



VISUAL EFFECTS SOCIETY  
TECHNOLOGY COMMITTEE

# STUDIO PLATFORM SURVEY REPORT

20

21

# INTRODUCTION

The SIGGRAPH conference hosts the annual VFX Reference Platform Birds of a Feather session, and in 2021 the focus was on operating systems due to some major shifts that happened over the previous year. The community has been confronted by a combination of changes including the impending end of support for CentOS Linux 7 in 2024, the replacement of CentOS Linux 8 by CentOS Stream at the end of 2021, the increase in Windows adoption driven by growing game engine use and VR support, and Apple's migration from Intel to ARM.

The [community discussion at SIGGRAPH](#) inspired the launch in October 2021 of the first annual studio survey by the Visual Effects Society Technology Committee and the VFX Reference Platform Working Group. This report summarizes the responses, highlights some key insights, and proposes next steps to address some of the shared challenges and opportunities. If you are just looking for the highlights then you can skip straight to page 16 for the Summary, Conclusion, and Next Steps.

The goal of the survey is to create a better understanding of the collective platform and software needs of the VFX and Animation studio community, with a specific focus on artist workstation operating system selection and upgrade strategy. We hope that we have succeeded and that the information in this report will help inform better decision-making for both studios and vendors alike.

We are indebted to all those members of the community who took the time to respond to the survey and any insight gained from this report is thanks to them. Thank you for helping us build a more complete picture of the collective platform needs across the community.

# ABOUT THE SURVEY

The survey was open from October 20th to November 12th, 2021. All individual studio submissions have been handled strictly confidentially, and responses were anonymized and de-duplicated before analysis. This report only presents aggregate data and any information relating to individual studios will not be shared. All questions were optional although the majority of respondents chose to answer all the questions.

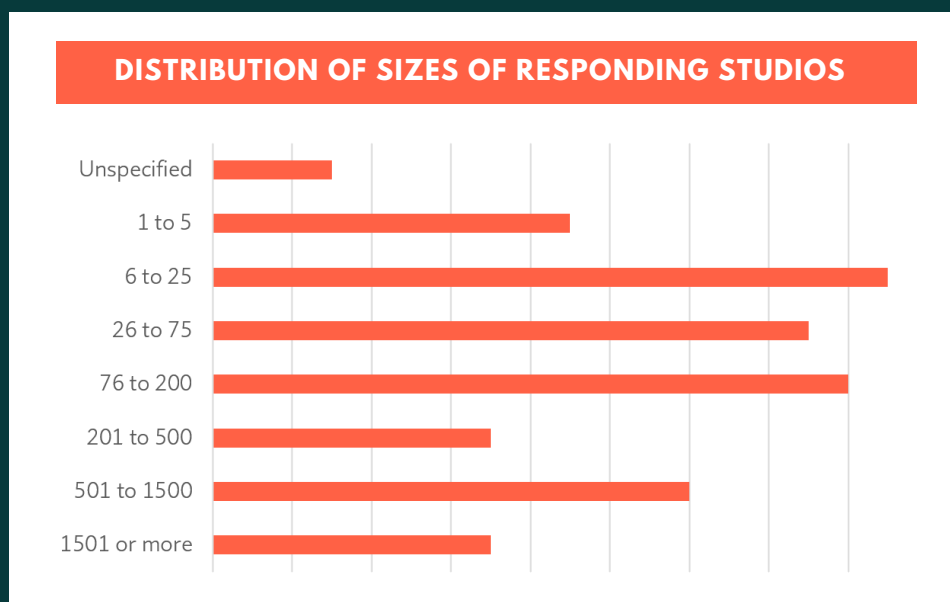
As expected, most submissions were from VFX and Animation studios, with a small number also coming from other areas like videogames and design. After careful examination, we are confident that the submissions constitute a valid and representative cross-section of our industry.

Studio sizes are based on the reported peak headcount over the previous 12 months.

**88**  
UNIQUE STUDIOS

**56%**  
OPERATING IN MORE  
THAN ONE CITY

**59,319**  
ARTIST WORKSTATIONS



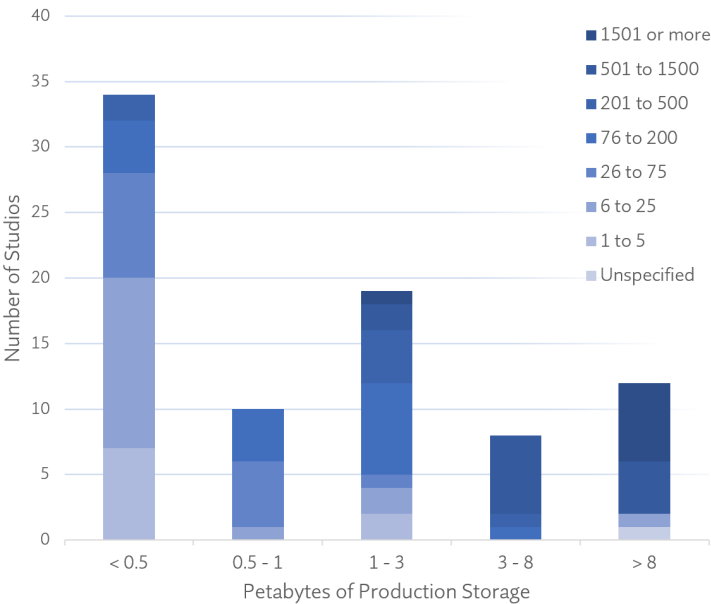
# STORAGE AND RENDER

Most studios shared their peak render farm capacity over the last year as well as their shared production storage capacity, excluding backup and archive.

