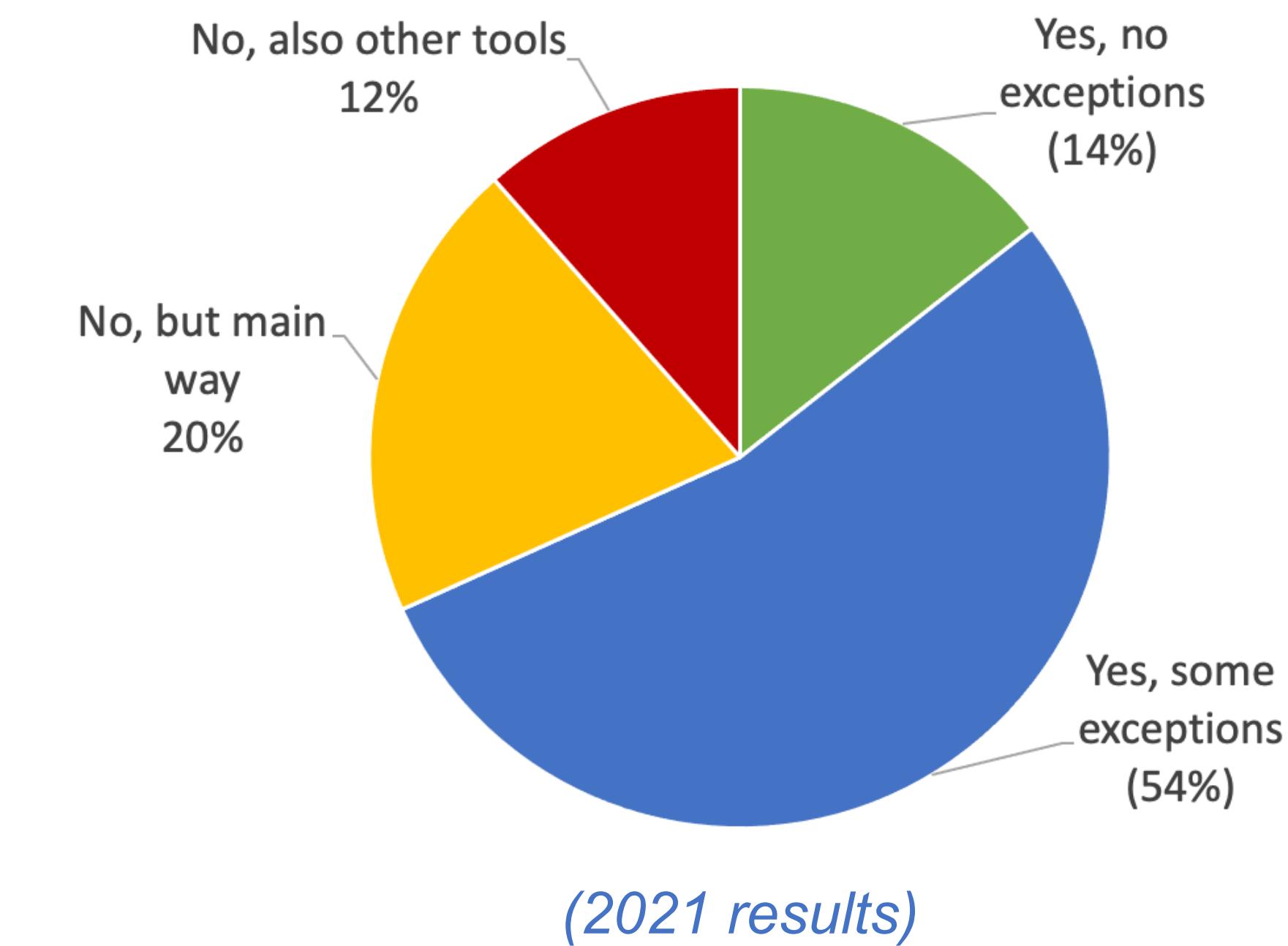
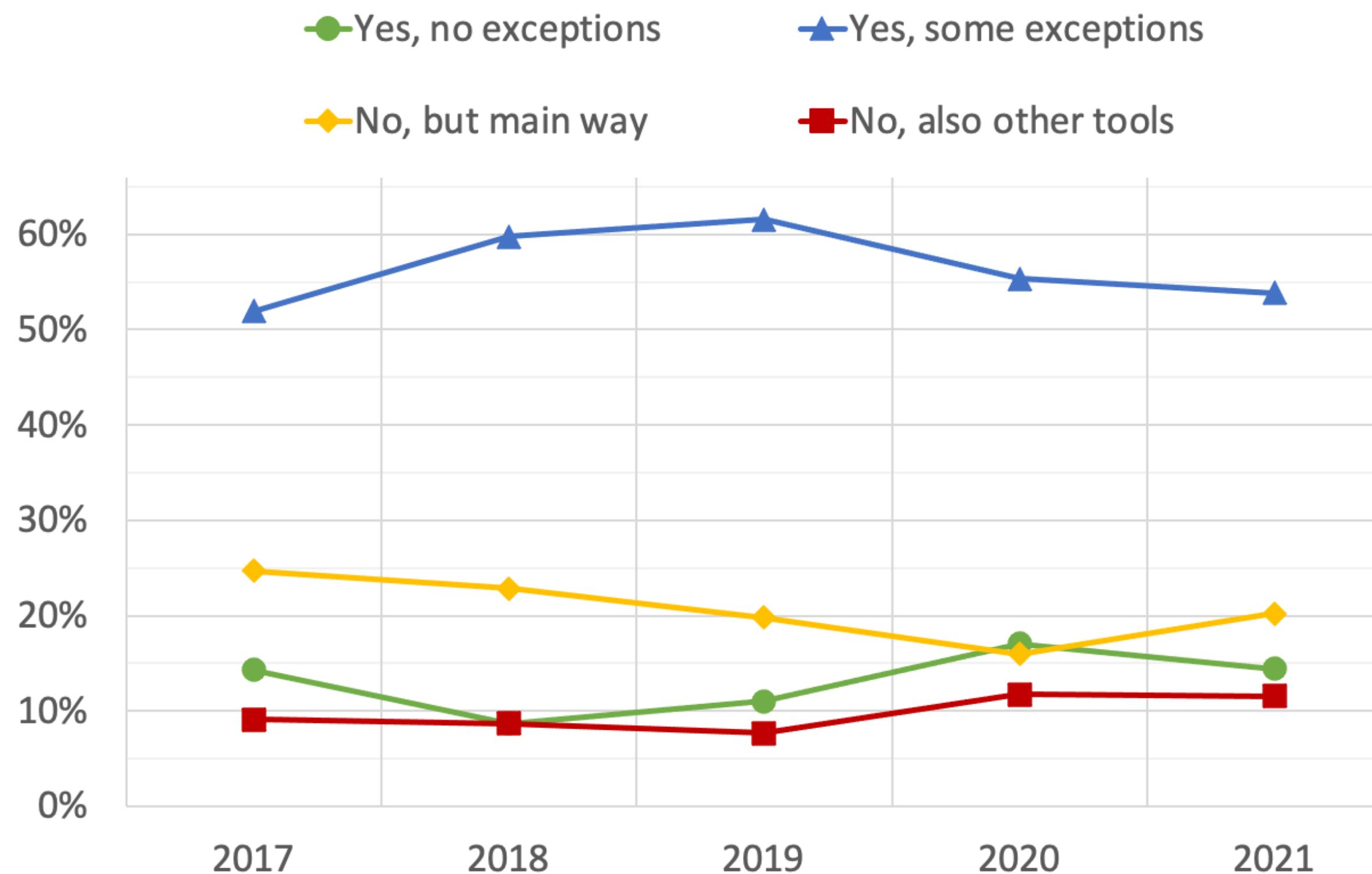
Depends a lot on how many systems are in use

51% has < 1k modules installed, 45% has > 1k



# easybuild User Survey

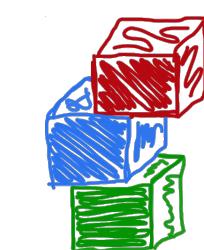
*Is EasyBuild your only way of installing (scientific) software?*



Very stable results, pretty much as expected...

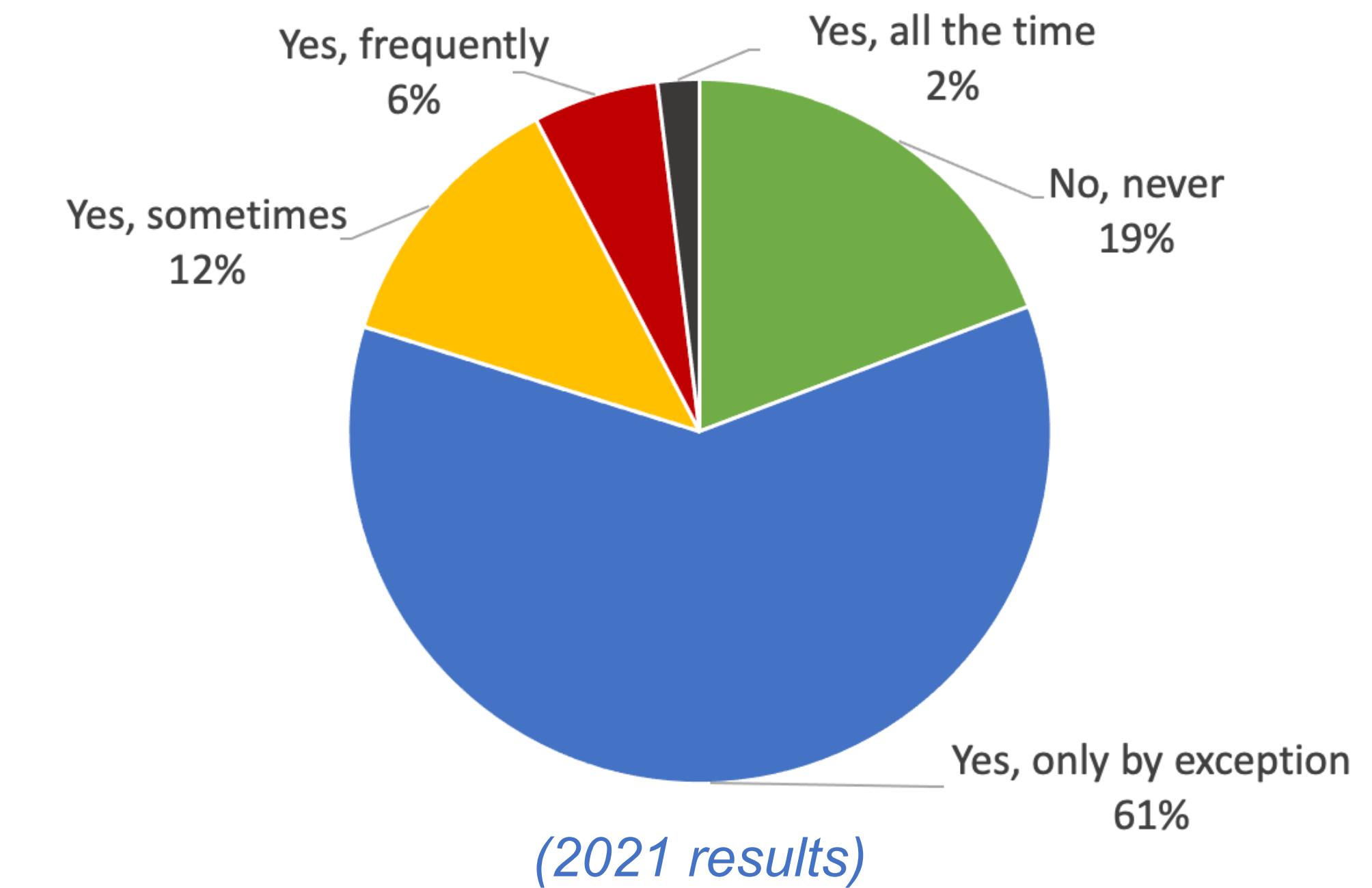
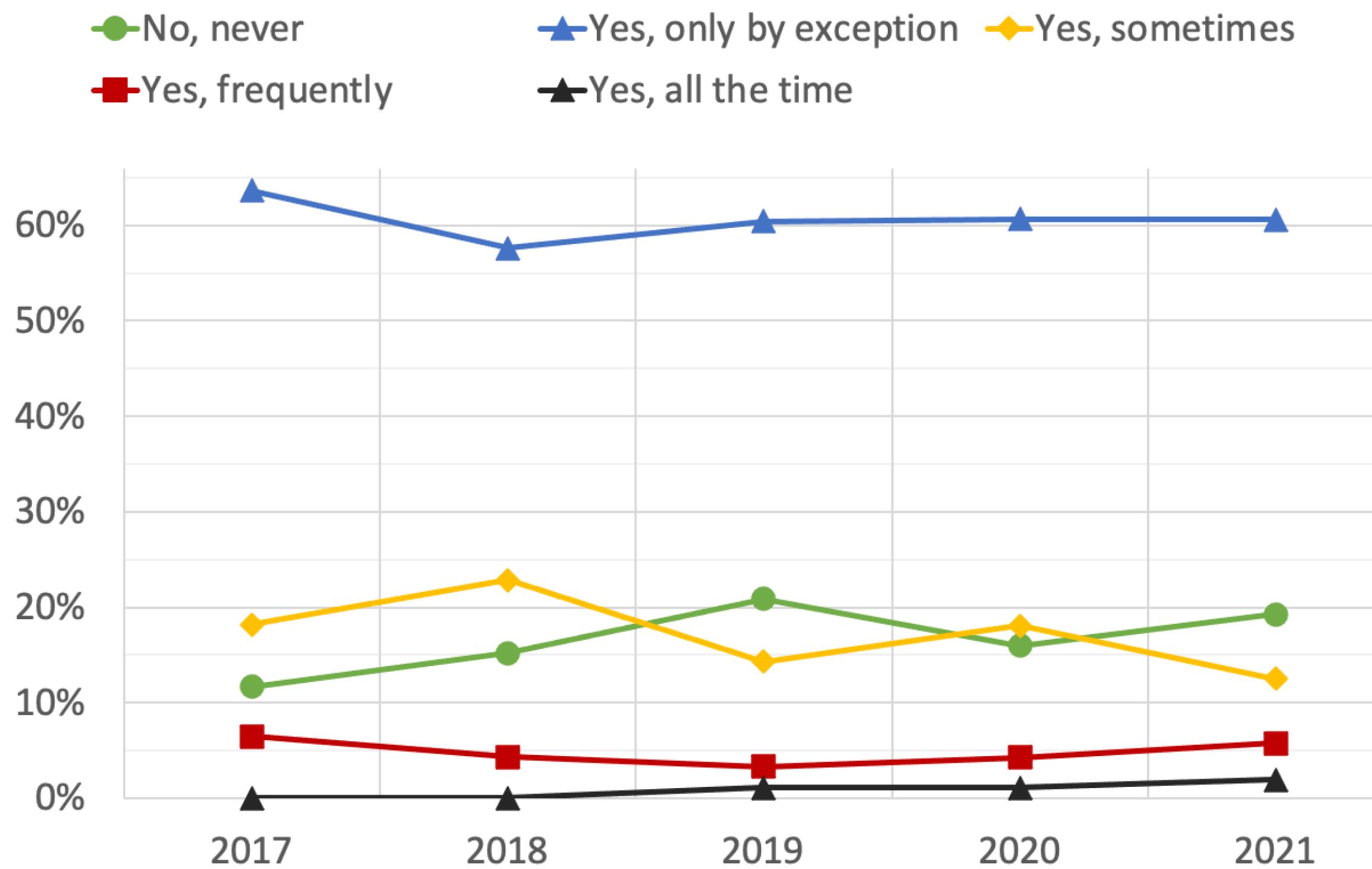
Slightly fewer exceptions than previous years?

Less than 15% uses EasyBuild for all installations.



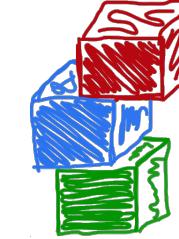
# easybuild User Survey

*Do you still install (scientific) software manually?*



**Very stable results, pretty much as expected...**

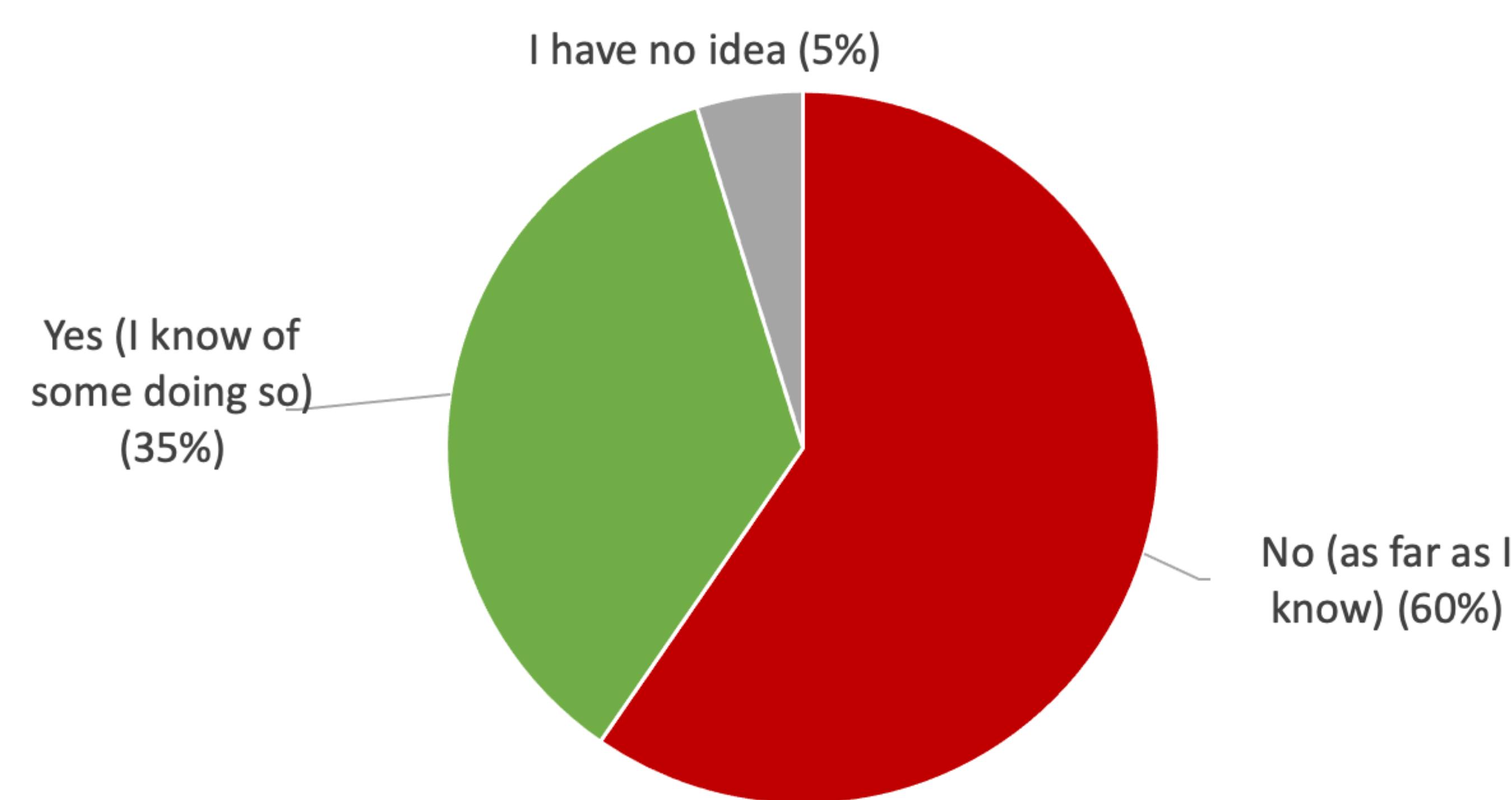
~20% never does manual installations anymore.



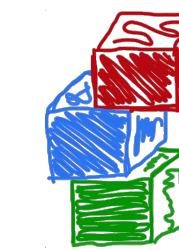
# easybuild User Survey

new survey question!

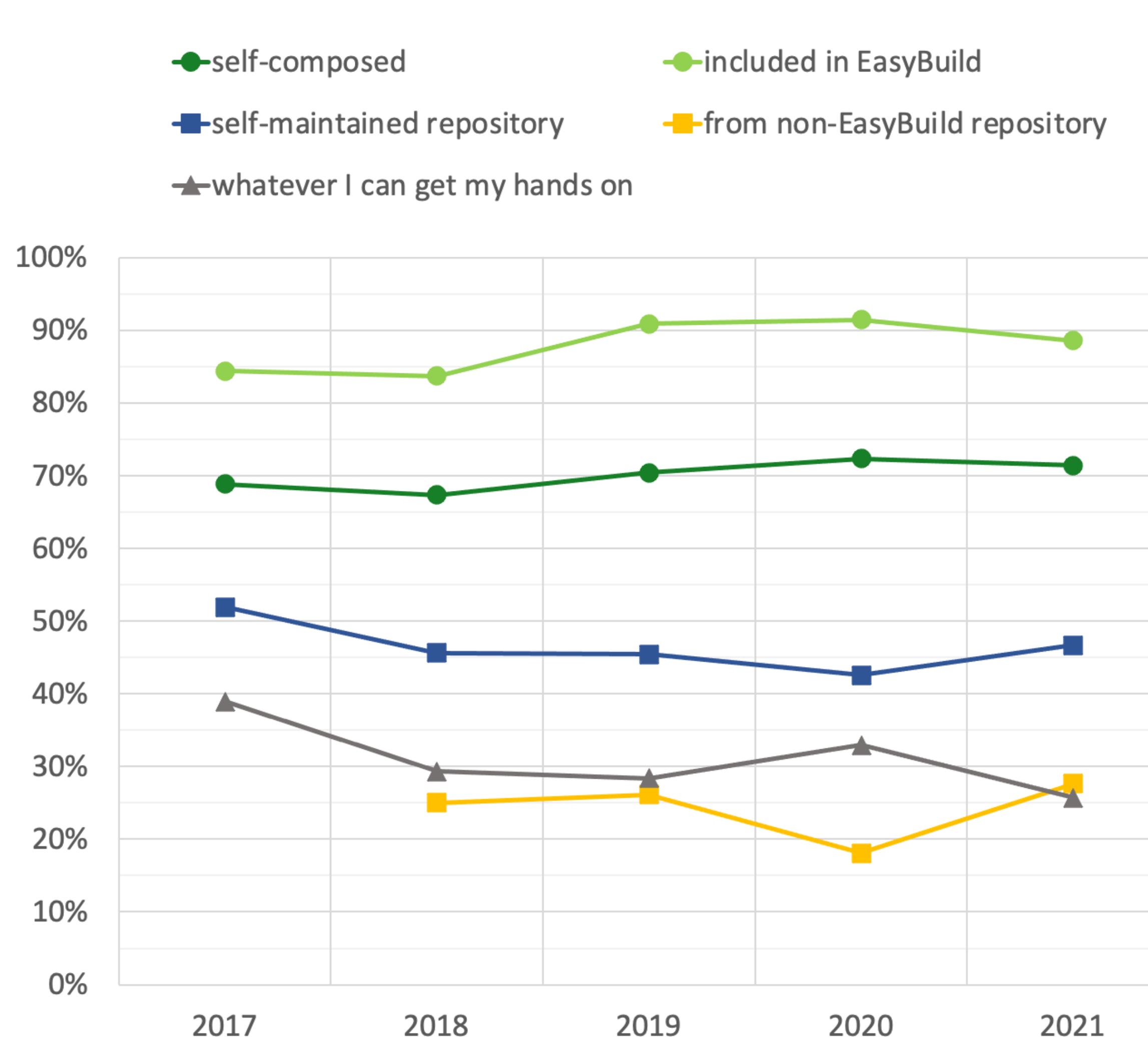
*Are end users using EasyBuild to install software in their own accounts, or are you doing so yourself?*



A lot of untapped potential to empower end users with EasyBuild  
to install software on top of what's provided centrally?

 easybuild User Survey

## Which easyconfig files do you use?



Very stable results over the years!