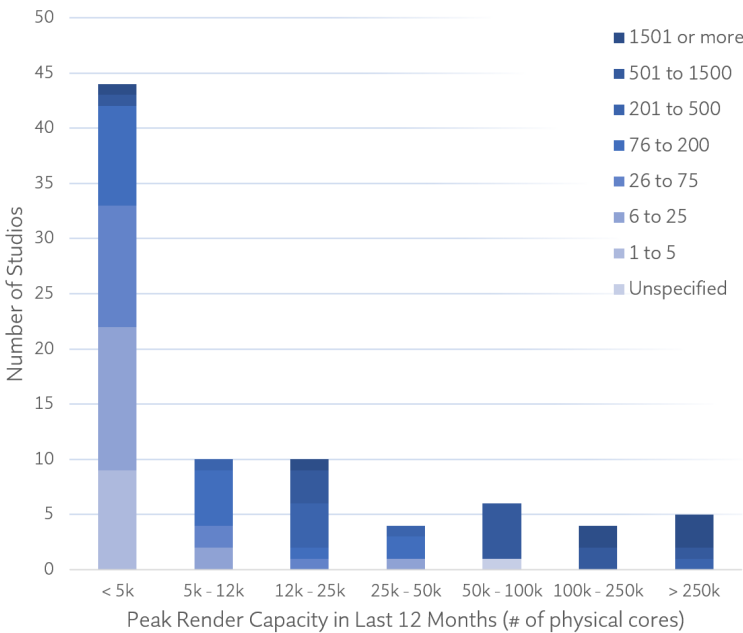
Almost half the studios have less than 500 Terabytes of shared production storage, which reflects the more modest needs of smaller studios, and that not all types of services are as demanding of data storage as others.

It is a similar story for render farms, with over half of the studios having a peak farm size of less than 5,000 physical CPU cores.

Unsurprisingly, larger studios tend to have higher resource needs with 14% of studios having over 8 Petabytes of production storage, and 6% of studios with a peak render farm size of over 250,000 physical CPU cores, which likely includes utilization of elastic cloud resources.

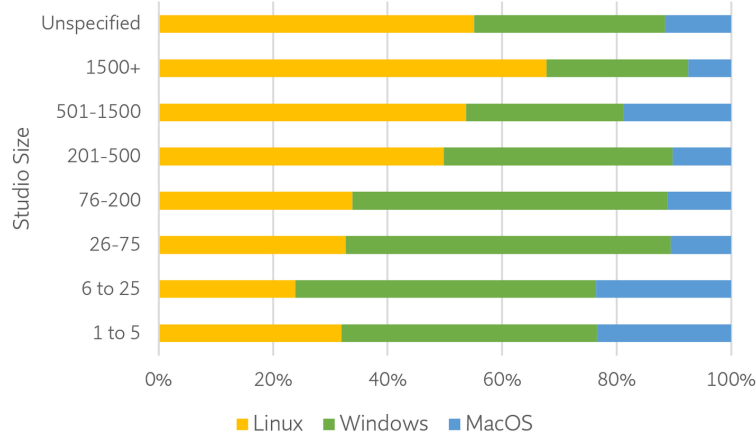


Distribution of production storage capacity by studio headcount

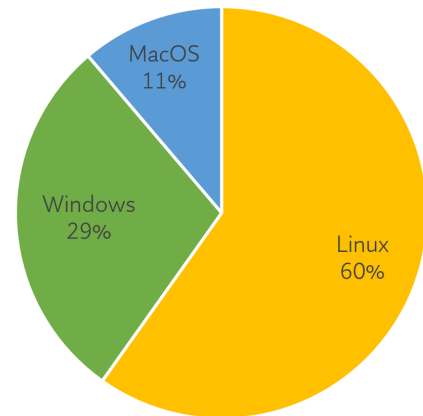


Distribution of peak render farm capacity by studio headcount

# WORKSTATION OS



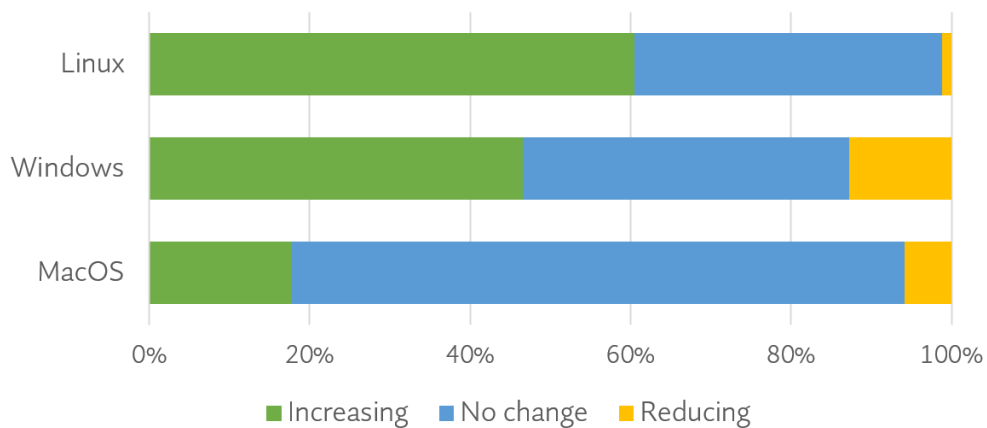
Distribution of total artist workstations by primary operating system broken out by studio headcount



Split of total artist workstations by primary operating system

All three major operating systems have a substantial presence across the responding studios. Windows tends to have the largest share of workstations in studios with less than 200 employees, whereas Linux seems to be the leader in larger studios. Linux has around 60% of the share of all workstations across the studios responding to the survey.

Looking at the graph below which indicates forward-looking plans, Linux's share is expected to increase further over the next 2 to 3 years. A higher proportion of Windows-based studios seem to be looking to migrate workstations to Linux than Linux-based studios migrating to Windows.



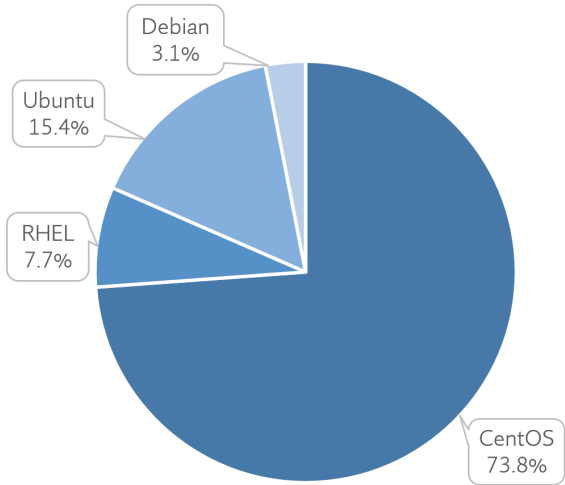
Ratio of studios planning to change the proportion of operating systems installed on workstations in the next 2 to 3 years

# LINUX DISTRIBUTIONS

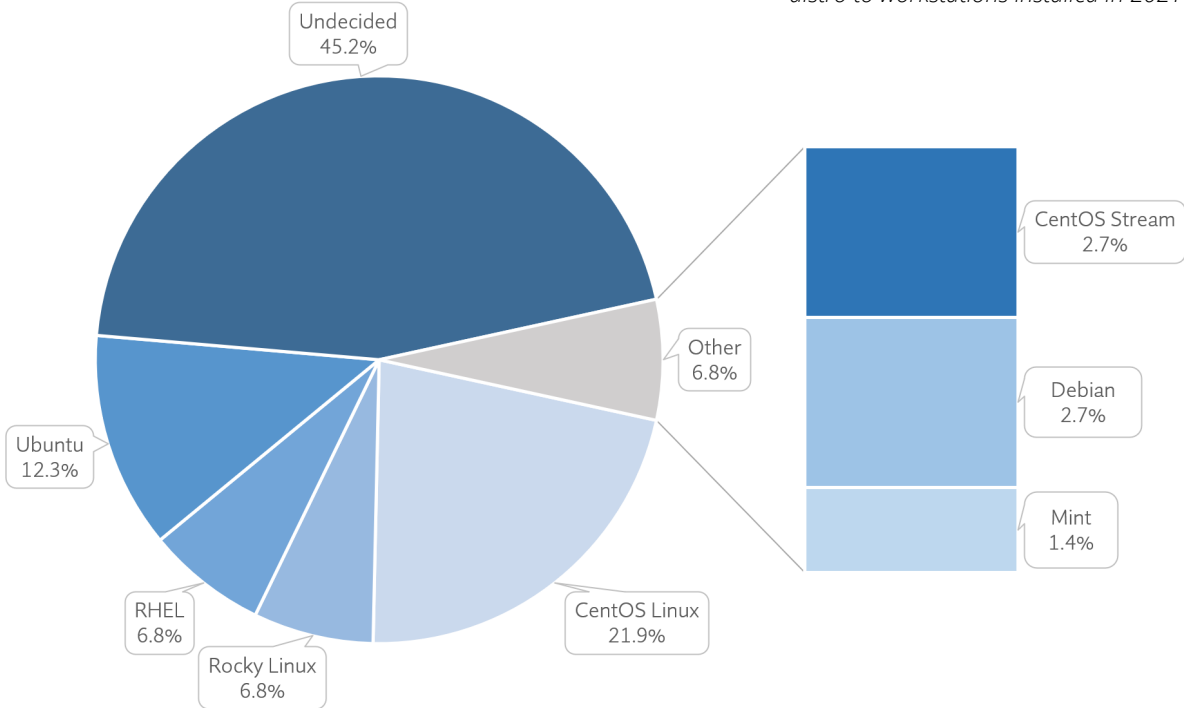
The graph to the right shows the split of Linux distributions installed on artist workstations in 2021. Note: this is broken down by the number of studios rather than by the number of individual workstations

The graph below shows the same split, except this time it's based on studios' plans for new workstations in 2022.

These results highlight just how dominant CentOS Linux 7 remains across the installed base of Linux workstations, and the large proportion of studios yet to decide what distribution to deploy in 2022. New distributions like Rocky Linux have emerged and, like CentOS, are fully compatible with RHEL because they are built from the same source code, and so offer a relatively simple migration path.