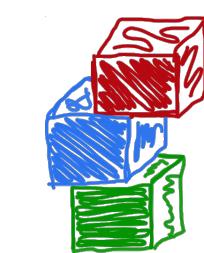
~90% uses easyconfigs that come with EasyBuild

~70% creates own easyconfigs (~50% also contributes)

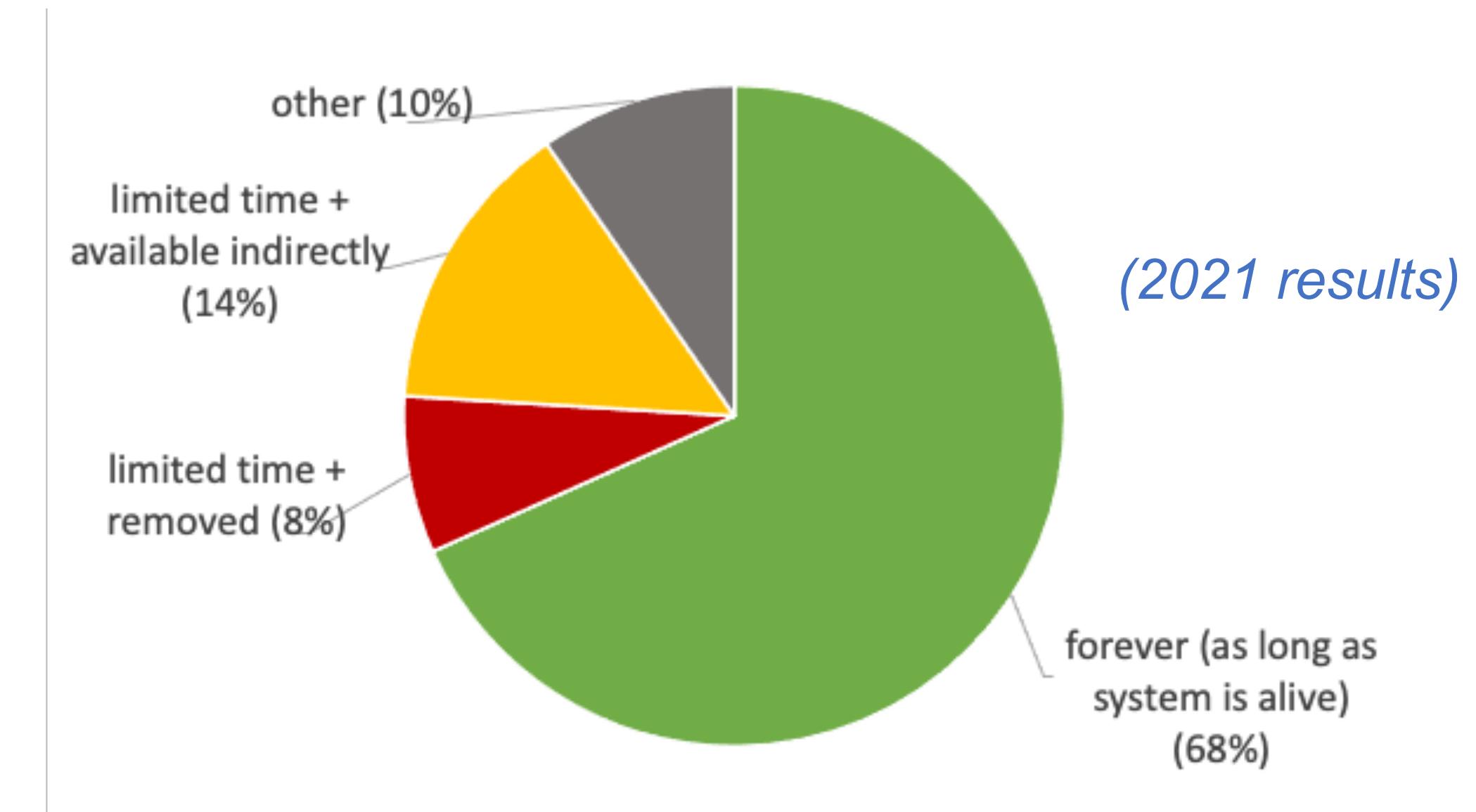
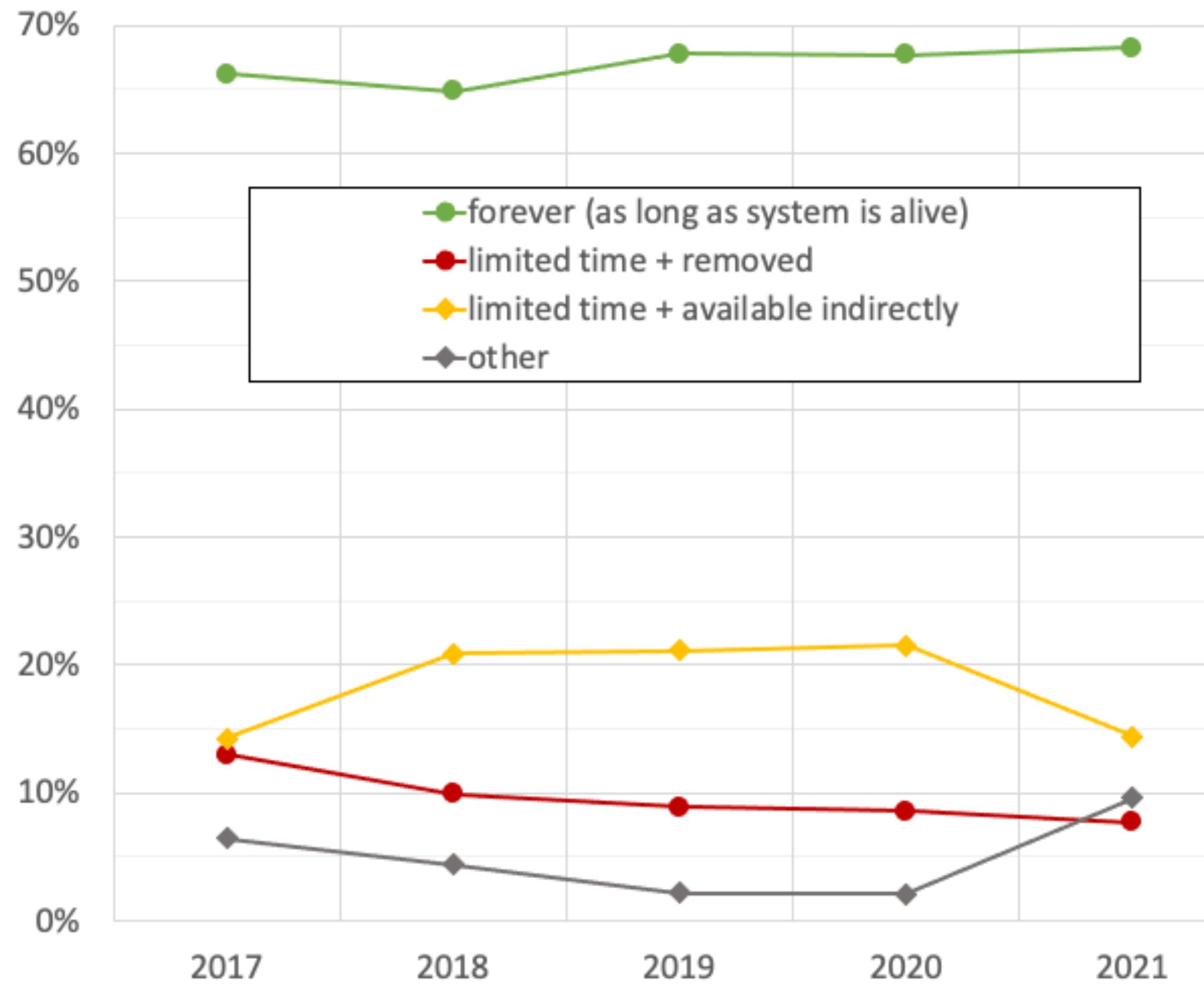
~25% uses easyconfigs from non-EasyBuild repos

→ Which ones?

→ JSC, CSCS, Compute Canada, ... more?

 easybuild User Survey

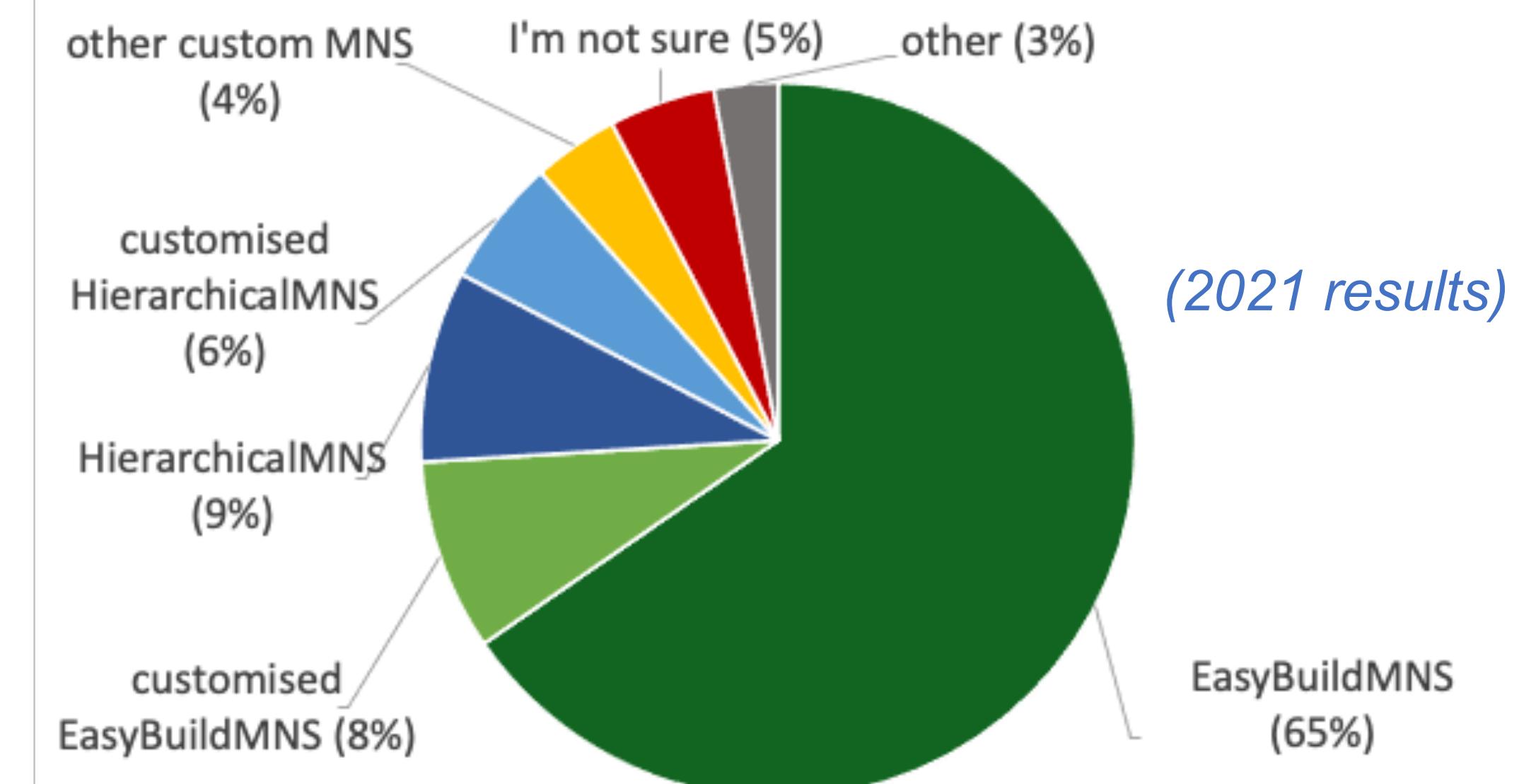
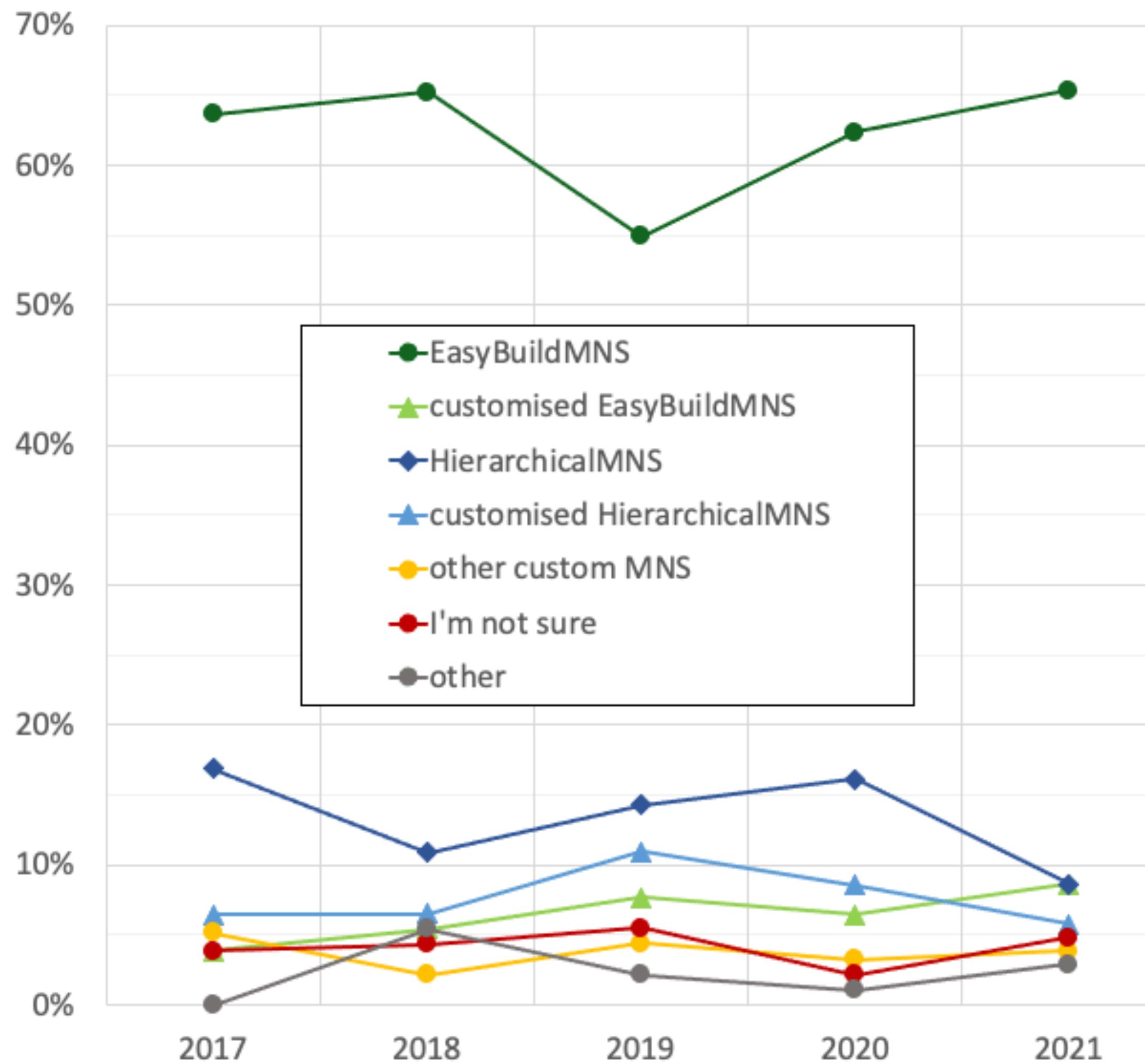
*How long are modules installed with EasyBuild available to users?*



Most don't have real life-cycle management for software installations

Not much is changing here it seems...

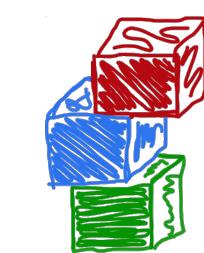
## *Which module naming scheme do you use?*



Most people stick to the default module naming scheme (EasyBuildMNS)

Some people experimented with HierarchicalMNS, but then reverted?

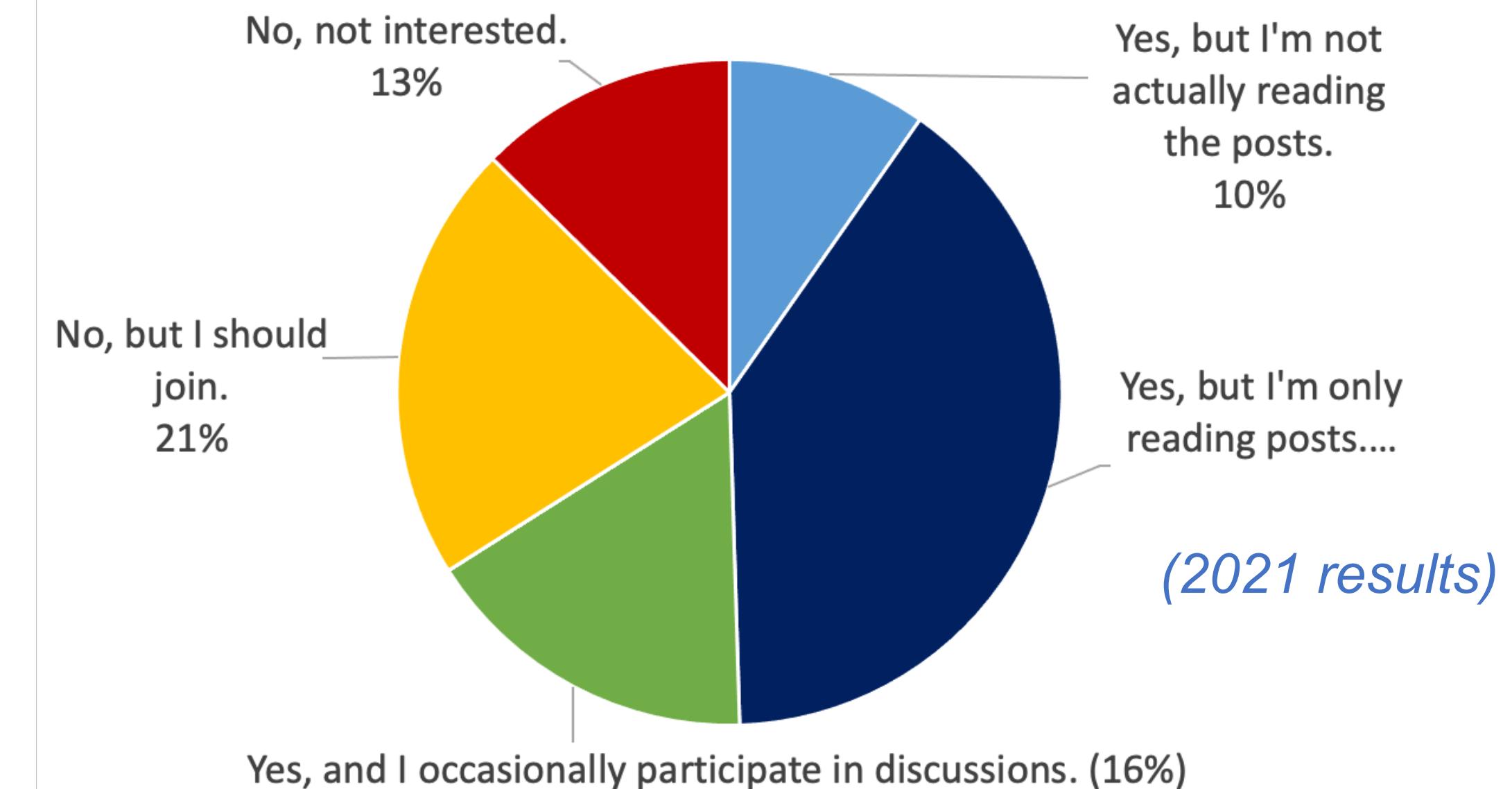
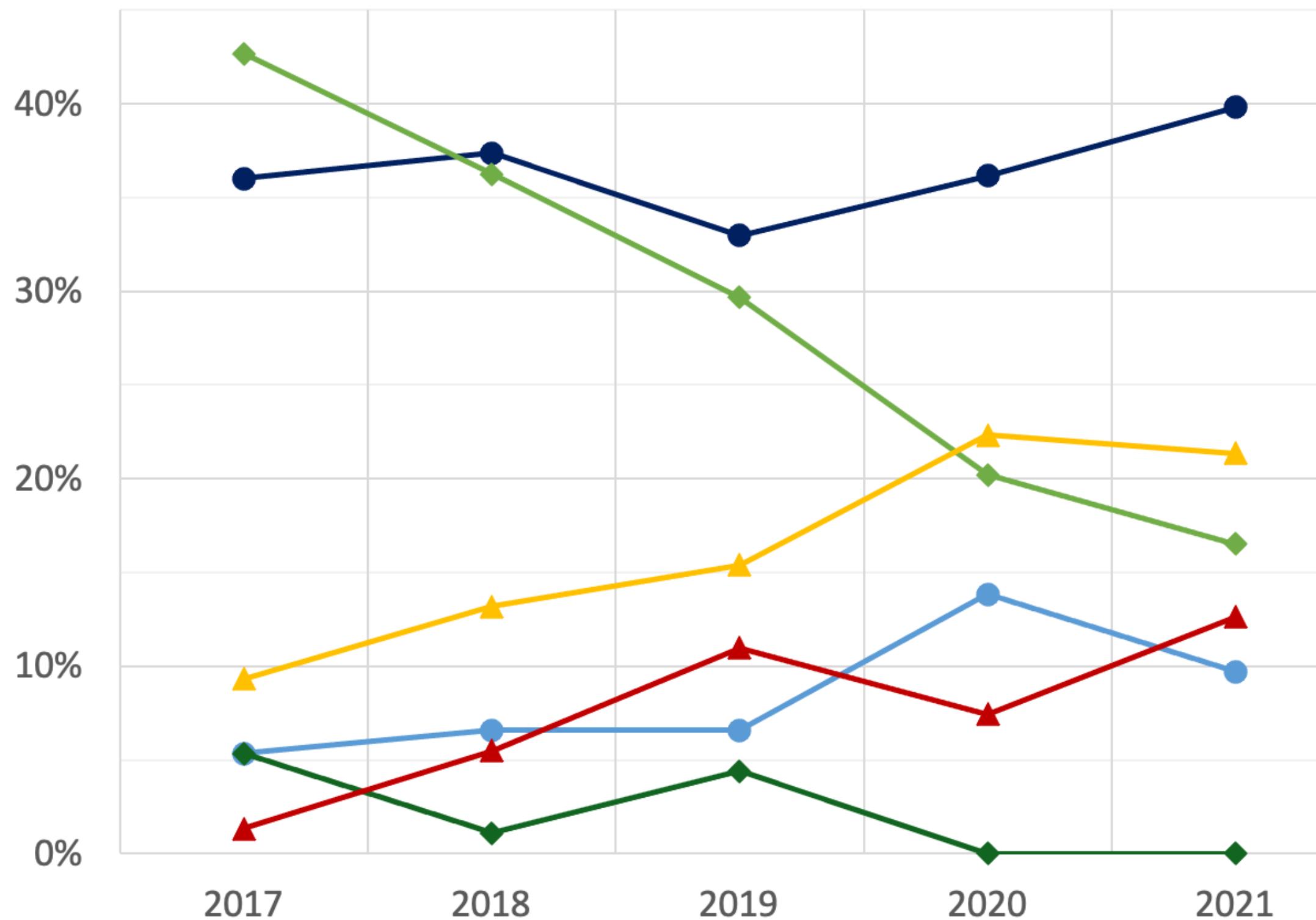
Only a small minority takes full control of module naming scheme



# easybuild User Survey

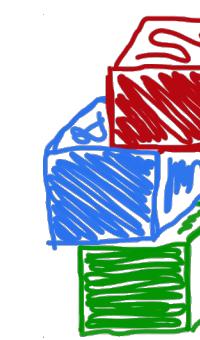
## *Are you subscribed to the EasyBuild mailing list?*

- Yes, but I'm not actually reading the posts.
- Yes, but I'm only reading posts.
- Yes, and I occasionally participate in discussions.
- Yes, and I frequently participate discussions.
- No, but I should join.
- No, not interested.



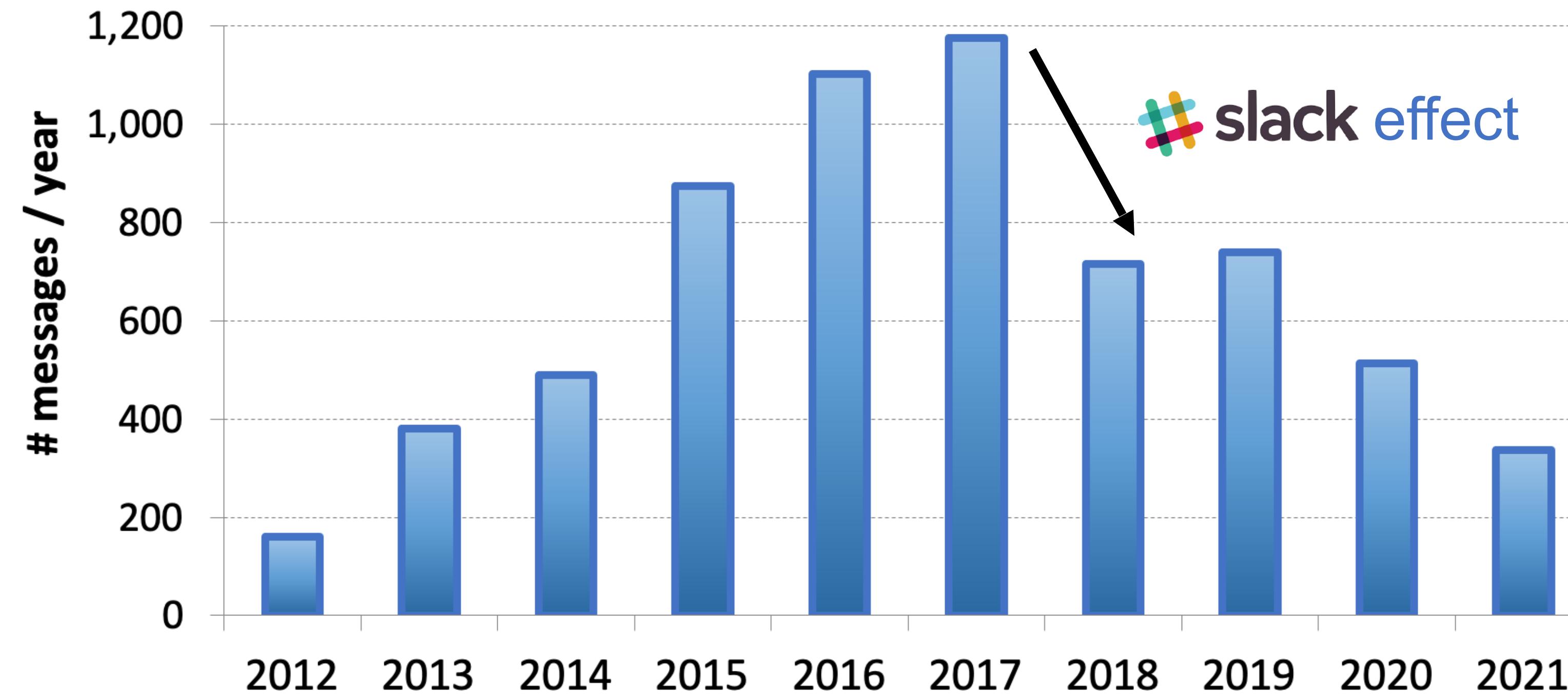
Significant decline in active participation on mailing list  
 Small increase in passive participation though...  
 Mailing list remains an important communication channel!  
 (cfr. survey results on channel that lead to survey participation)

Subscribe to EasyBuild mailing list via  
<https://lists.ugent.be/wws/subscribe/easybuild>

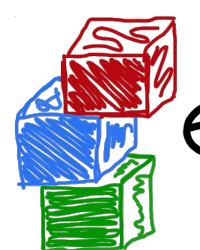


# easybuild mailing list (traffic)

Traffic on EasyBuild mailing list peaked in 2017,  
due to start of EasyBuild Slack channel, but remains fairly active.

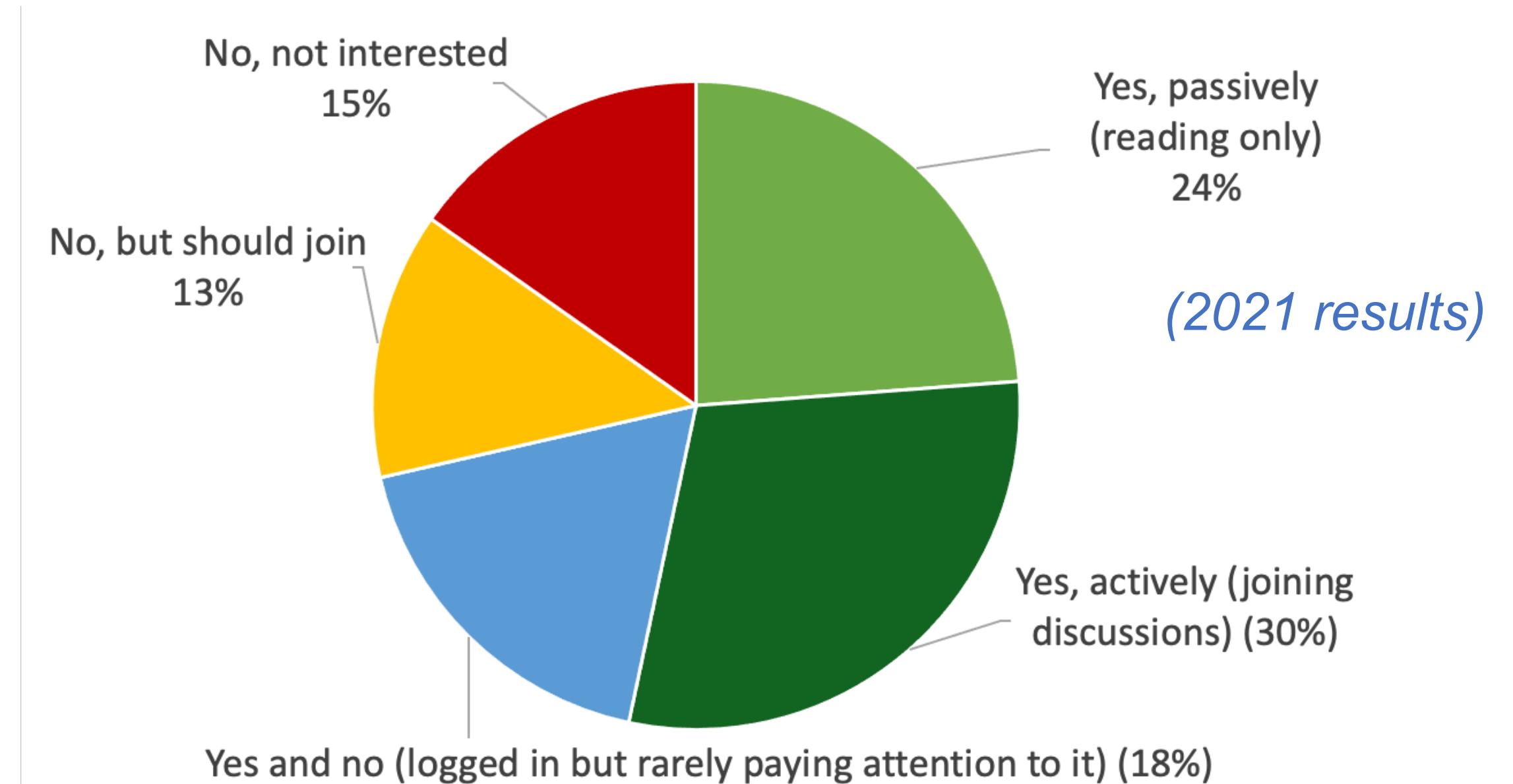
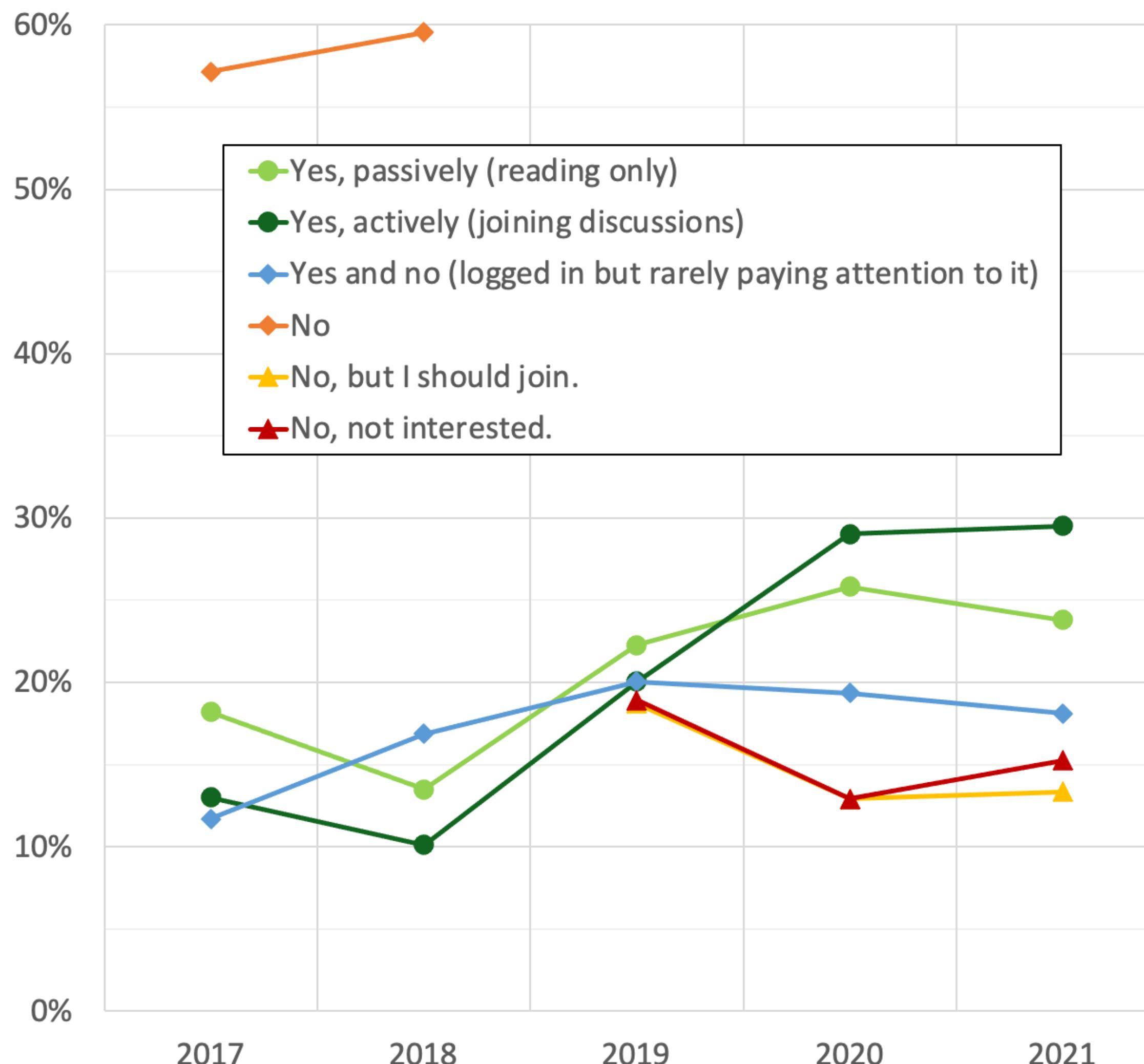


296 subscribers to EasyBuild mailing list currently



# easybuild User Survey

*Do you use the EasyBuild IRC/Slack channel?*



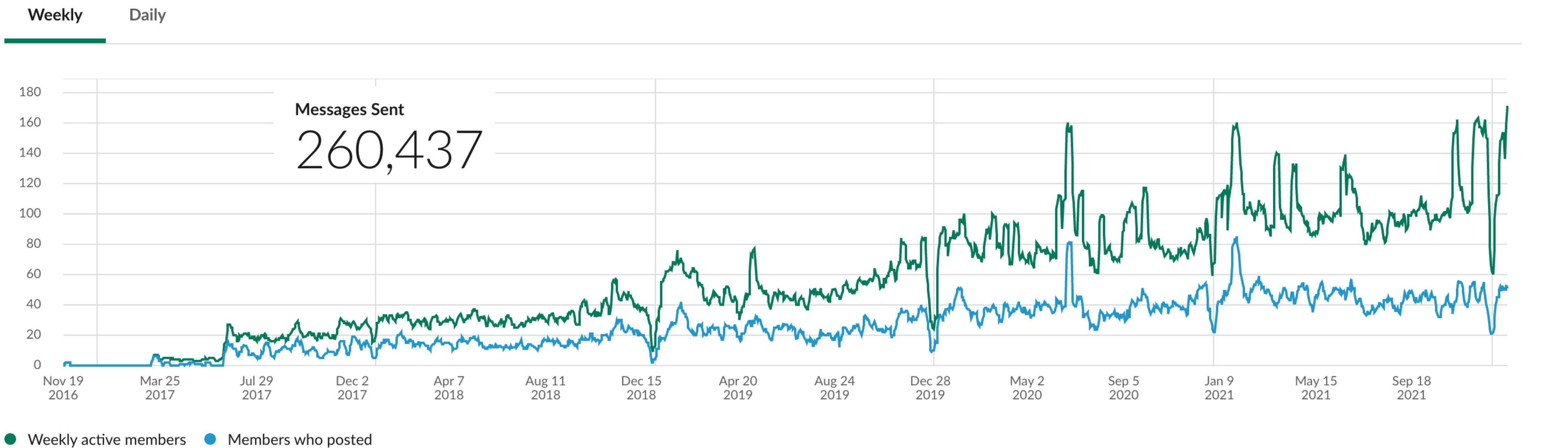
Steep increase in ratio of people (actively) joining Slack.  
Significant part of EasyBuild community is not on Slack (or ML)!

Join EasyBuild Slack via  
<https://easybuild.io/join-slack>

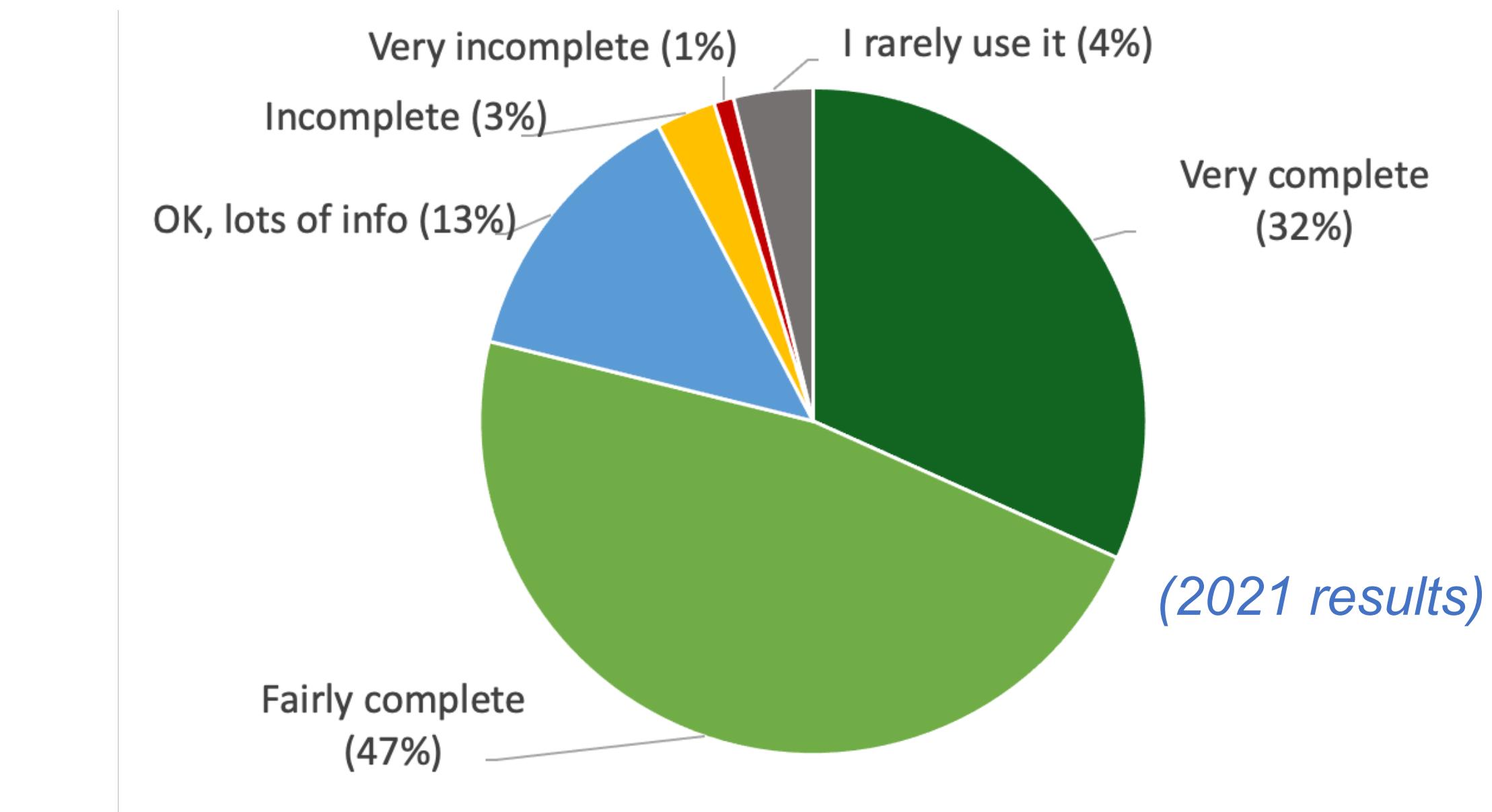
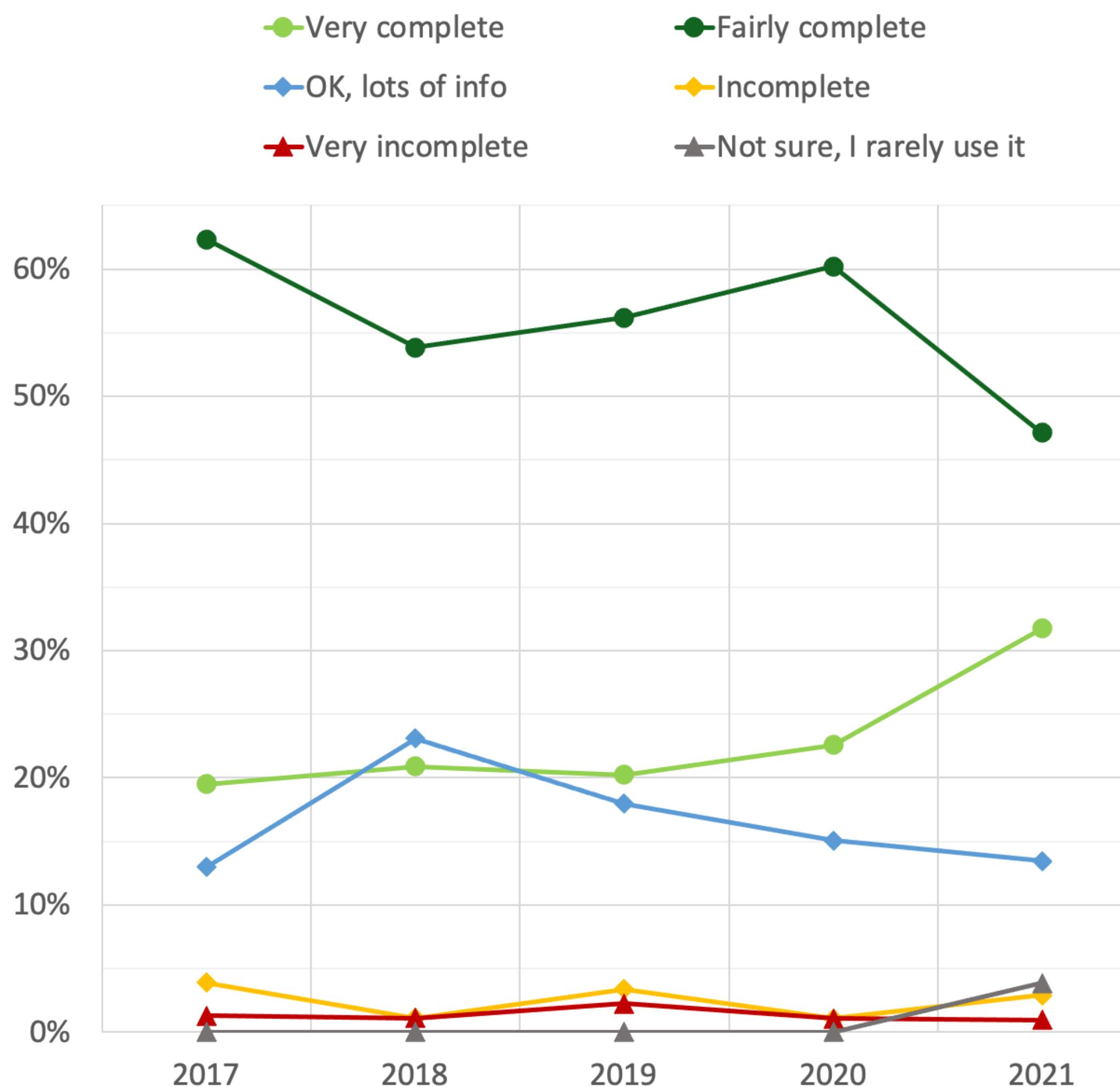