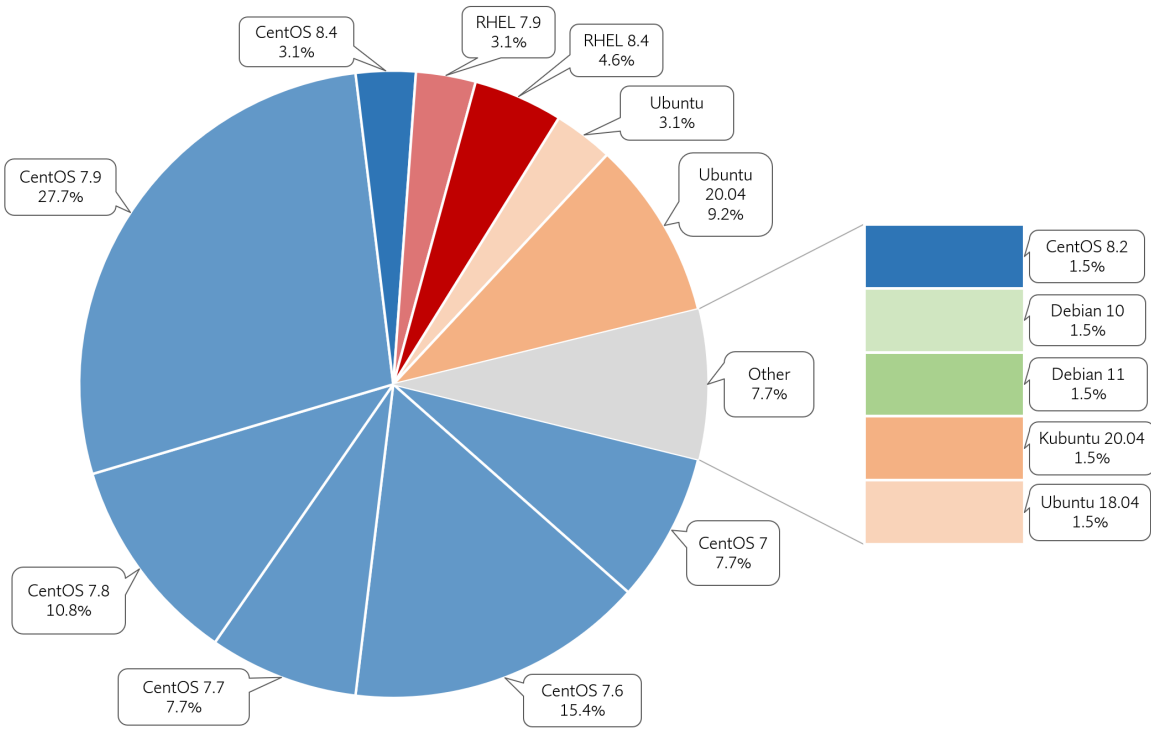


Proportion of studios deploying each Linux distro to workstations installed in 2021

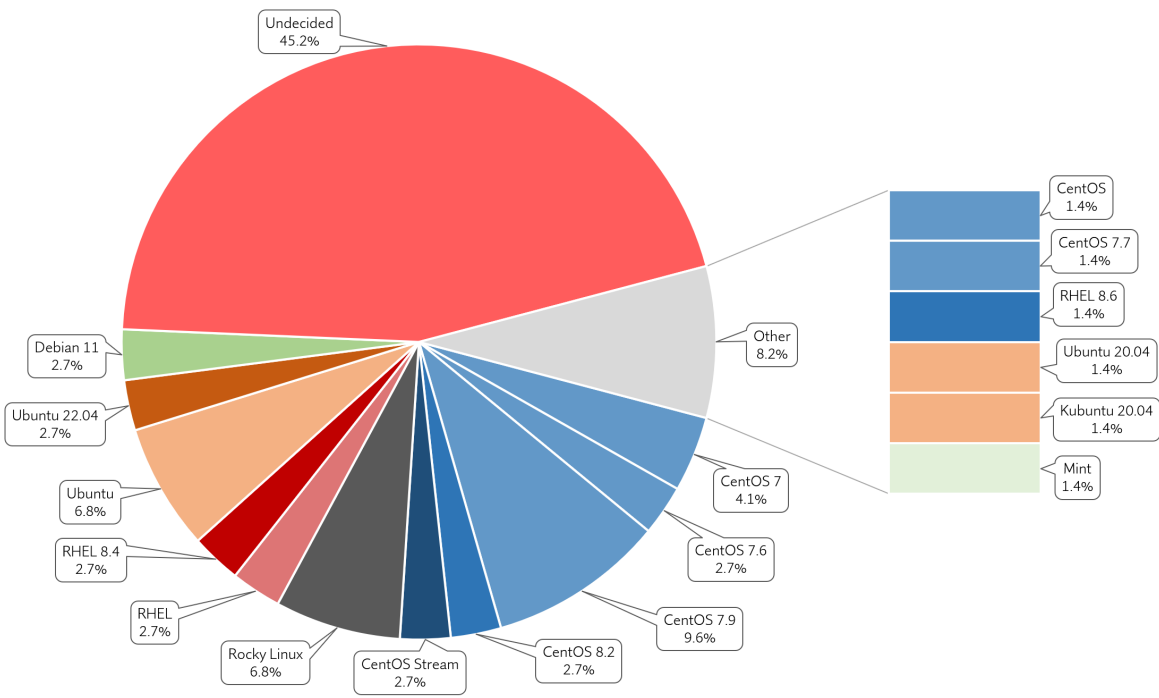


Proportion of studios planning on deploying each Linux distribution to new workstations installed in 2022

The graphs below show the same results as the previous page but are broken down to the specific versions of the various Linux distributions. Where no version is shown, there was no version information provided in the corresponding survey response.



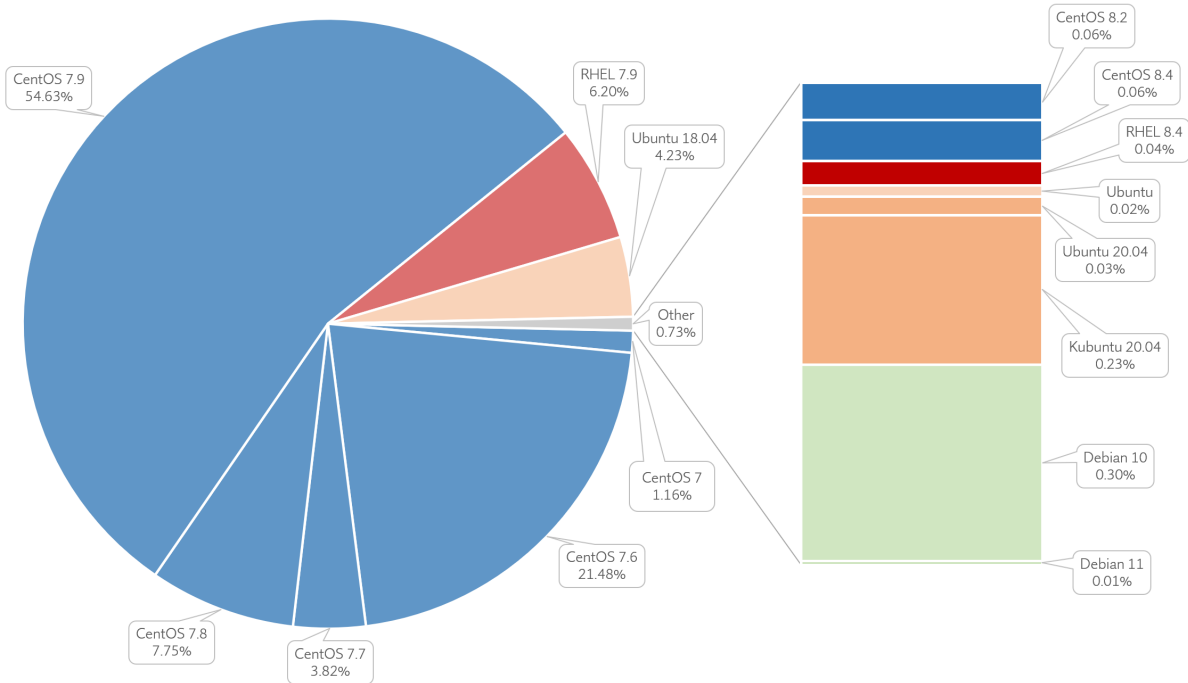
Proportion of studios deploying each Linux distribution version to workstations installed in 2021