- steady growth in activity since start of EasyBuild Slack in 2017
- 542 members on Slack channel (+70 in 2019, +160 in 2020, +175 in 2021)
- Total messages sent increases quickly (since 2019: 105k → 192k → 260k)

Join EasyBuild Slack via <https://easybuild.io/join-slack> !



## *How complete is the EasyBuild documentation?*

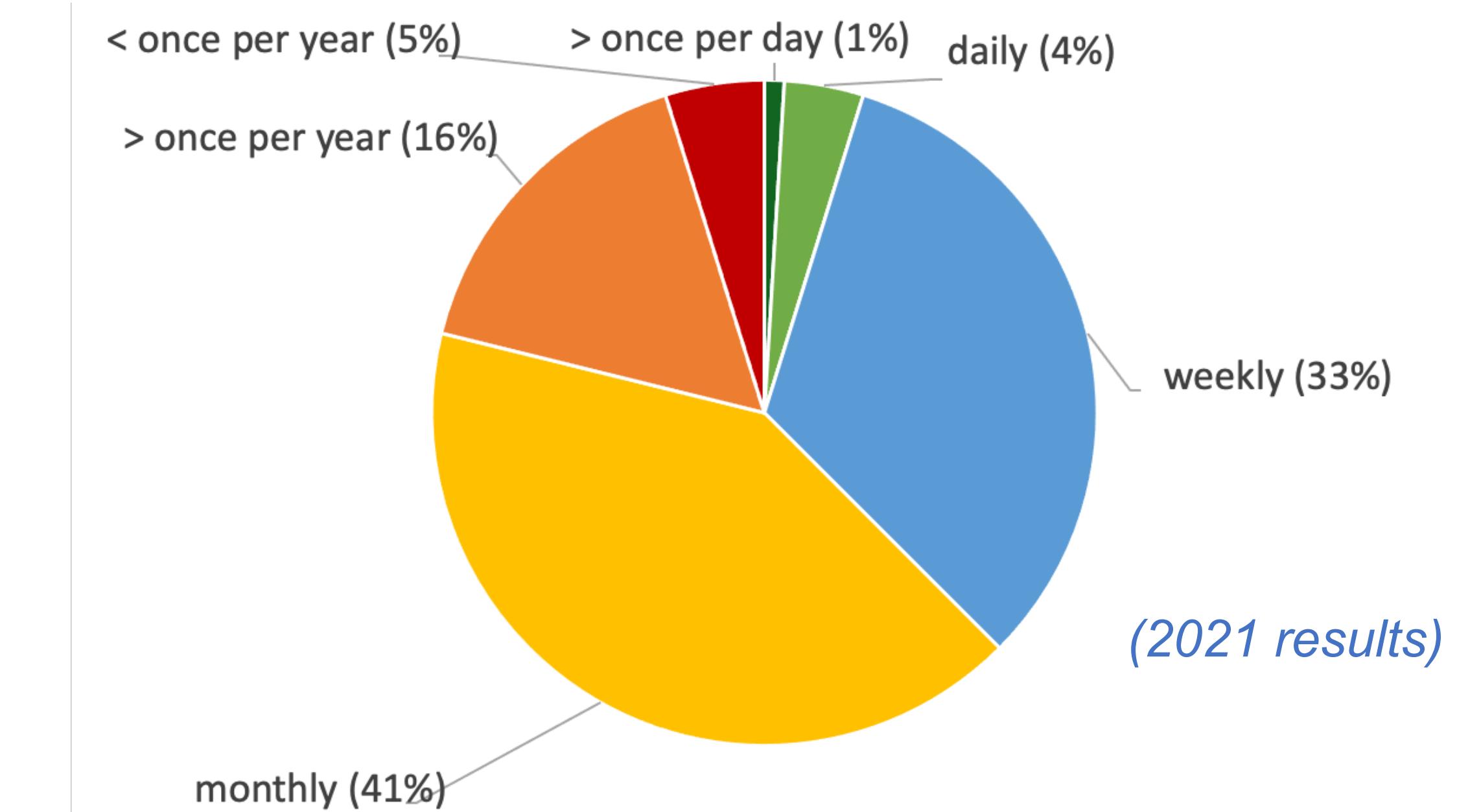
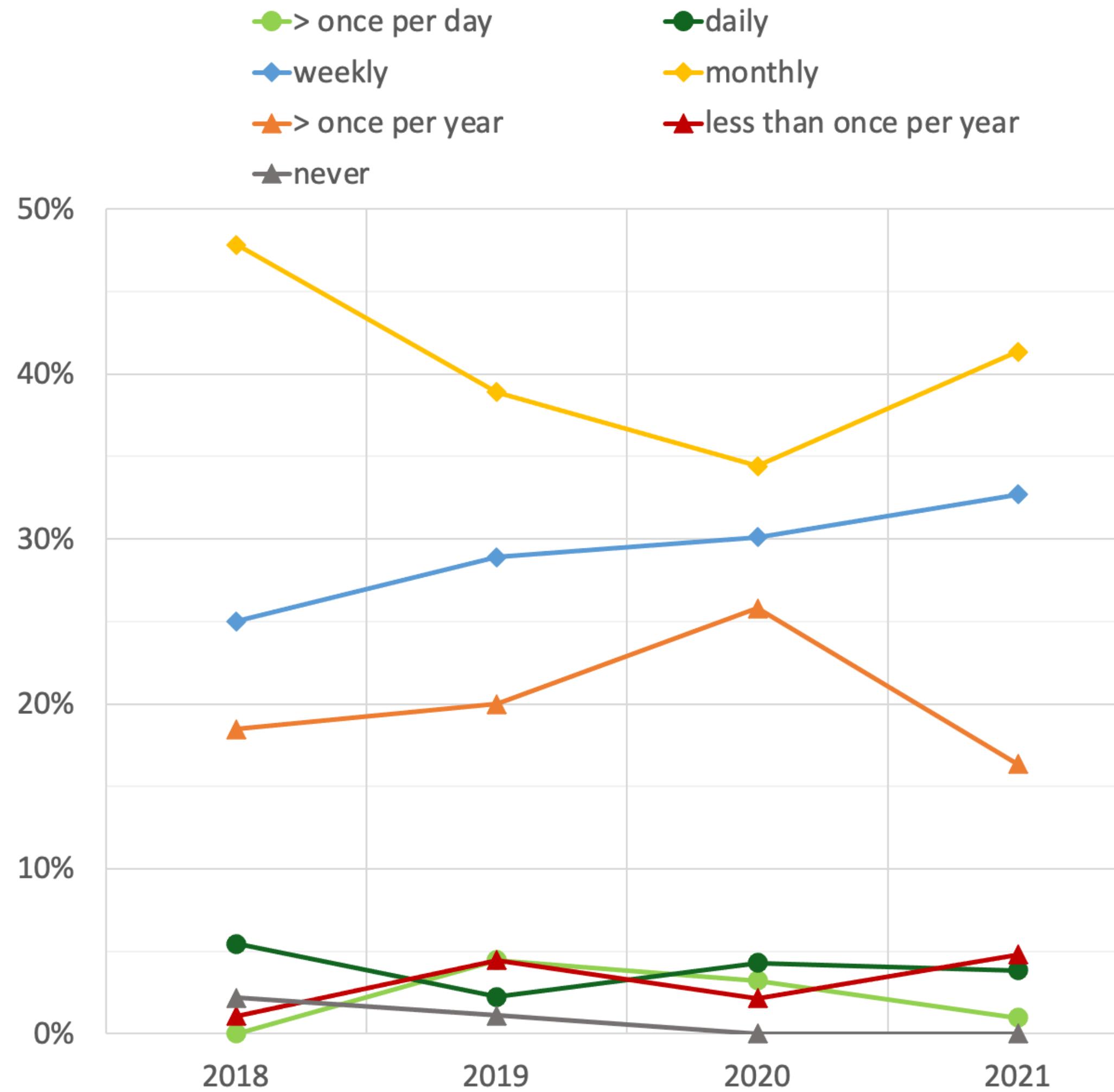


Vast majority (~79%) is positive about EasyBuild documentation

Remarkable shift towards "very complete"

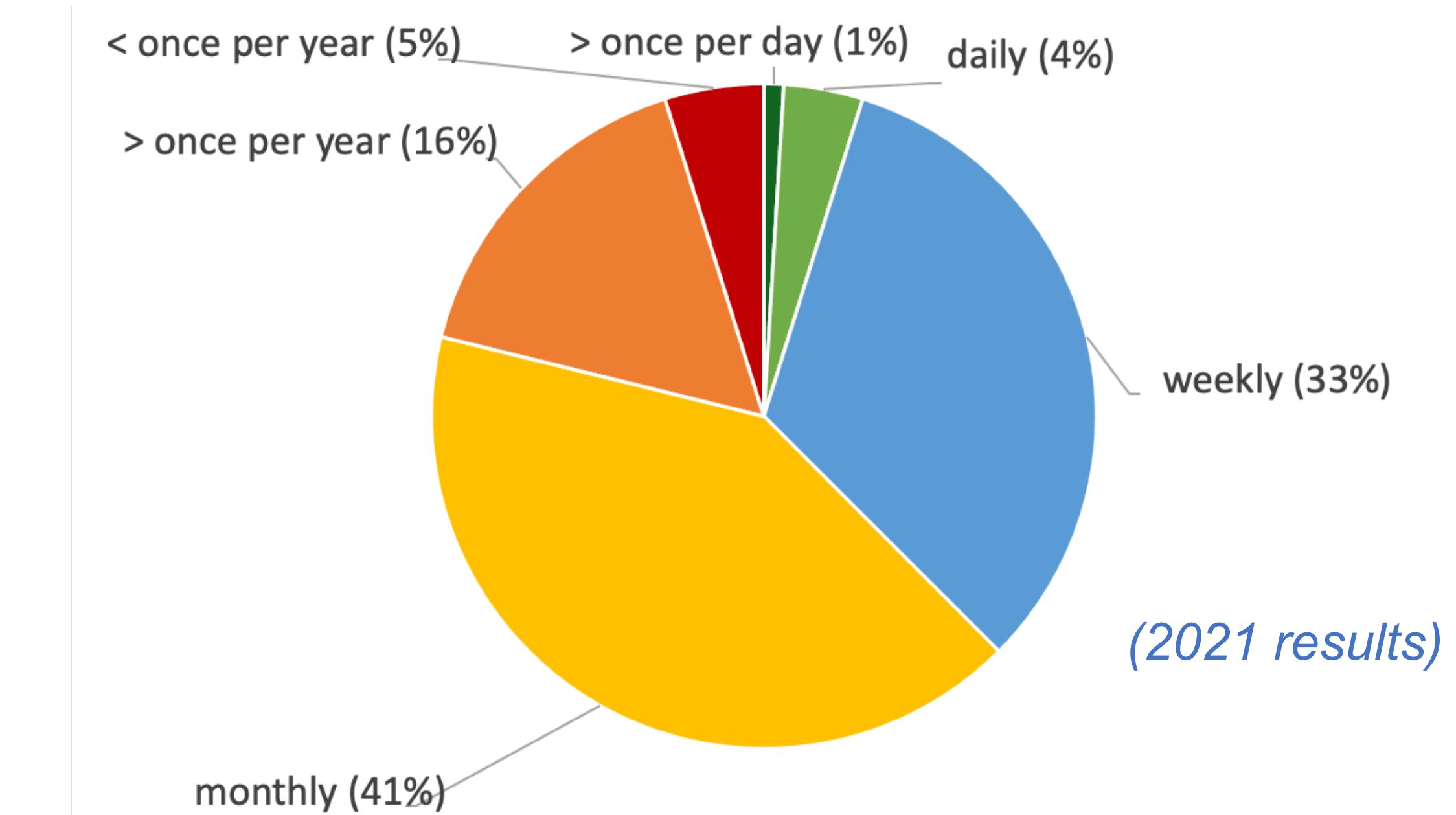
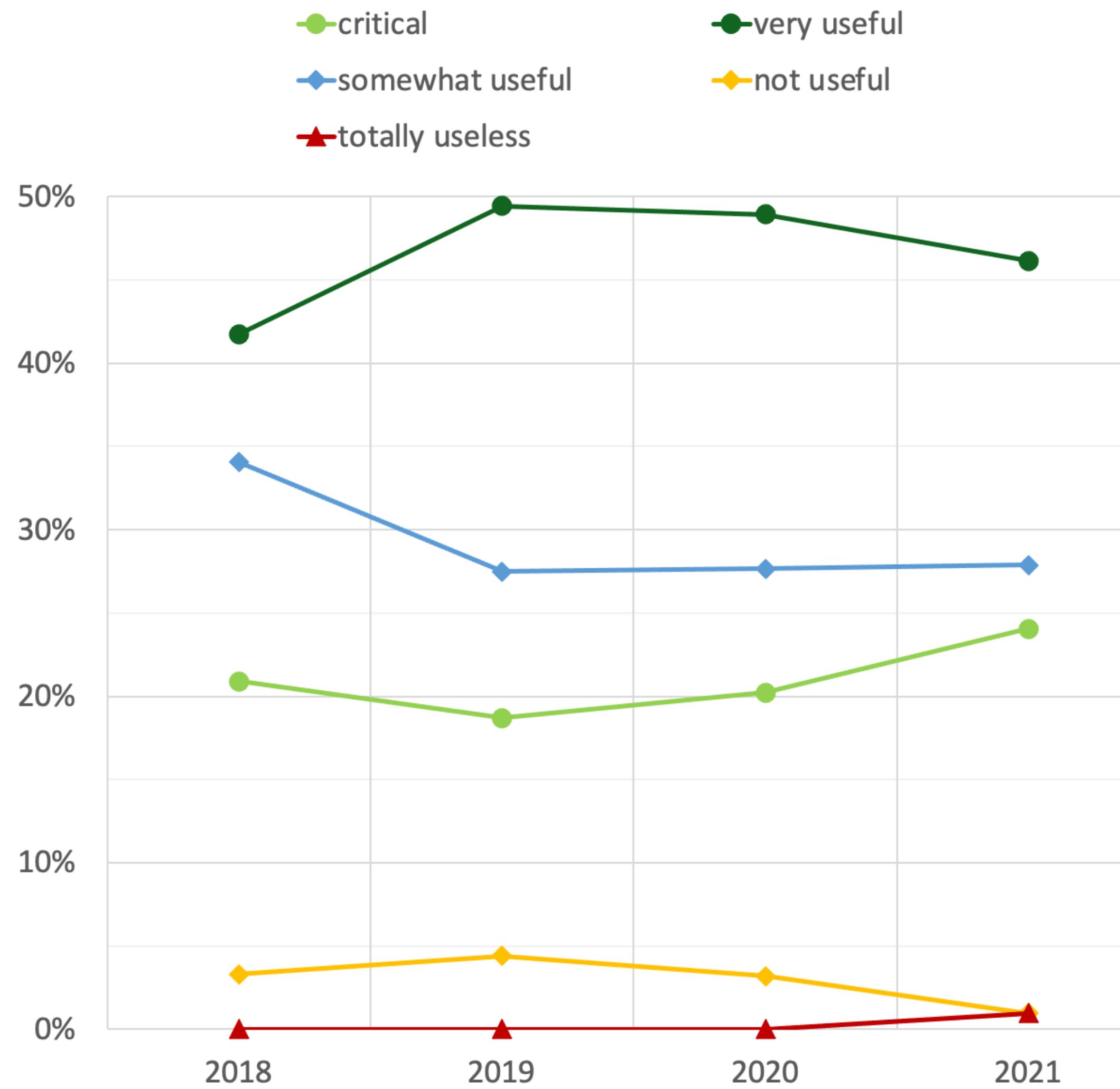
Effect of EasyBuild tutorial?

## *How often do you consult the EasyBuild documentation?*



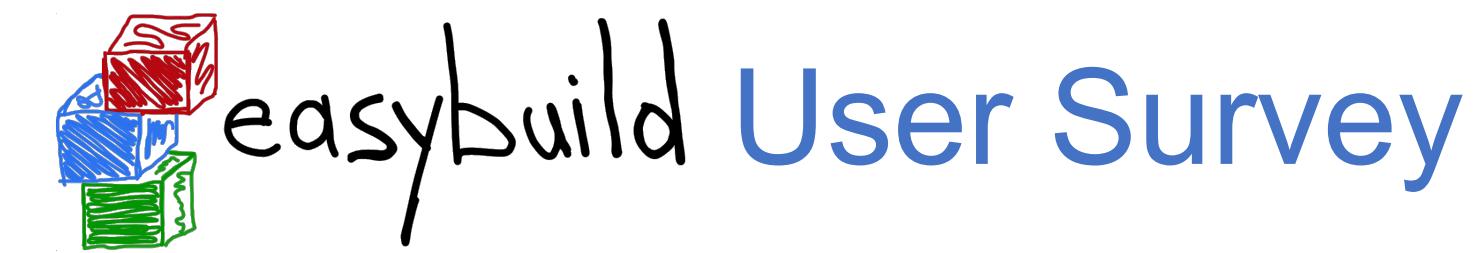
Shift towards more frequently consulting the documentation?

## *How useful is the EasyBuild documentation to you?*



Usefulness of documentation is slightly increasing

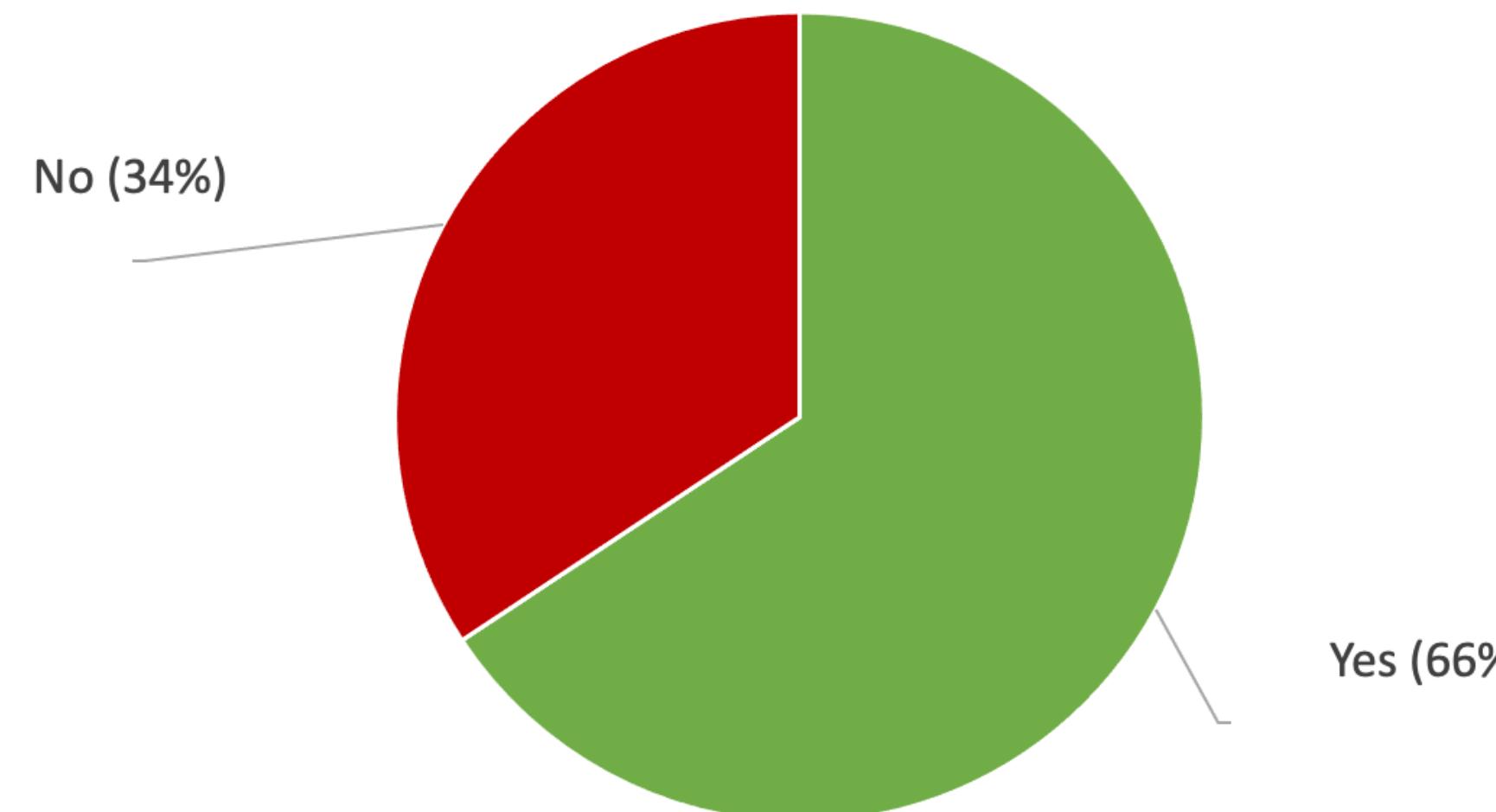
Effect of EasyBuild tutorial?



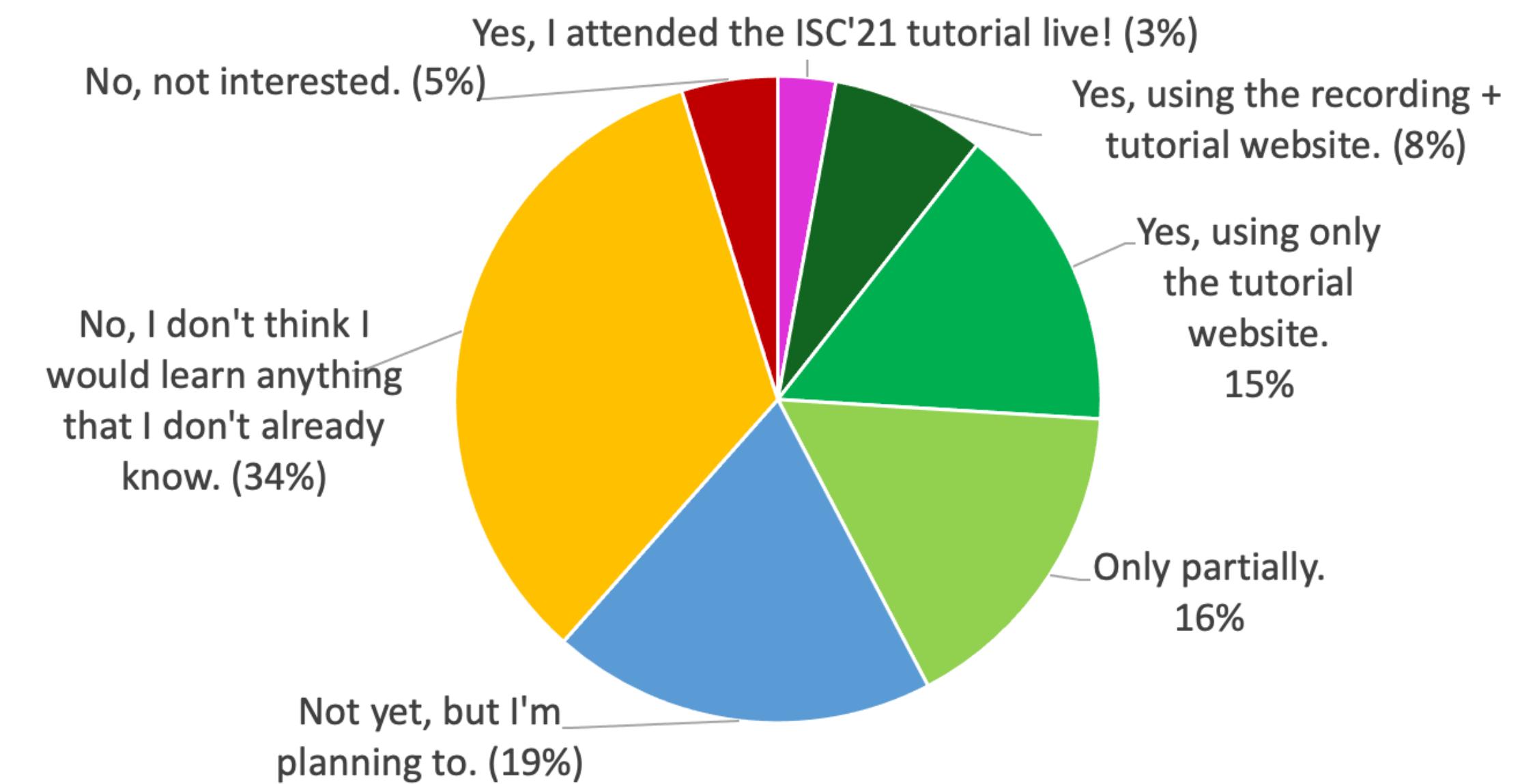
<https://easybuild.io/tutorial>

new survey question!

*Are you aware of the EasyBuild tutorial?*



*Have you worked through the introductory EasyBuild tutorial?*



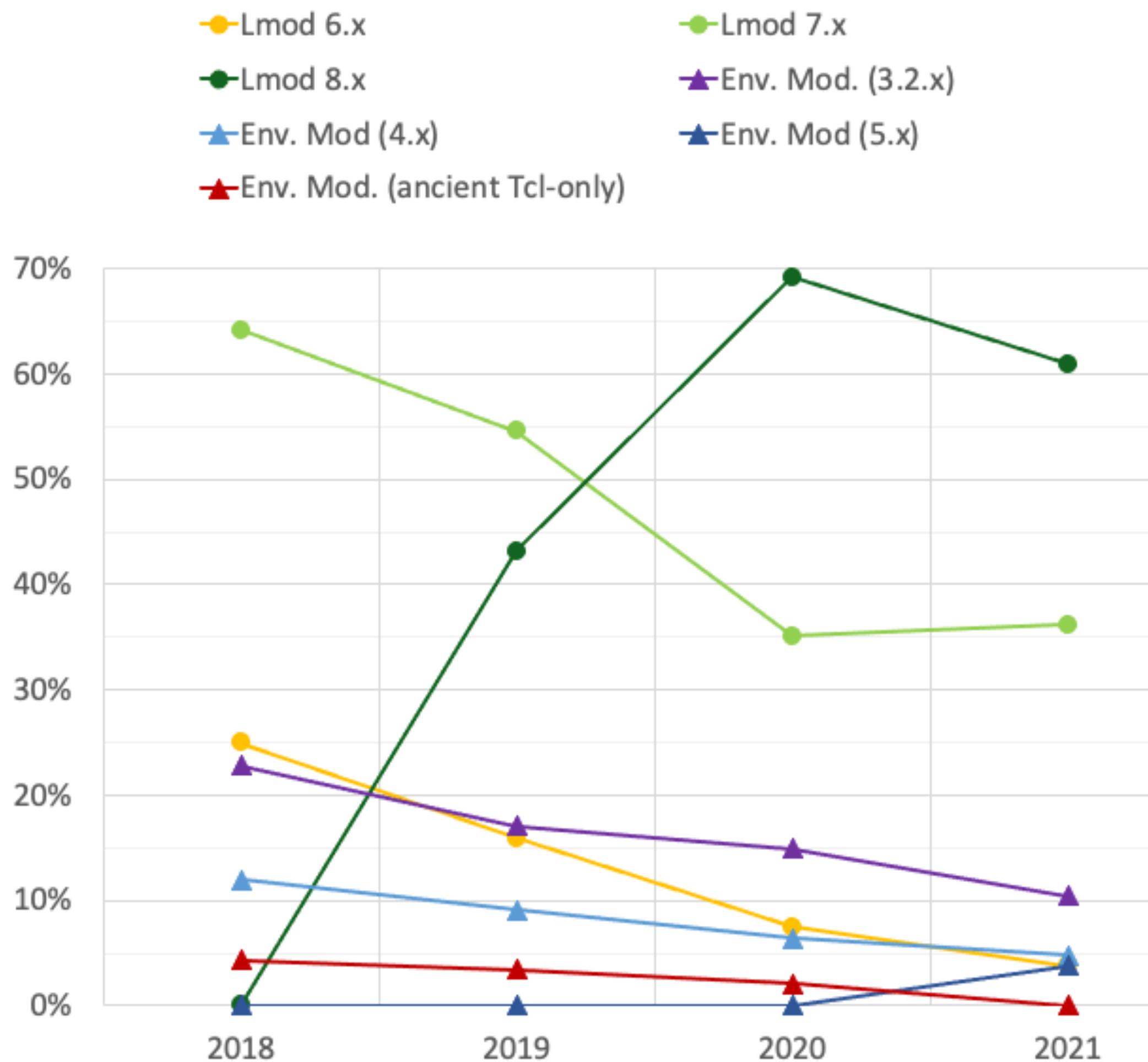
More awareness needed for EasyBuild tutorial, and which topics it covers...  
Additional tutorial sections needed on more advanced topics?

# Documentation revamp plans



- Current EasyBuild documentation:
  - `.rst` format (reStructuredText)
  - rendered using Sphinx (on ReadTheDocs)
- Goal is to migrate to:
  - `.md` (MarkDown) + rendering with `mkdocs`
  - Move documentation "sources" to separate `easybuild-docs` GitHub repository
- Motivation:
  - MarkDown format is also used in GitHub issues, PRs, wiki, EasyBuild tutorial
  - `mkdocs` tool is way more user-friendly: easy to locally render the docs
  - Material for Mkdocs is a very nice theme for technical documentation

## *Do you use any other tools/projects in combination with EasyBuild?*



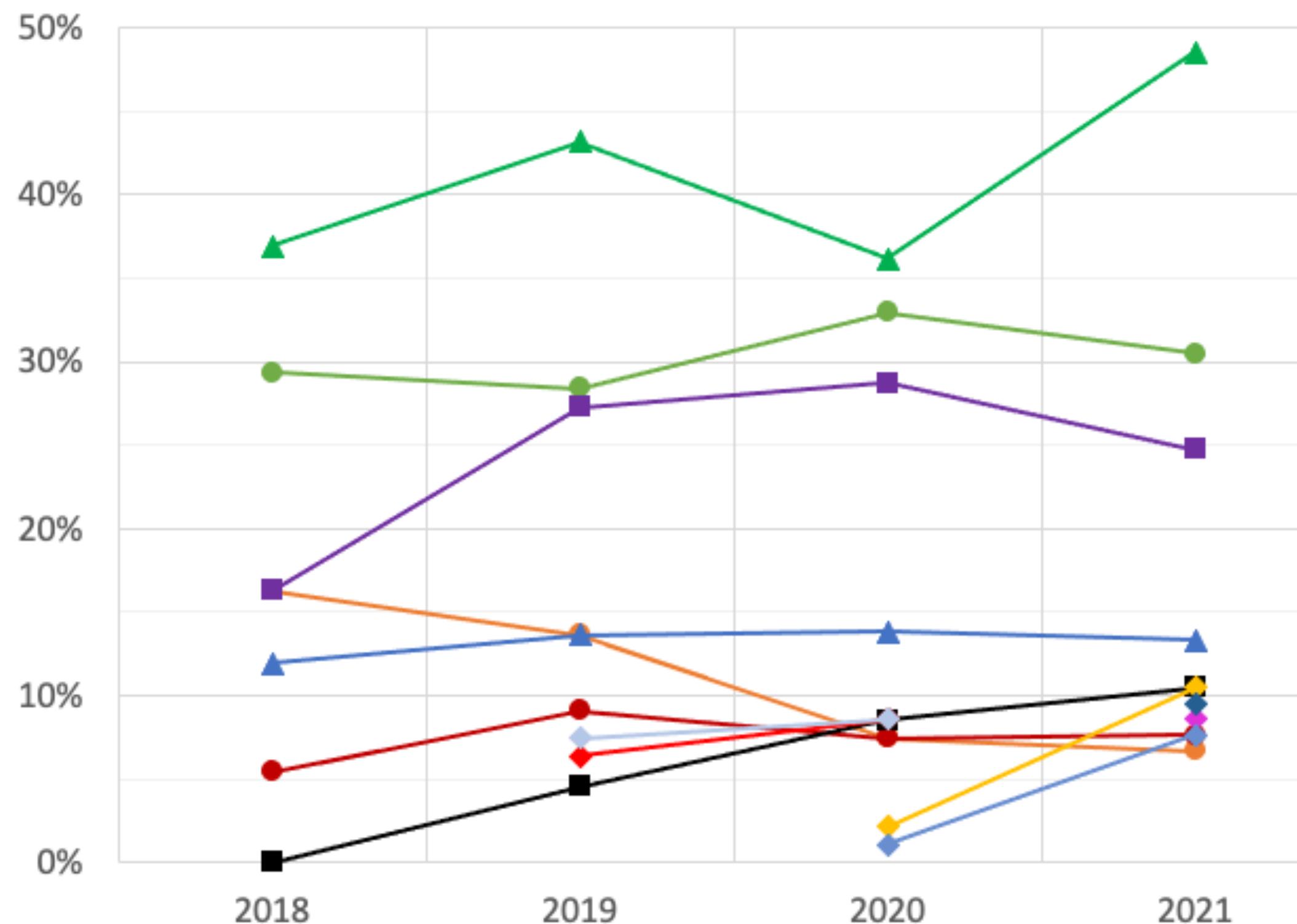
### Modules tool

- Lmod remains most popular modules tool (by far)
- ~61% is using Lmod 8.x, ~36% is using Lmod 7.x
- ~4% still using Lmod 6.x (deprecated in EasyBuild!)
  - Partially due to outdated Lmod package in Debian/Ubuntu
  - New maintainer for Lmod package in Debian/Ubuntu: Alexandre Strube (JSC)
- Environment Modules 5.x is chipping away market share?
- Most popular Environment Modules versions is *still* 3.2.x (Tcl/C)

## *Do you use any other tools/projects in combination with EasyBuild?*

● GC3Pie (eb --job)	● Slurm (eb --job)	● Spack
■ conda	■ Gentoo Prefix	▲ Singularity
▲ Docker	◆ Jenkins	○ archspec
◆ GitLab	◆ ReFrame	◆ Rich
◆ easy_update		

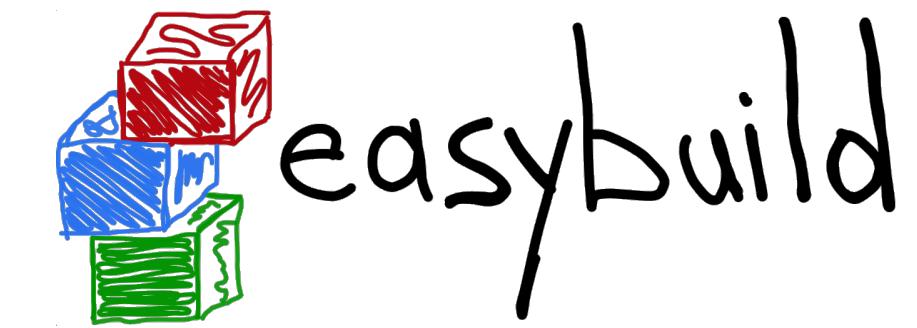
### *Other tools*



- Slurm more popular than GC3Pie as backend for eb --job
- Singularity and Conda used by over 30%
- Small stable minority (~8%) uses both EasyBuild and Spack
- Increased use of Gentoo Prefix, GitLab, ReFrame, archspec, Rich, easy\_update

*(only tools with > 5% usage are included here)*

# Recent enhancements & changes



- Performance improvements for easyconfig parsing and EasyBuild startup
- Use <https://sources.easybuild.io> as fallback source URL for downloading
- Support for re-running sanity check using `eb --sanity-check-only`
- Support for `eb --skip-extensions`
- Replace OpenBLAS with FlexiBLAS in `foss/2021a` & newer `foss` versions
- `foscuda` toolchains replacement with `foss + CUDA + UCX-CUDA`
- Support for `eb --check-eb-deps`
- Rich output, progress bars
- Support for installing extensions in parallel (experimental)

# Rich output, progress bars



- Progress bar to show progress on downloading of files, installation steps, extensions, easyconfigs being installed, ...

```
Installing 'reshape2' extension (116/990) ━━━━━━━━ 0:26:14
... Installing R/4.1.0-foss-2021a: taking care of extensions (9 out of 17 steps done) ━━━━━━ 0:33:48
0:36:40 2 out of 3 easyconfigs done: CMake/3.20.1-GCCcore-10.3.0 (OK), bzip2/1.0.8-GCCcore-10.3.0 (OK)

$ eb /tmp/GCCcore-11.2.0.eb --fetch --sourcepath /tmp/$USER
= Temporary log file in case of crash /tmp/eb-8t45cork/easybuild-k2gnp0tv.log
= processing EasyBuild easyconfig /tmp/GCCcore-11.2.0.eb
= building and installing GCCcore/11.2.0...
  >> installation prefix: /user/gent/400/vsc40023/eb_arcaninescratch/RHEL8/zen2-ib/software/GCCcore/11.2.0
= fetching files...
Downloading gcc-11.2.0.tar.gz ━━━━━━━━ 52.4/143.2 MB 5.5 MB/s 0:00:17
Fetching files: 10% (1/10) ━━━ 0:00:10 (gcc-11.2.0.tar.gz)
```

- Requires to have the Rich Python package installed (which requires Python 3)

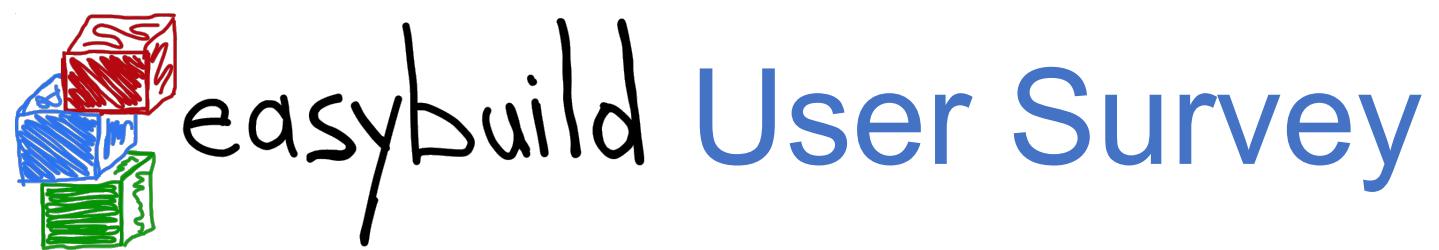
```
pip3 install rich
```

- Supported since EasyBuild 4.5.0, controlled via `--output-style` configuration setting
- See documentation at [https://docs.easybuild.io/en/latest/Progress\\_bars.html](https://docs.easybuild.io/en/latest/Progress_bars.html)