Proportion of studios planning on deploying each Linux distribution version to new workstations installed in 2022

The previous graphs all show the proportion of individual studios, but that does not reflect the installed base of Linux distributions because the quantity of workstations varies based on the size of each studio.

The graph below instead shows the proportion of Linux workstations with each distribution installed. This makes a broad assumption that all Linux workstations at each studio are using the same distribution version as the studio chose to install on newly deployed workstations in 2021. While this may not be a totally accurate assumption, it should at least illustrate the relative size of the installed base of the major distributions.



*Proportion of distributions across all Linux workstations if all Linux workstations at each studio was using each studio's choice of Linux distribution for workstations installed in 2021.*

These results highlight just how dominant CentOS Linux remains across the installed base of Linux workstations, and that there is no clear successor yet. Most planned use of Rocky Linux came with the comment that this was still in the testing phase.

For studios currently using CentOS Linux, the survey asked when they expect to make a decision as to what distribution they are planning to move to next. The results on the right show that most plan to decide within the next 12 months.



*When does each studio currently using CentOS Linux expect to decide what distribution to replace it with?*



# LINUX DESKTOP ENVIRONMENTS

---

On Windows and MacOS there is effectively a single desktop environment for software and hardware vendors to target. On Linux, there is the advantage of choice, but that comes at a cost.

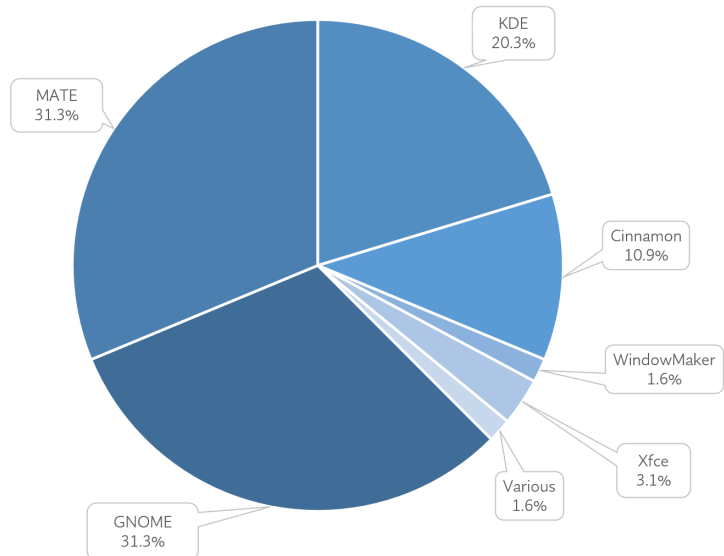
Some vendors' support of Linux is not as full-featured as on other platforms because they have to make compromises to support the variety of desktop environments used by their studio customers.

We believe this survey is the first attempt to capture the Linux desktop environments used across the studio community.

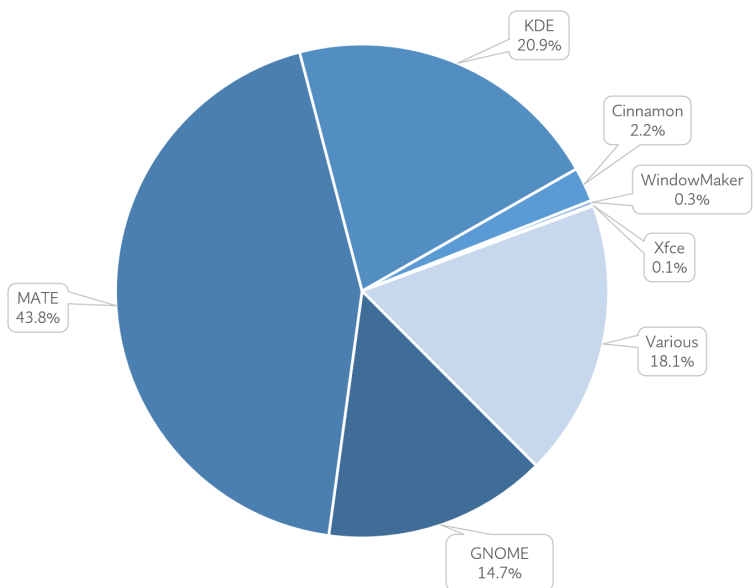
The two graphs on the right show the distribution of desktop environments currently used. The top graph by number of studios, and the bottom graph by total number of workstations.

Note that MATE is a fork of GNOME 2. We can see that taken together, GNOME and MATE are in the majority, both by number of studios and by total workstations.

Many studios switched to MATE when GNOME 3 came with some major UX changes, and also because early releases had some serious performance issues.