# Installing extensions in parallel

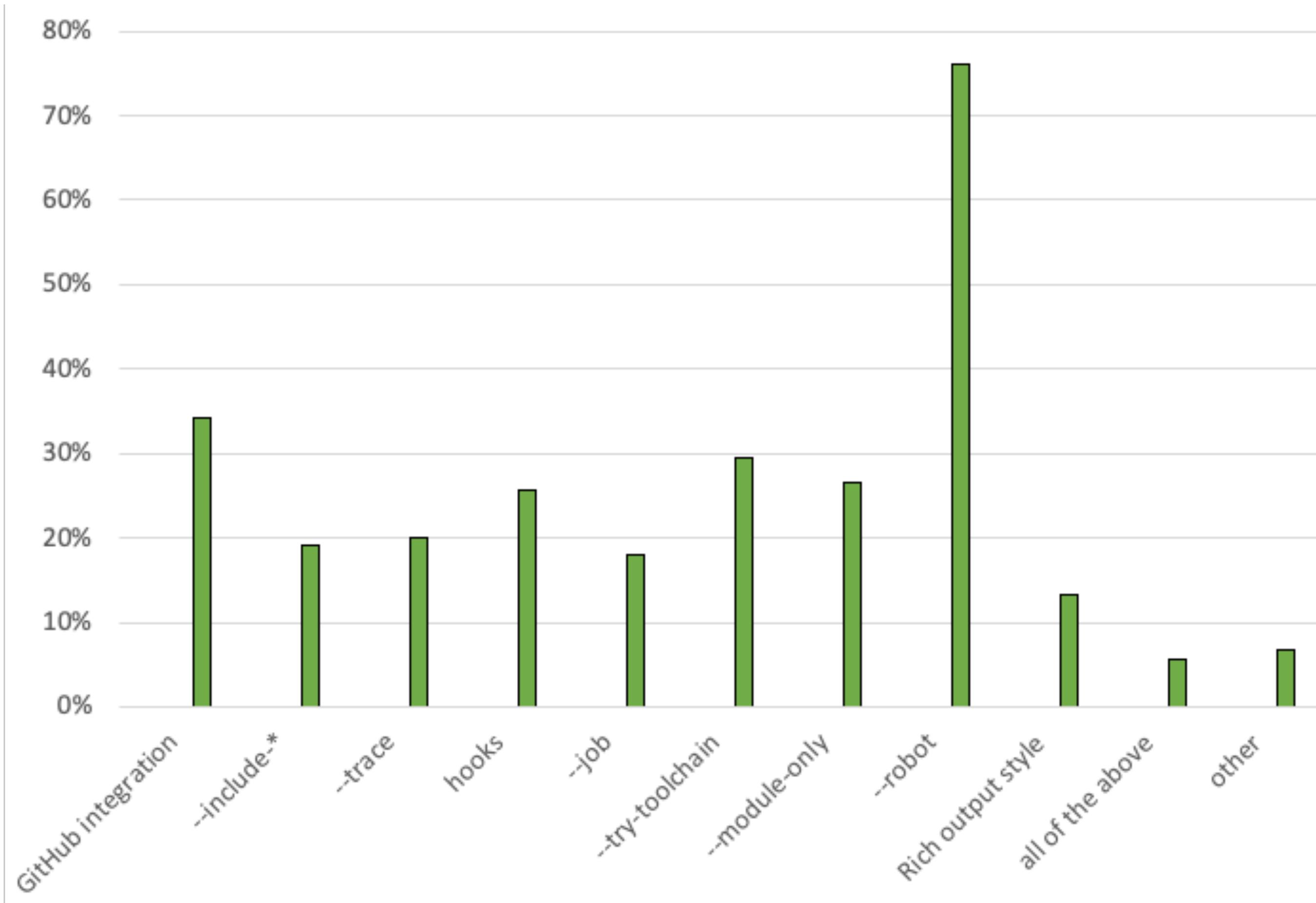


- **Experimental feature** (requires configuring EasyBuild to enable using it)
- Only works for R packages currently
- Significant speedup for R with `eb --experimental --parallel-extensions-install`
- For other extension types (Perl, Python, ...) we need to known how to extract dependencies
- Extensions installed in other modules not taken into account yet
- So installing extensions in R-bundle-Bioconductor in parallel not working yet...
- See documentation at [https://docs.easybuild.io/en/latest/Installing\\_extensions\\_in\\_parallel.html](https://docs.easybuild.io/en/latest/Installing_extensions_in_parallel.html)

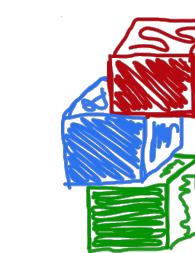


## *What are your favourite EasyBuild features?*

(question type changed in 2021 survey from single-answer to multi-answer)

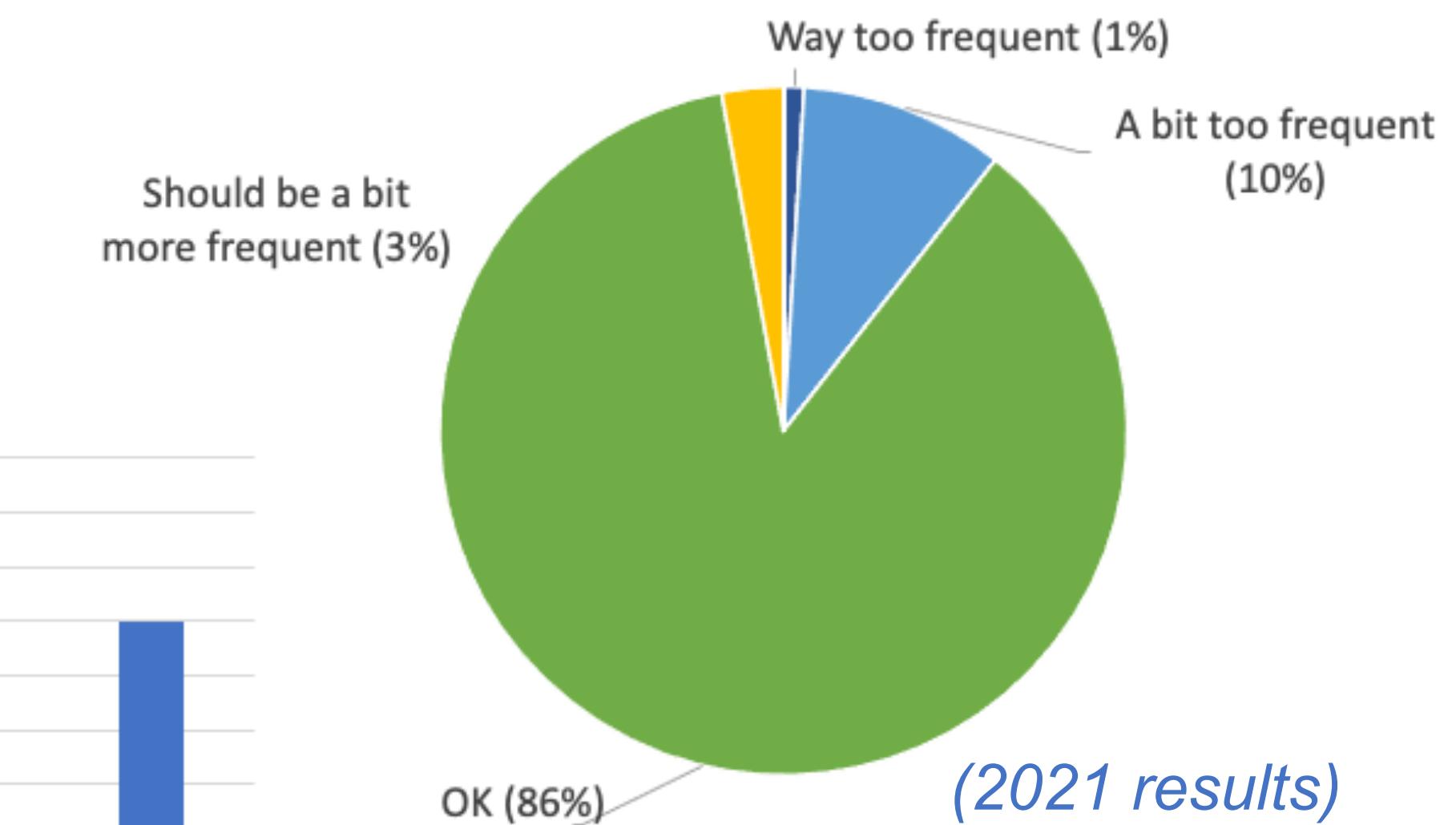
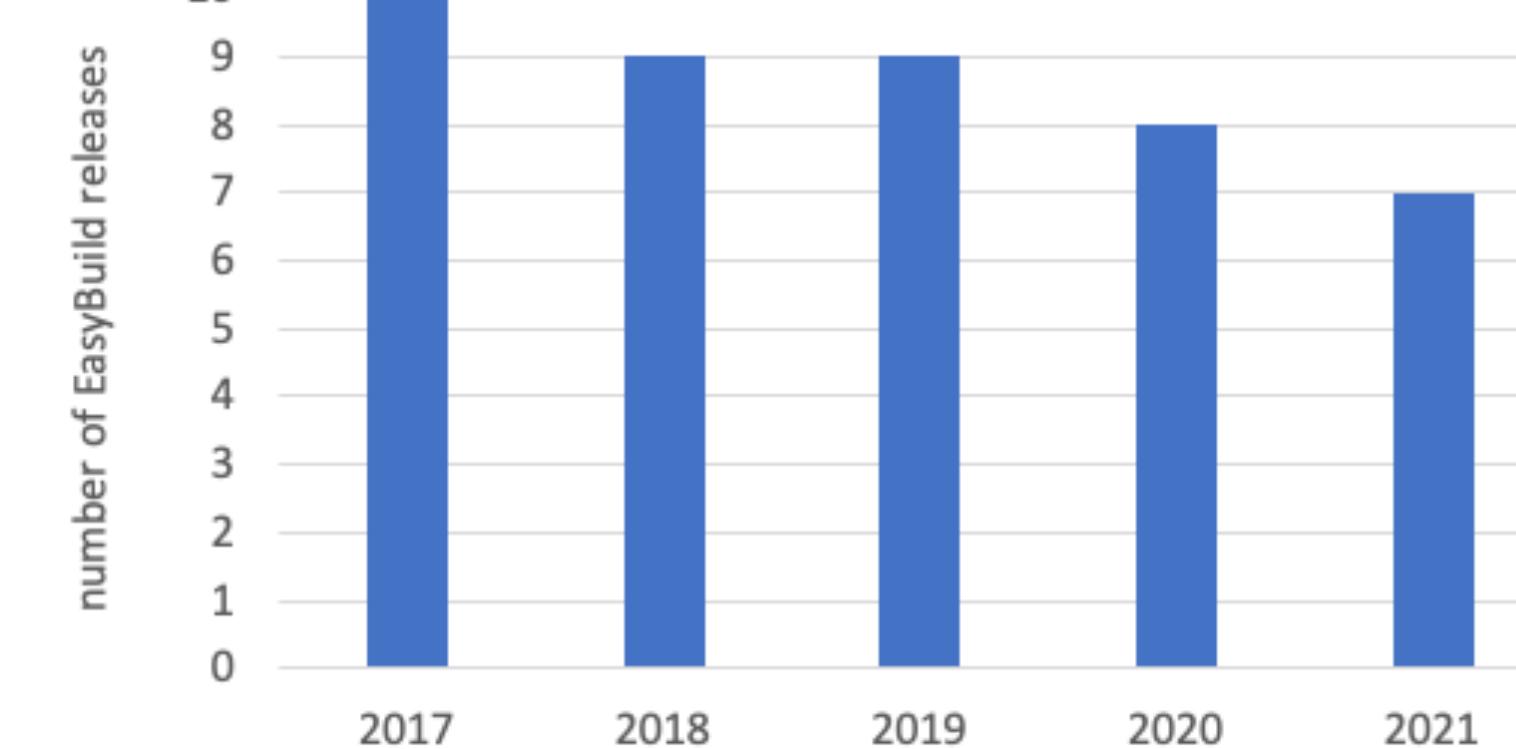
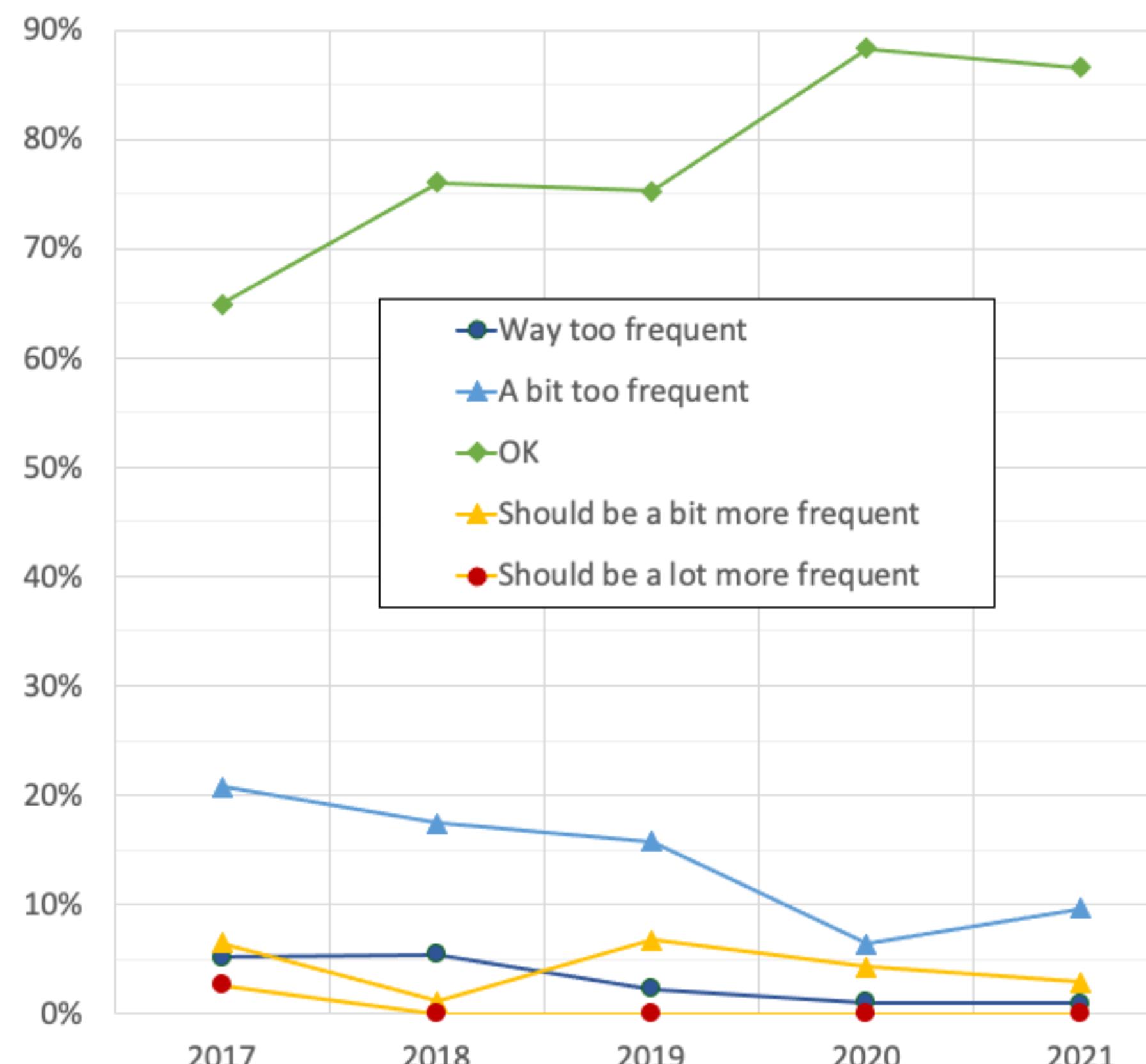


- Powerful features are underappreciated?
  - GitHub integration (`--new-pr & co`)
  - Hooks (customization)
  - Distributed installation (`--job`)
  - Rich output style (progress bars)



# easybuild User Survey

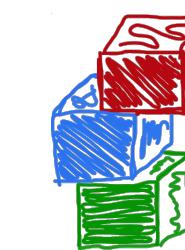
*How do you like the frequency of EasyBuild releases?*



Number of EasyBuild releases has been slowly declining over the years

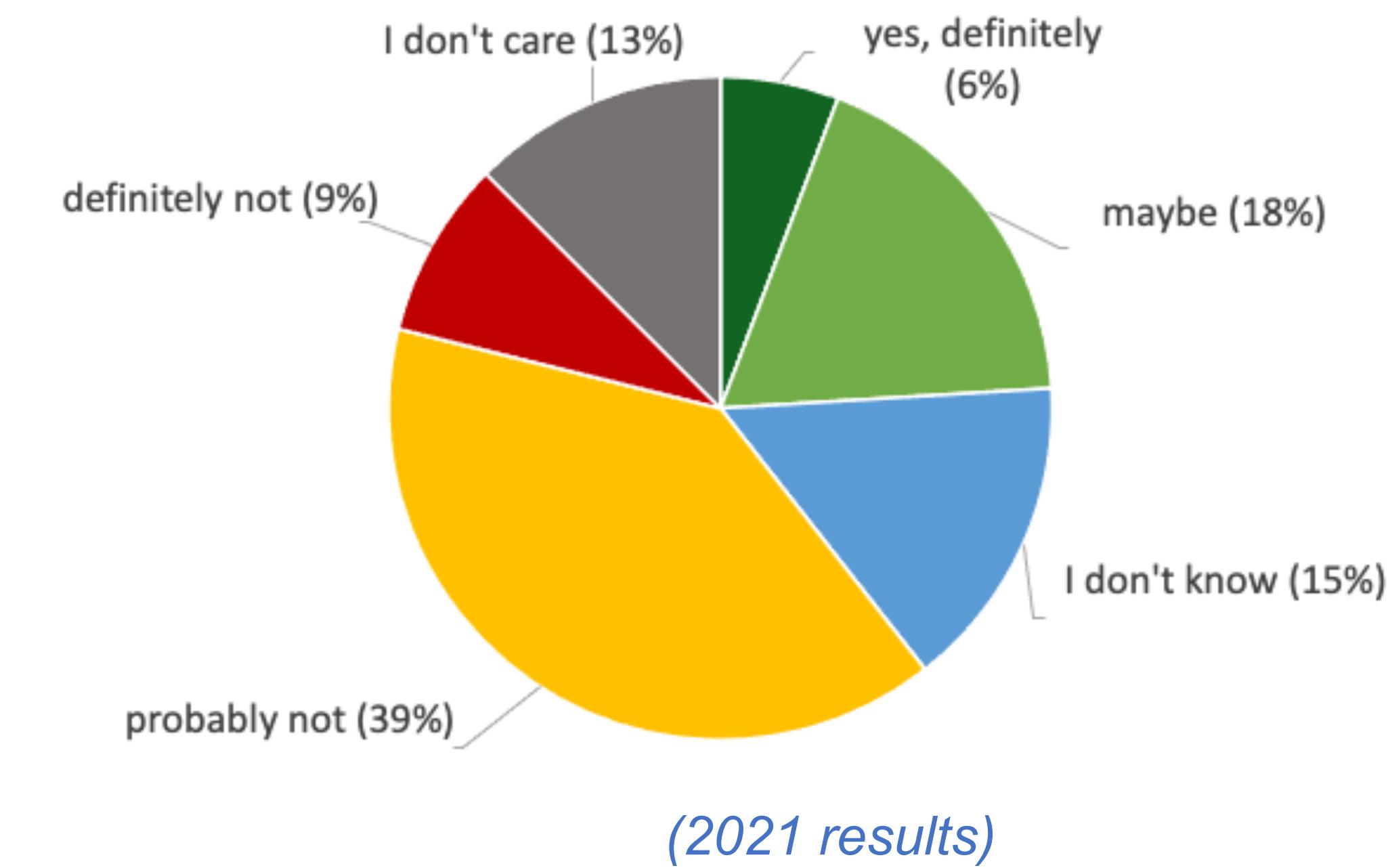
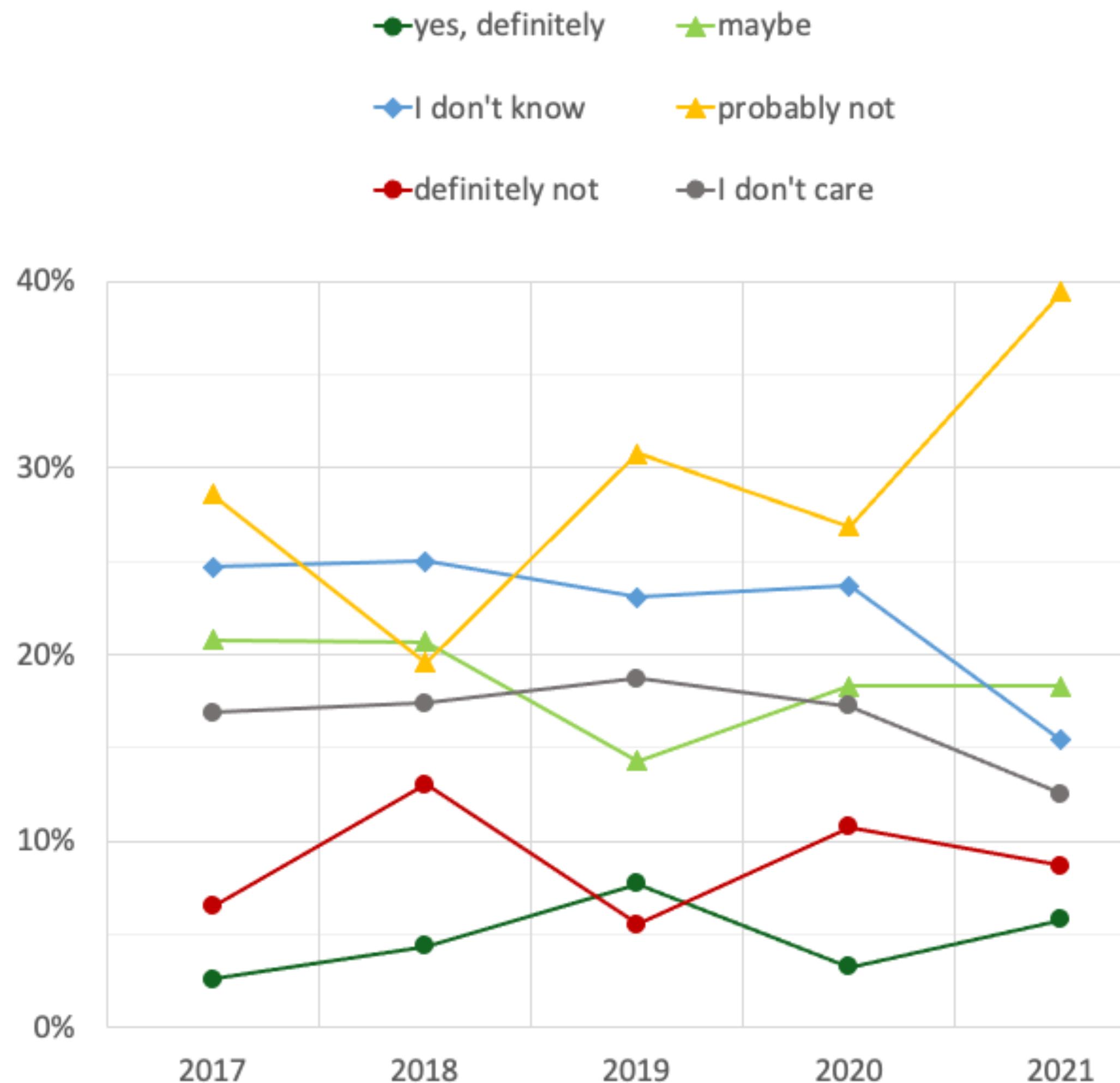
Currently: new EasyBuild release every 7-8 weeks

Frequency is better appreciated now than before 



# easybuild User Survey

*If a commercial support option would be available, would you consider purchasing it?*