*Distribution of primary desktop environment currently used on Linux workstations, broken out by number of studios*



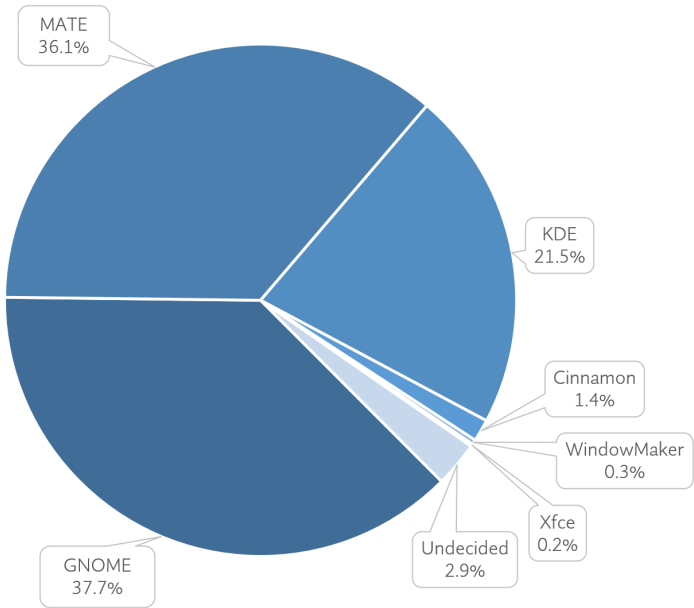
*Distribution of primary desktop environment currently used, broken out by number of Linux workstations*

The graphs on this page show what desktop environments the studios plan to use on Linux workstations in the future. Again, the top graph is broken out by number of studios and the bottom by total workstations. Note the bottom graph makes a broad assumption by using the workstation numbers from 2021 because the survey did not ask for data on planned workstation numbers for the future.

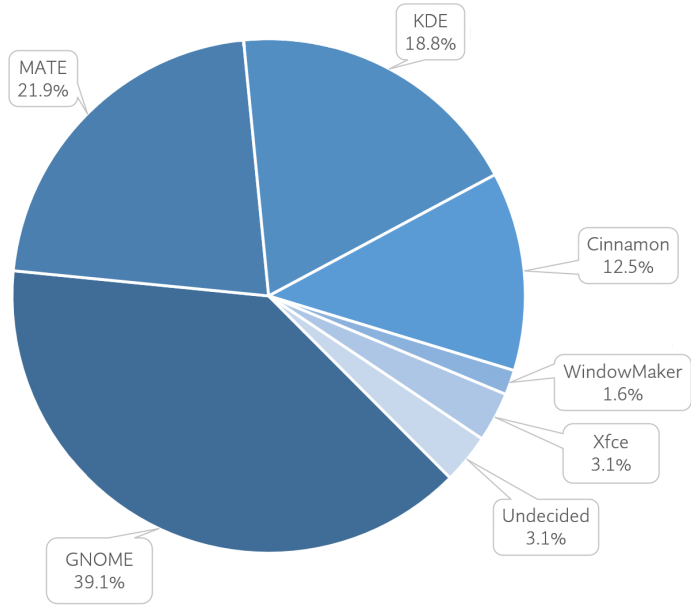
KDE is holding steady but GNOME and MATE both are expected to increase market share, mostly due to studios standardizing on one of these major desktop environments rather than supporting the use of various different environments. The significant share of Cinnamon is primarily driven by a single larger studio.

It is also worth noting here that the future of MATE on Red Hat based distros (i.e. CentOS, Rocky, etc) is in question since it is not included with the RHEL 8 distribution, and rpm packages are no longer maintained by the broader MATE community.

Since RHEL 8, Red Hat is focused on GNOME development and support, and this is relevant to the large effort needed as the Linux community migrates towards Wayland from X11. Much development work is required for Wayland to effectively support the advanced features needed by professional artist workstations.



*Distribution of primary desktop environment planned for the future. broken out by number of studios*



*Distribution of primary desktop environment planned for the future. broken out by number of Linux workstations, assuming workstation numbers remain constant.*

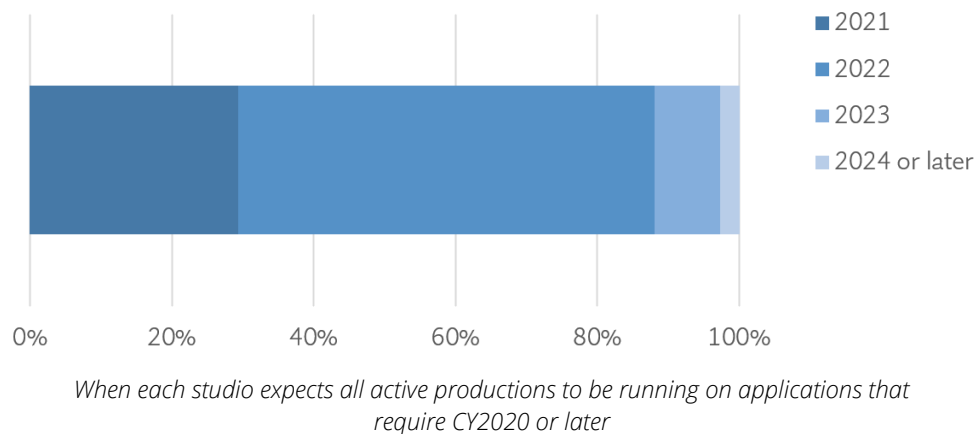
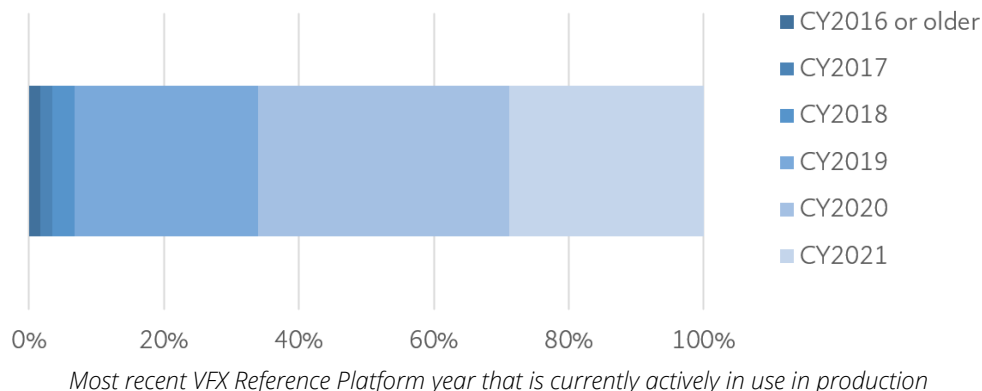
# VFX REFERENCE PLATFORM

---

The VFX Reference Platform provides a common target for software providers to help ensure compatibility across products from different providers when they are integrated together in a studio pipeline to create collaborative workflows.