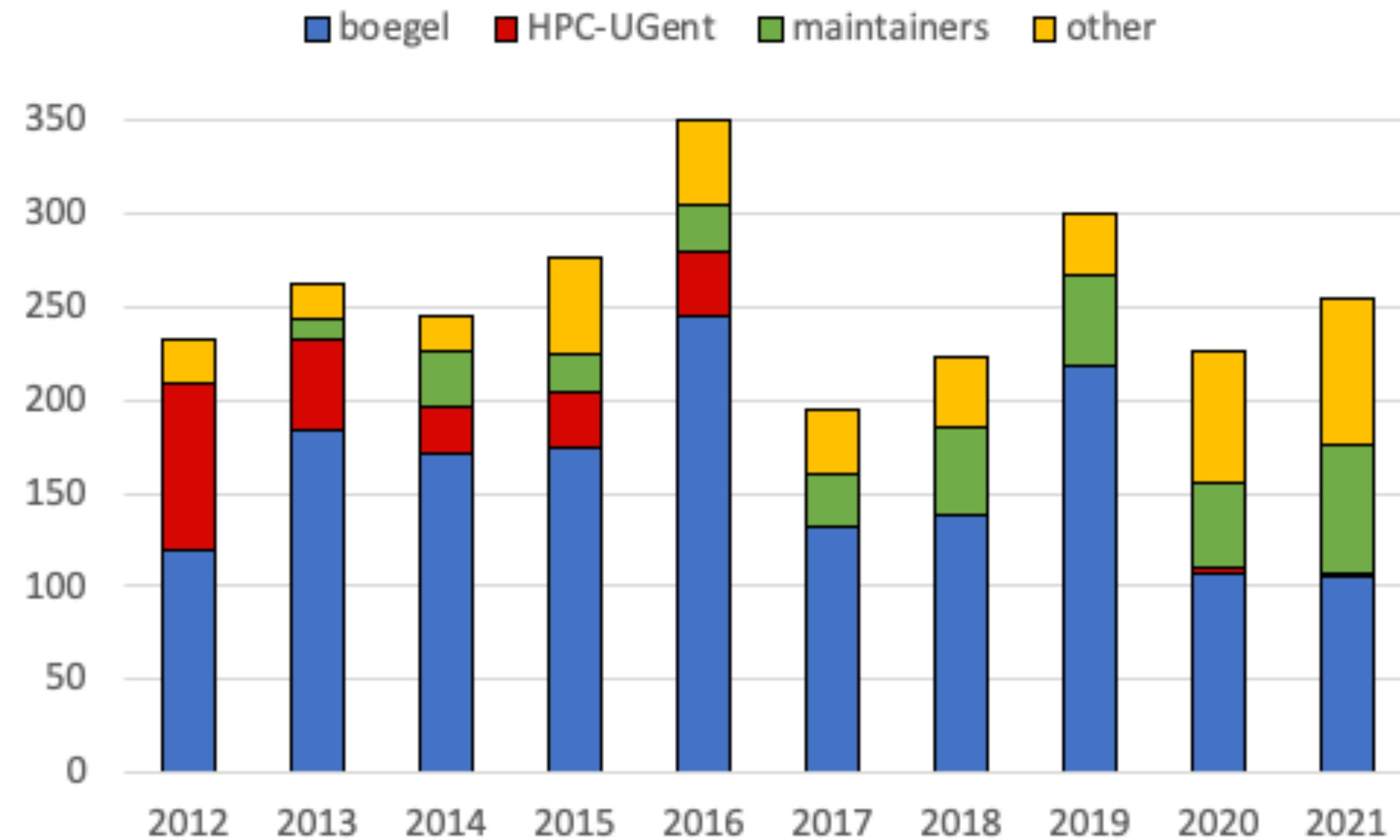
Less people feel a need for commercial support?

About ~25% may be interested

# Contributors, contributors, contributors...

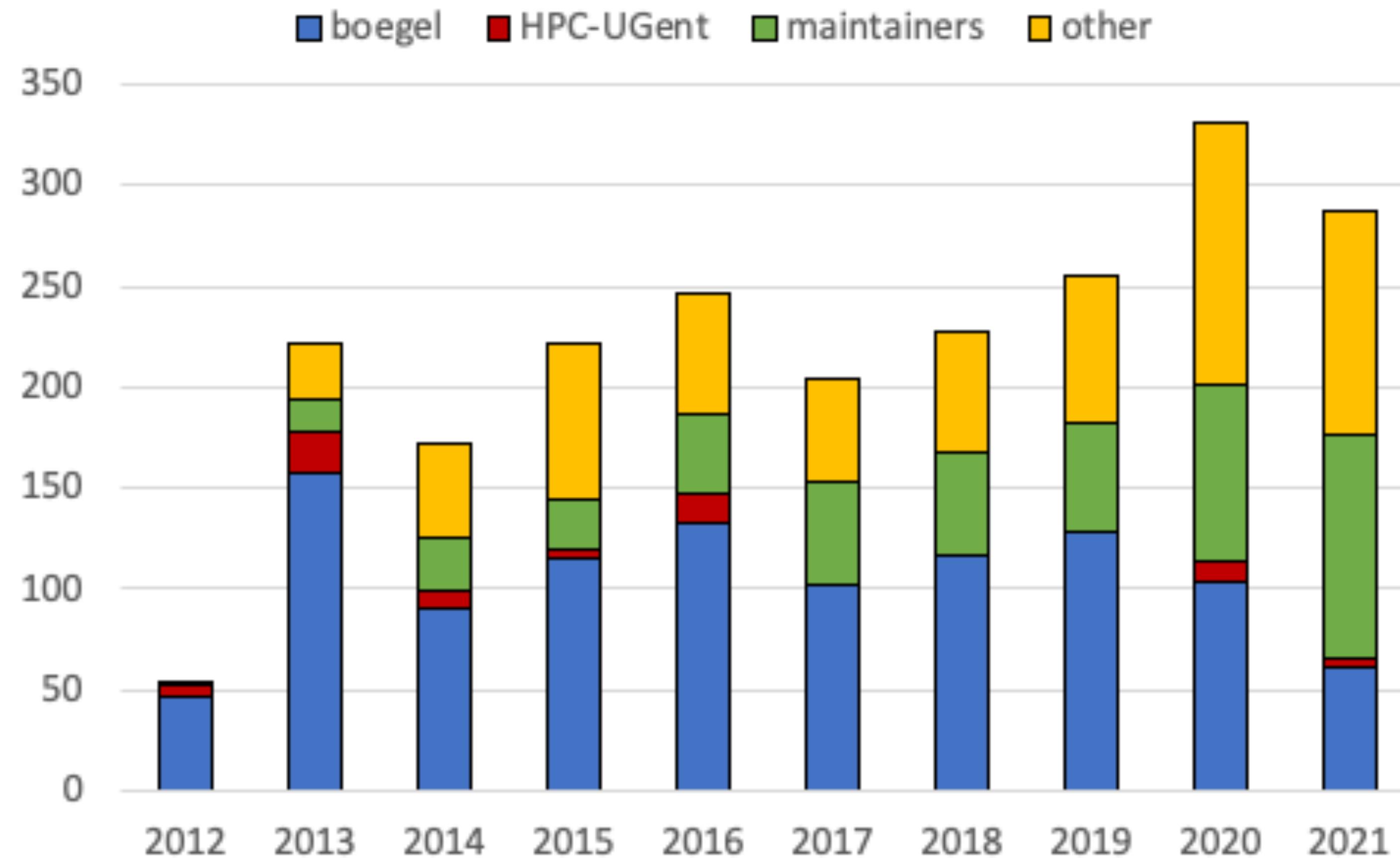


# Overview of contributions (framework)



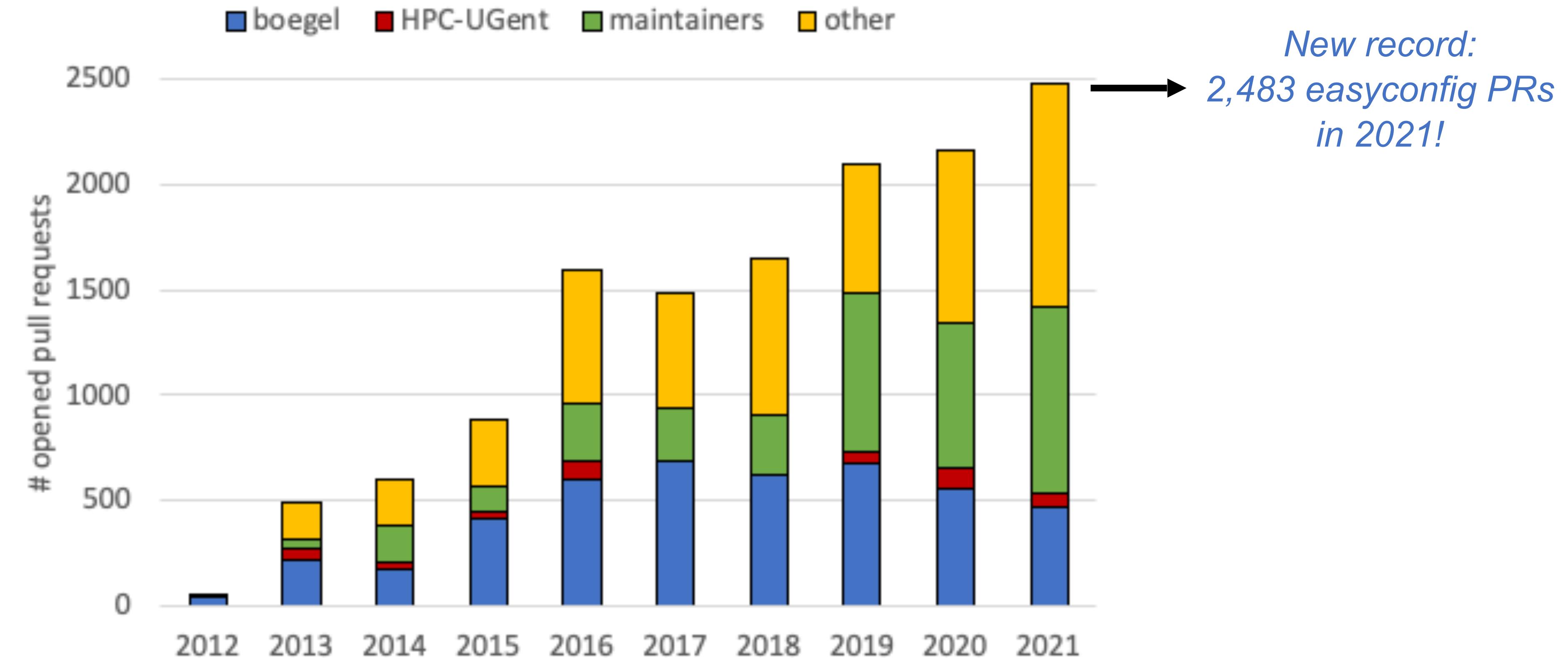
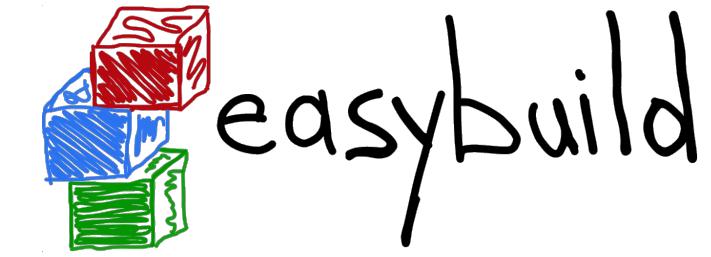
- Almost 60% of framework PRs in 2021 by contributors outside HPC-UGent
- Peak in PRs in 2019 is due to effort for porting EasyBuild to Python 3

# Overview of contributions (easyblocks)



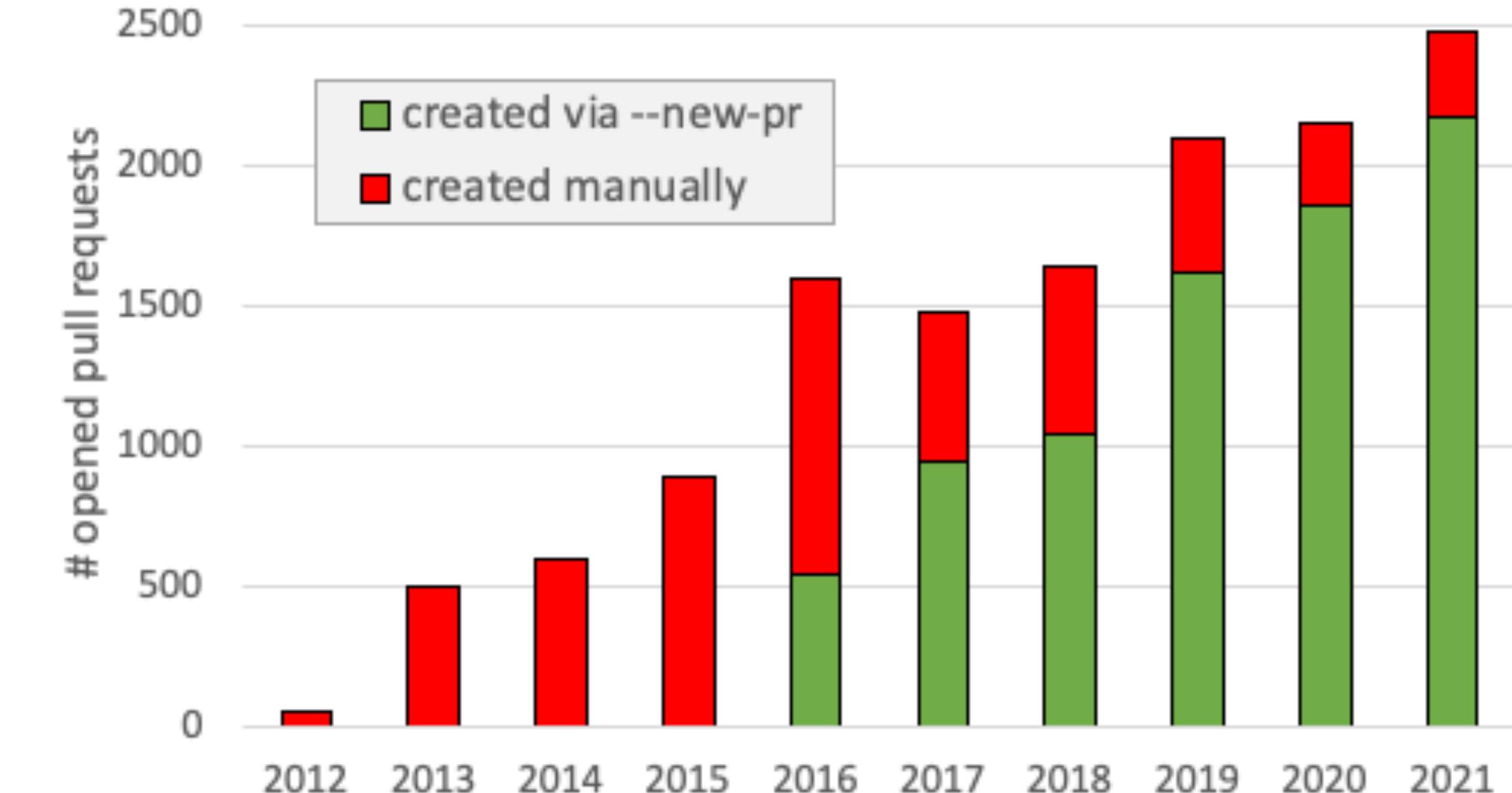
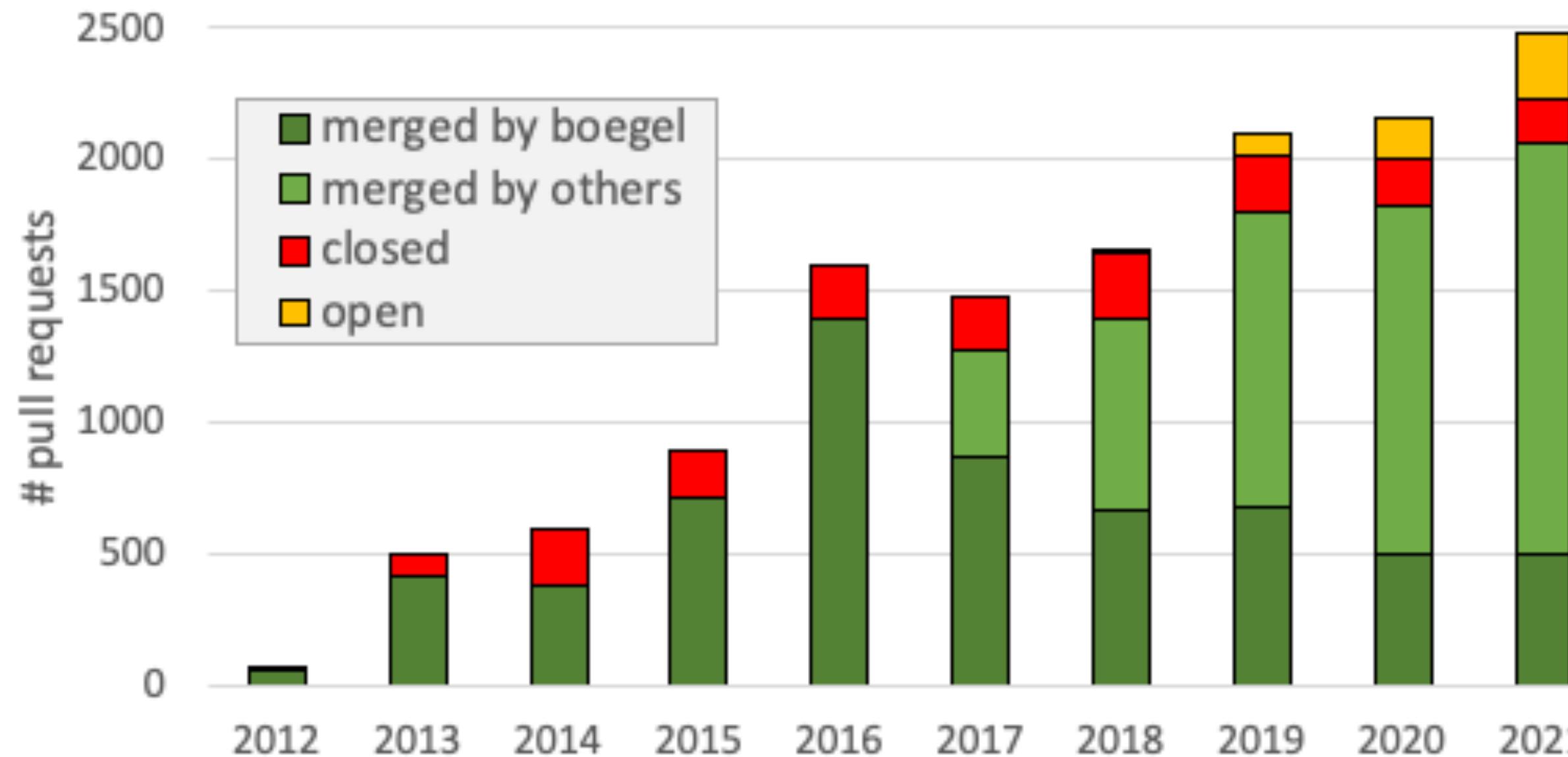
- Slightly less contributions compared to last year, but still over 250 PRs in 2021
- > 75% of PRs by outside contributors, ~39% by people who are not an EasyBuild maintainer

# Overview of contributions (easyconfigs)



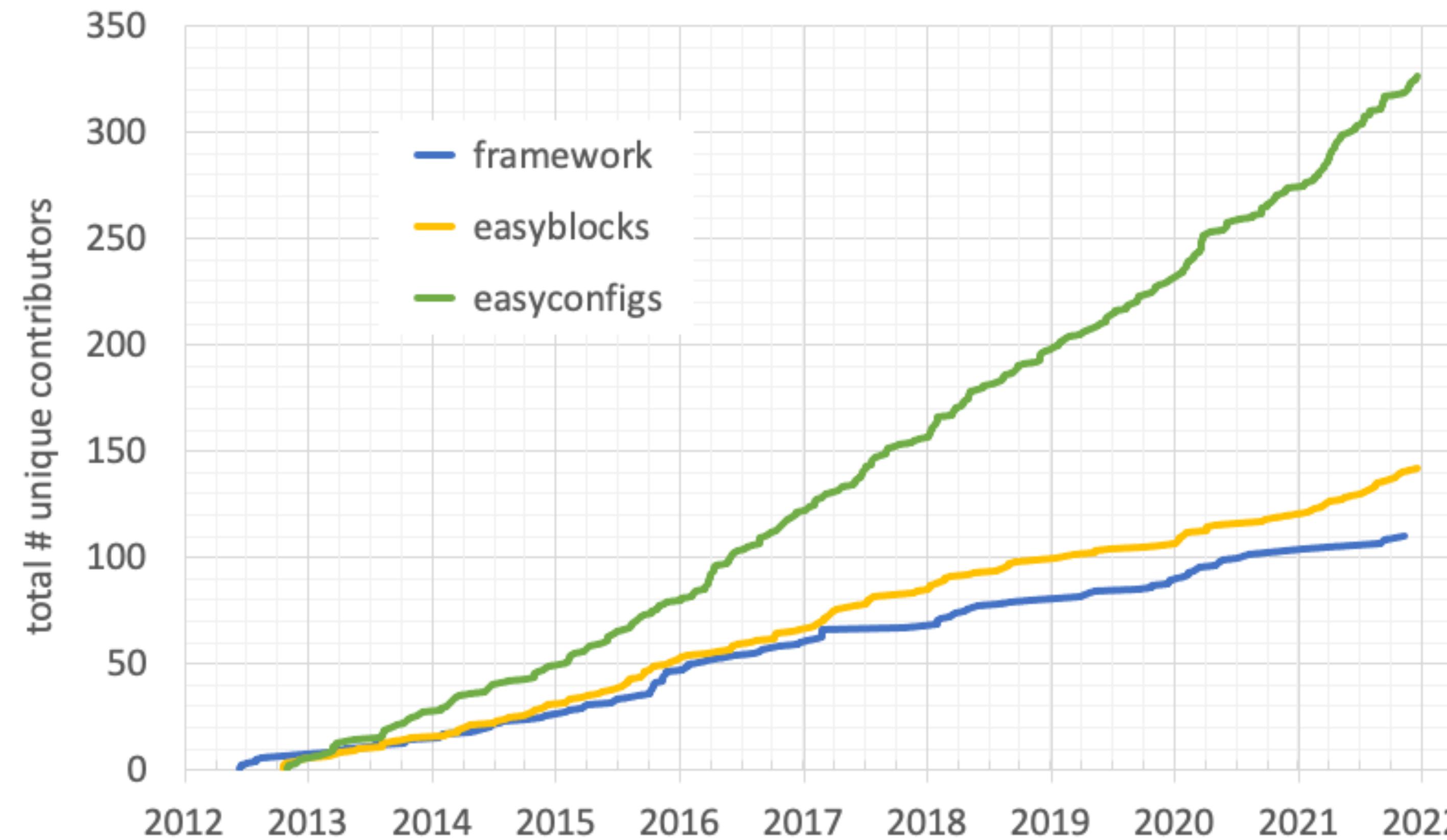
- Explosive growth in easyconfig PRs in 2016 (partially thanks to `--new-pr`)
- Stabilised in 2016-2018, significant increase in 2019-2020 > 2,000 PRs, in 2021 almost 2,500 !
- Growing ratio of PRs from contributors outside of HPC-UGent, now over 80%

# Overview of contributions (easyconfigs)



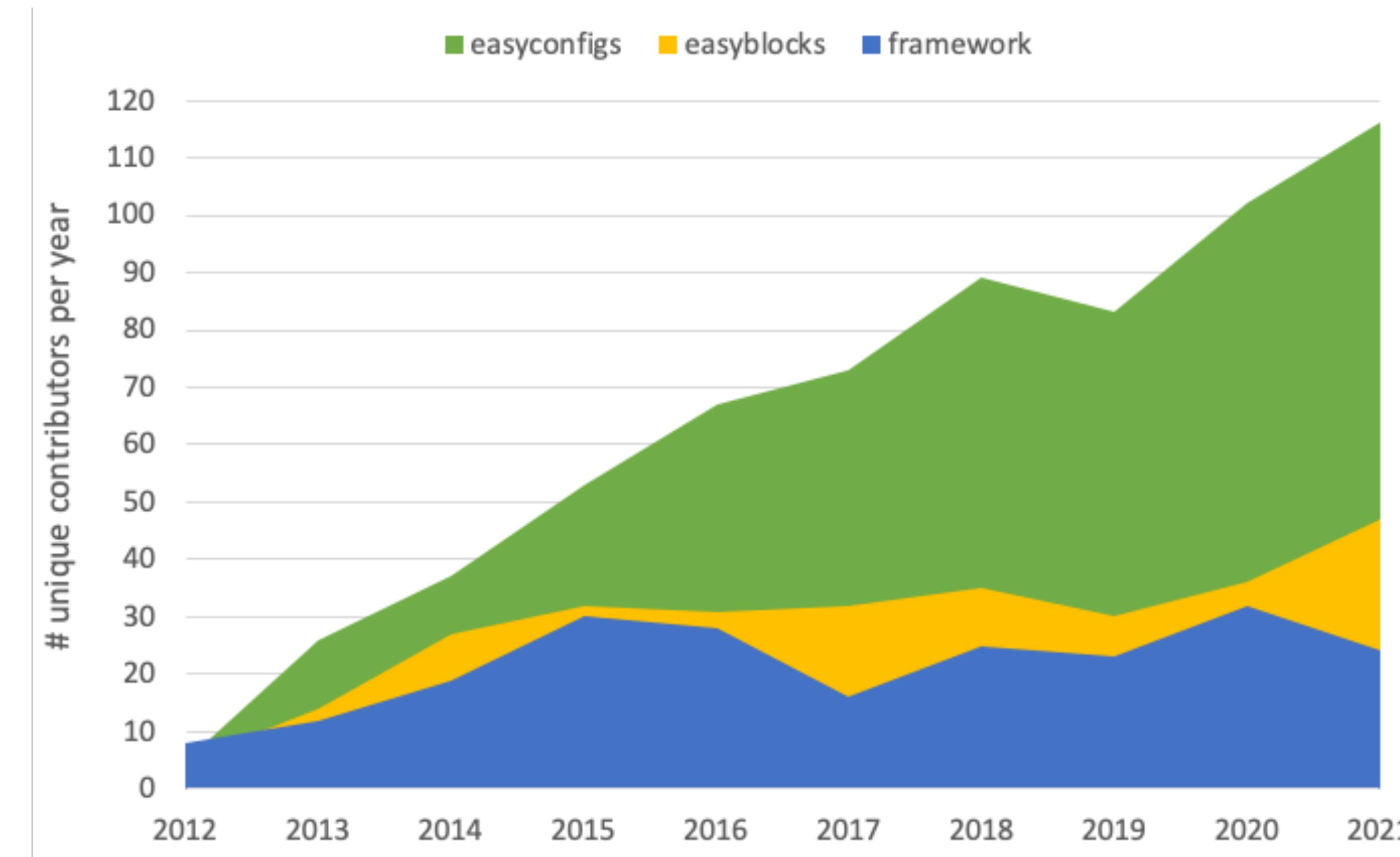
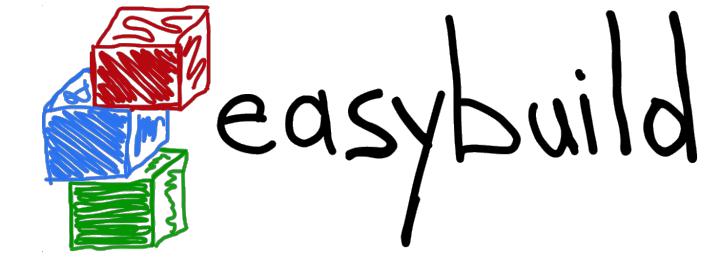
- Growing number of easyconfig PRs merged by other maintainers (~76% in 2021)
- Ratio of PRs opened with "eb --new-pr" is increasing even more (88% in 2021!)

# Overview of unique contributors (total)



- Well over 100 unique contributors to EasyBuild framework (+7 in 2021)
- Continued growth in unique contributors for easyblocks (142, +22 in 2021)
- Steadily growing number of unique contributors to easyconfigs, now well over 300

# Overview of unique contributors (per year)

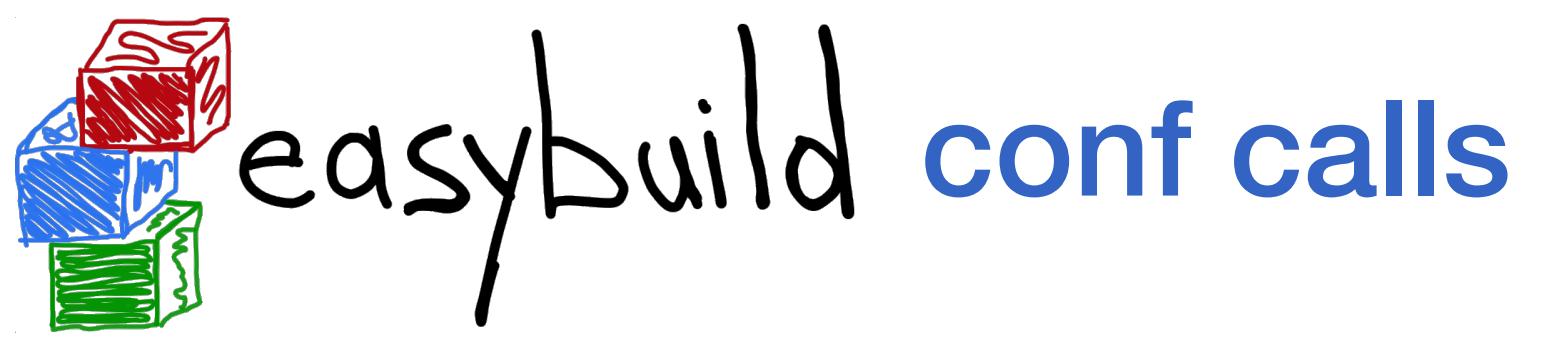


- 25-30 unique contributors per year to EasyBuild framework
- Increase in unique contributors per year to easyblocks, now close to 50
- Over 100 unique contributors per year for easyconfigs since 2020

# EasyBuild maintainers

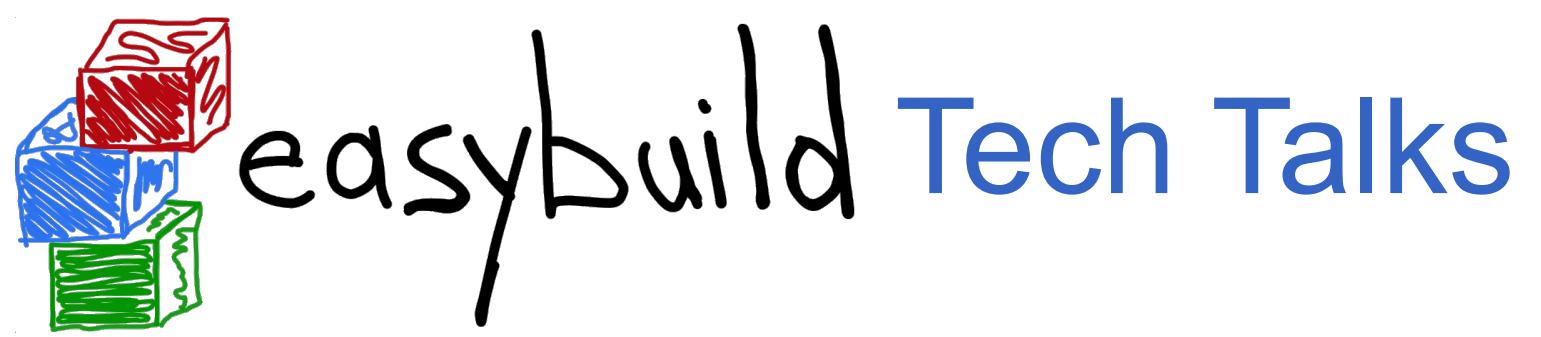


- Currently 20 EasyBuild maintainers
- Some more active than others, some no longer active (both are fine)
- Roughly a dozen of (significantly) active maintainers
- Recently added:
  - Simon Branford (Univ. of Birmingham, UK)
  - Bob Dröge (Univ. of Groningen, Netherlands)
  - Sebastian Achilles (JSC, Germany)
  - Balázs Hajgató (HPC-UGent, Belgium)
- **Suggestions / proposals for additional maintainers are always welcome!**



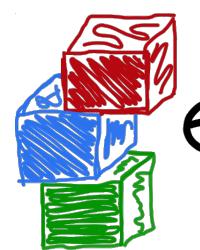
<https://github.com/easybuilders/easybuild/wiki/Conference-calls>

- EasyBuild conference calls via Zoom, every other week
- **Open to anyone to join** for those interested in EasyBuild
- Since Nov. 2013, barely any were skipped => **189** conf calls so far!
- Switching between 10am CET and 5pm CET
- Significantly well attended recently (usually ~10 or more participants)
- Usual topics: overview of recent developments, plans towards next release, Q&A
- Additional topics based on recent discussions or following suggestions
- Detailed notes are kept on EasyBuild wiki



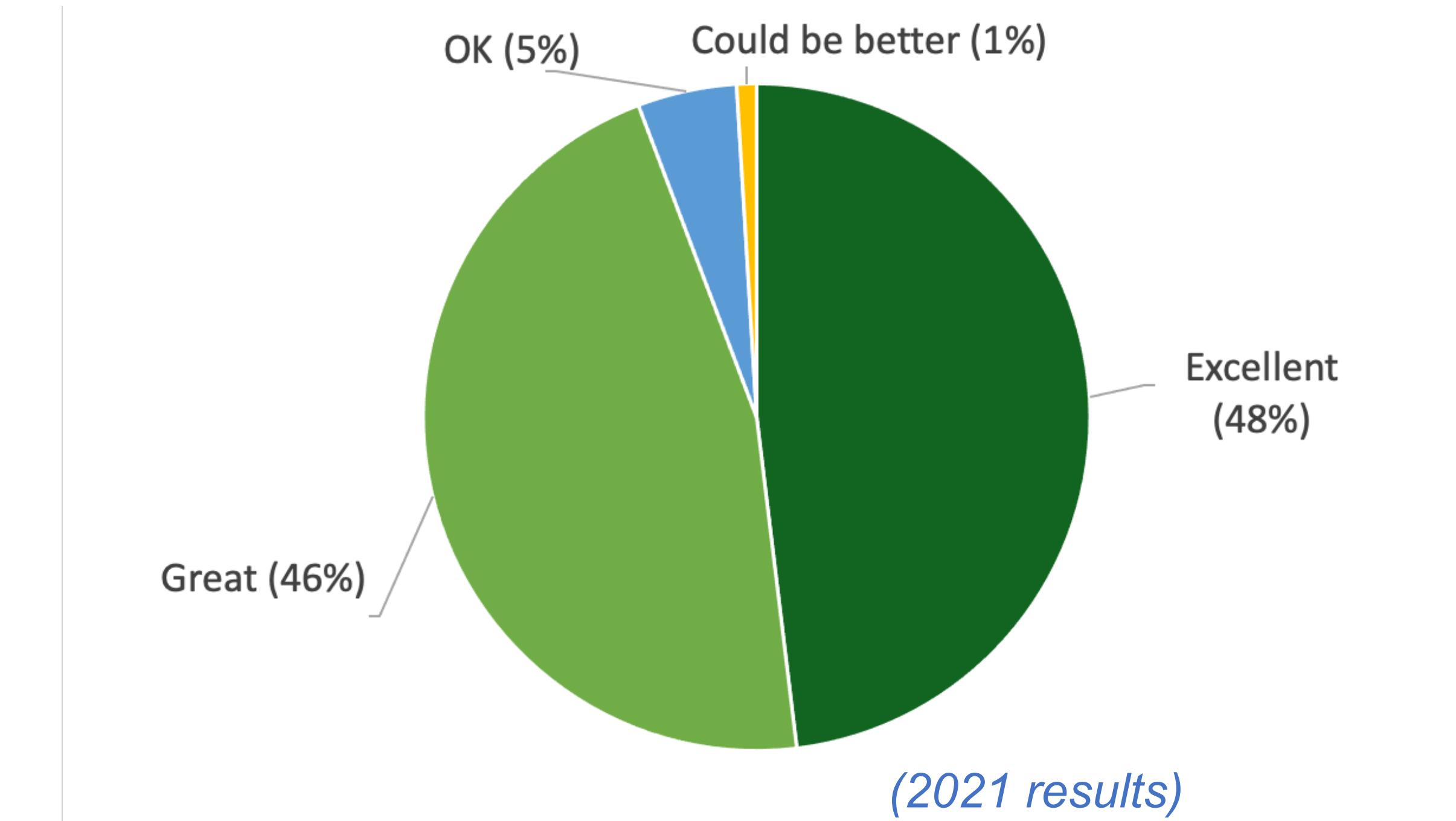
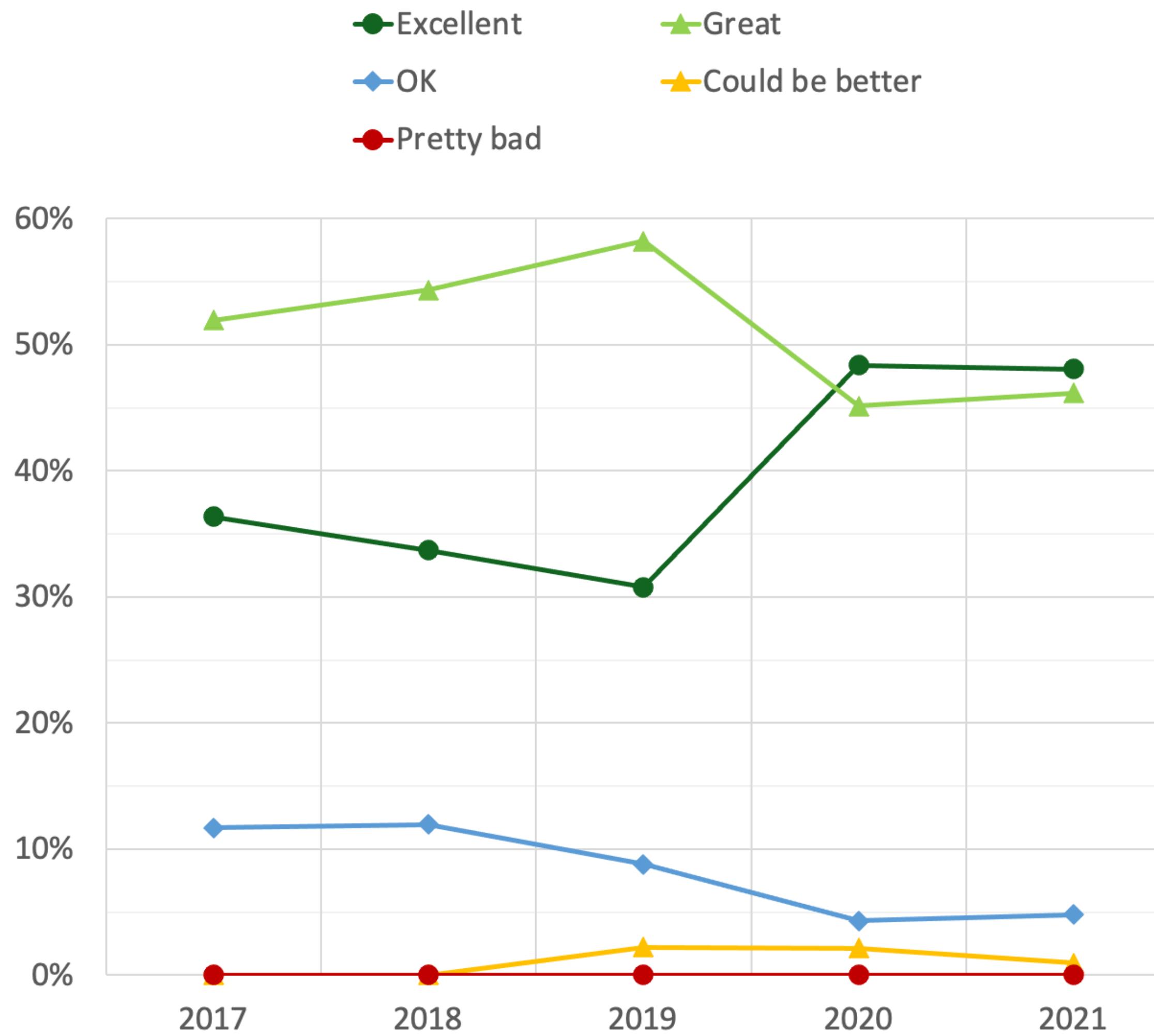
<https://github.com/easybuilders/easybuild/wiki/EasyBuild-Tech-Talks>

- In-depth technical talks on topics relevant to the EasyBuild user community
- Sessions are open to anyone interested, streamed + recorded via YouTube
- Three in 2021:
  - **FlexiBLAS - A BLAS and LAPACK wrapper library with runtime exchangeable backends**  
by Martin Köhler (Max Planck Institute Magdeburg)
  - **Performance Optimizations & Best Practices for AMD Rome and Milan CPUs in HPC Environments** by Evan Burness (Microsoft Azure)
  - **MPItrampoline: Choose your MPI implementation at run time**  
by Erik Schnetter (Perimeter Institute)
- Suggestions for topics are welcome!



# easybuild User Survey

*How would you rate the overall quality of EasyBuild?*



Positive evaluation of overall quality is *still* growing...

*(nobody ever answered "pretty bad")*

# Goals for 2022

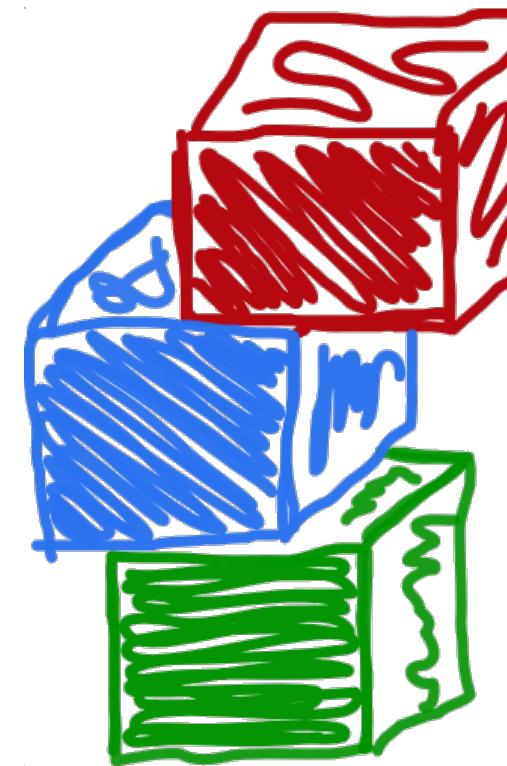


- Rework documentation with mkdocs (rather than just talking about it...)
- Better error reporting: isolate actual problem if shell command failed, ...
- Enhancements in EasyBuild framework that save time of users & maintainers
- More extensive testing
  - Using different operating systems (containers to the rescue)
  - Start testing on aarch64 (Arm) more actively (in AWS?)
  - Using ReFrame

# Challenges in 2022



- Insatiable hunger of scientists for getting more (new) software packages installed...
- **Increasing diversity in hardware (CPU/GPU) and software (toolchains)**
- Keeping EasyBuild compatible with Python 3.x (every new minor version has breaking changes)
- **Keeping up with incoming contributions/pull requests**
  - As a contributor: please use GitHub integration features! (`--new-pr` & co)
  - Bot(s) should take care of more stuff...
    - *Automatic* test reports once CI tests pass + approved review by maintainer
    - For variety of CPU architectures and OS configurations (using containers)



easybuild

# Questions?

[@boegel \(GitHub\)](#)

[@kehoste \(Twitter\)](#)

[kenneth.hoste@ugent.be](mailto:kenneth.hoste@ugent.be)

[easybuild@lists.ugent.be](mailto:easybuild@lists.ugent.be)

<https://easybuild.io>

<https://docs.easybuild.io>