It's important to the community that studios regularly upgrade to keep up with new releases. This helps vendors and studios alike to minimize the costs of supporting older releases and improves security by removing older vulnerabilities from the ecosystem.

The graphs below are based on studios that make use of the annually updated VFX Reference Platform as a baseline configuration for their vendor applications and in-house software. They show that these studios generally are doing a good job of upgrading, with over 90% actively using CY2019 or later in production at the time of the survey. Looking ahead, the vast majority of studios expect all productions to be using CY2020 or later by the end of 2022.



# STUDIO COMMENTS

---

The survey asked about each studio's biggest challenges relating to operating system and platform support, features, or interoperability. A selection of the responses that highlight the common themes raised is shared here. Firstly, there were many comments about the challenge of supporting multiple operating systems, and the frequency of updates and upgrades.

*“ Trying to manage all those different OS levels is very challenging especially wrt security ”*

*“ Patching operating systems for security and features, while accommodating legacy tools and workflows, all within tight production schedules ”*

*“ Yearly updates of "bigger" libraries (eg gcc, python, boost, qt) is too rapid. Switch VFX platform to tick tock model or only update reference platform every other year. ”*

Several studios commented on some specific challenges of Linux and Windows.

*“ Primary challenges are lack of availability of some key software on Linux, and more generally maintenance and deployment of Windows infrastructure, relying so much more on local installs/licensing. ”*

*“ On Linux supporting newer software (glibc related etc.). On Windows it's automation of installation and maintenance of machines. ”*

*“ All our artists refuse to work with Linux and we chose to keep on Windows for their comfort. But sometimes it's hard to manage. ”*

*“ Using Windows in general brings its own set of problems compared to Linux; much harder to guarantee a baseline OS image that is then configured with Ansible (or other) and Rez (or similar). ”*

*“ Windows character limits, limitations of Active Directory management ”*

*“ Windows brings all the Enterprise IT challenges (complicated license management, etc). ”*

*“ Effort required to support a broader Windows user base driven by Unreal Engine ”*

---

While a core challenge with Linux is the more limited commercial software support, the challenges studios experience with Windows seem more focused on manageability and consistency across larger deployments.

A few studios highlighted the challenge of finding expertise and resources.

*There doesn't seem to be a lot of resources available geared toward supporting Linux desktops.*

*Finding experienced IT and development talent is hard, so we have to learn a lot as we go, and haven't found a great document on best practice for VFX studios around platform.*

A unique challenge with Linux is the proliferation of different distributions. While there are advantages to being able to choose between different options, several studios called out some of the specific challenges it causes.

*Primary difficulty is vendors supporting modern Linux distributions. We would love to run something more recent than CentOS 7, however none of the vendors will provide support if you aren't running RHEL or CentOS.*

*Linux - it's just a complicated mess. If there was a VFX Platform blessed Linux ISO for workstations and headless for everyone to rally / build around. It would make adoption much faster. Someone (group) just needs to grab the bull by the horns.*

*Not having a Linux distribution that the industry has officially standardized on makes it seem like Linux isn't a stable desktop platform to management. It also introduces support challenges because there isn't a standardized way of supporting Linux desktops.*

*Windows is seen as working out of the box, while Linux is seen as a technical challenge to overcome before work can be done. Having a standard Linux distro and desktop environment would go a long way to alleviating some of those concerns.*

The VES Tech Committee will be working with major industry groups and vendors to research whether Linux distribution and/or Desktop Environment standardization would be advantageous and what would be the most viable options to make it work for the community.

---

---

Several studios specifically called out the challenge of deciding what to do following the news that CentOS Linux support will be coming to an end.

*“The biggest concern is CentOS going EOL and people migrating to different distros (i.e no continuity). I'm not concerned which OS it is as long as it's consistent. The thought of having to run Ubuntu for Maya and something else for say Flame is horrifying.”*

*“Desktop choice and uncertainty of the distro for adoption post CentOS.”*

*“Determining the best alternative for CentOS.”*

*“Concerned about which distribution to move to after CentOS.”*

The user experience on Linux and support for more advanced features and hardware were also raised as challenges in some comments.

*“We're disappointed with the overall UX for artists on CentOS and looking ahead to Ubuntu/Kubuntu/PopOS, but there are obvious challenges.”*

*“For Linux we seek for a decent desktop environment for the artist, good enough support for GPUs and pen tablets.”*

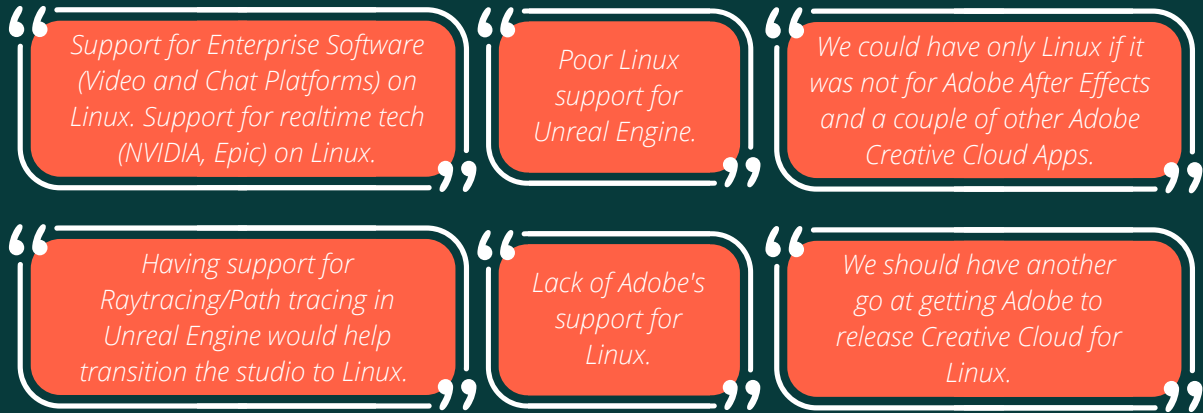
*“HDR support, multichannel audio, Wayland support, external peripherals, and having them all work smoothly via remote protocols like Teradici.”*

The following comment sums up several comments on the challenge of a few software vendors not fully targeting the VFX Reference Platform with their products.

*“Inconsistent adoption of the VFX Reference Platform by software vendors, especially the smaller ones.”*

---

More specifically, several studios singled out their major challenge being a lack of full Linux support from Unreal Engine and some Adobe products.



While these are only a sampling of the comments submitted, they are indicative of the general themes that emerged when looking at the responses as a whole and we believe they are representative of the views of the broader studio community.

# SUMMARY

---

The response to the survey surpassed expectations and we believe it provides a **representative perspective** of the broader studio community. While there are no great surprises in these survey results, they confirm **the community is facing some real challenges that require concerted action** to avoid future, more serious issues that would increase costs and impede innovation.

Of all the major operating systems, **Linux is the preferred option on the majority of professional artist workstations** across VFX and animation studios. That dominance does not seem to be changing, and the survey results indicate that most studios expect Linux workstation numbers to increase in the future at a higher rate than Windows or MacOS.

Across those Linux workstations, **CentOS Linux currently has the majority market share which is why its end of life in 2024 presents such a challenge for the community**. The survey tells us that most impacted studios have yet to decide what Linux distribution to move to next, but most plan to decide before the end of 2022, so there is urgency for us to find some alignment.

The risk of further distribution fragmentation is very real and clearly demonstrated in these survey results. The survey comments corroborate what we have heard informally, that there does seem to be an acknowledgment that **something needs to be done at a broader industry level**, with some studios directly asking for help in deciding which distribution to move to next.

Although the survey only covered studios, we already know that **system and software vendors are also facing uncertainty as to what to do next**. If they take the lead then they risk driving further fragmentation and therefore not meeting the needs of the studio customers. If they wait for the studios to decide, it will likely be too late to retool in time for their next major product release, delaying and increasing the risks of the OS transition.



# CONCLUSION

---

Linux is further increasing its dominant market share of professional graphics workstations and backend compute in VFX and animation, which implies that it continues to offer compelling benefits. **Linux seems to be more important to studios than it has ever been.**

However, **Linux has been becoming less important to many software vendors** that are seeing their customer base grow significantly in other areas. At the same time, the unplanned move away from CentOS Linux threatens more fragmentation and uncertainty. **The community needs to work together to map a clear path forward, and make it easier for both studios and software vendors to adopt, support, and sustain Linux for artist workstations.** It's such an important issue, and it's up to us collectively as a community to take action.

It's clear from the comments and the scope of the problem highlighted by the survey results that **coordination is needed** and that there is some urgency in helping the community create a forum to discuss the options, perhaps aligning on a common choice of distribution to minimize the support burden for vendors, focus 3rd party resources, and help better share know-how across the community.

The challenge is broader than just being a Linux issue. The community needs to think holistically about the sustainability and health of the critical foundation for professional artist workstations. Once we have solved the immediate Linux distribution issue, we **need to think longer term about a community knowledge base and work with industry partners to improve interoperability and manageability** of Windows, Linux, and MacOS for artist workstations.

The **VES Technology Committee** will build on its work creating the VFX Reference Platform and **take on the coordination task to address the problem of finding a sustainable, healthy platform for artist workstations.** The committee is looking to work with major software vendors, OS providers, Studios, the Academy Software Foundation, and other organizations to rapidly assess the options and engage with the community to recommend a path forward.

# NEXT STEPS

---



## Share Survey Report

All to socialize and share this report with colleagues and collaborators across the VFX and animation studio community, spreading the knowledge and insights learned from the survey.



## Upgrade CentOS Linux to 7.9

We strongly recommend that studios running CentOS Linux 7 move to CentOS Linux 7.9 to improve security and sustainability while the community decides on a longer term recommendation.



## Create Working Group

The VES Tech Committee will create a Working Group to focus urgently on the problem of Linux distribution and desktop environment fragmentation.



## Engage with Community

The VES Tech Committee will engage with industry partners, vendors, open source communities, and studios to coordinate ideas and proposals. Events will be organized to curate discussions and arrive at recommendations.

These next steps are vital to fostering a healthy platform for professional artist workstations in visual effects and animation studios. This is critical for continued innovation and further improvement of the user experience to enable artists to do their best work.

# ACKNOWLEDGEMENTS

---

This report and the ongoing efforts around platform sustainability would not be possible without the support and contributions of many people across the community.

Thank you to the members of the VES Technology Committee and in particular Nick Cannon, Francois Chardavoine, Ray Feeney, Steve May, JF Panisset, Sam Richards and Sebastian Sylwan for their innumerable contributions.

Thanks also to the members of the VFX Reference Platform Working Group and the Academy Software Foundation Technical Advisory Committee for their guidance and support.

Finally, thank you to all the individuals who took the time to respond to the survey on behalf of their studios and their colleagues who supported them.

**Thank you for your continued support in our efforts to foster a healthy and sustainable platform for the VFX and animation community**

## Contact

### Feedback and Discussion Forums

<https://groups.google.com/g/vfx-platform-discuss>  
#vfx\_reference\_platform @ <https://slack.aswf.io>

### VES Technology Committee

[ves-tech-workstations@googlegroups.com](mailto:ves-tech-workstations@googlegroups.com)

