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End User Computing State of the Union 2022 - 2023

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Highlights

The ninth edition of the worldwide "End User Computing - State of the Union" survey has just been released. This survey, which has been conducted yearly since 2012, is known for its unbiased, independent nature and is powered by the community. The survey provides valuable insights into the trends, deployments, configurations, and usage of end user computing in both on-premises and public cloud environments. It is also notable for being available to everyone for free. The latest edition of the survey received responses from over 706 people.

Highlights of the 2023 survey are:

- In 2022, slightly smaller companies tend to deploy DaaS compared to company sizes who deploy VDI on-premises in 2021.
- Most deployment are in the 1000-4999 concurrent user range, but we also see organizations with more than 100,000 users.
- Flexibility is strongly associated with the concept of Desktops as a Service. However, most respondents think of DaaS as a control plane in the cloud with virtual machines running on-premises. Does flexibility mean that don't want to be bothered with maintaining the desktop delivery and networking infrastructure?
- DaaS adoption is expected to grow according to most of the respondents. But on-premises virtual machines will still make up a large portion of that market.
- Pay-as-you-go based on concurrent monthly usage is the expected payment model although a subscription-based license is also favored if it a discount is offered.
- 11,65% of the respondents see DaaS as a strategic solution. Either as the main method of providing desktops to users or to support other strategic cloud initiatives.
- Cost and performance are the main concerns when moving to DaaS. These are often inversely proportional but surprisingly, not many companies perform load tests for rightsizing. User experience monitoring throughout the life cycle of the solution seems more popular.
- Most organizations still host at least a part of their virtual desktop VM's on-premises. Of the organizations who opt for fully cloud hosted solution, the vast majority land on Microsoft AVD as their primary solution. Either directly or through partner offerings.
- Only a very small portion of respondents deploy their desktops on a mix of public cloud providers. Will cloud-based virtual machines ever become commodity allowing us to move from one provider to the next based on whatever business requirement we need to meet?
- Application data and back-ends are also deployed both on premises and in the cloud. Would be interesting to see what the associated application performance hit as well as the ingress and egress cost would be if a cloud desktop is using an on-premises database.
- It seems we are gradually increasing the speed at which we patch our operating systems. Some organization report that they patch multiple times per week. Are DevOps practices finally taking hold in the EUC market?
- We see a slight shift to vendors that were born in the cloud which may be due to the rapidly changing landscape.
- User experience (performance) and manageability are the most important factors in selecting a DaaS solution.
- 65% of organization manage the hardware virtualization infrastructure needed to host virtual desktops themselves. The question is why and what would be the associated cost compared to moving to the cloud?



- More than 70% administer their virtual desktop images themselves. Experience tells us these day-to-day tasks add up to a large chunk of the operational cost of any desktop. Moving to the cloud obviously does nothing to change this.
- Windows 11 is not yet replacing Windows 10 as the default operating system for virtual desktops.
- Microsoft Configuration Manager is still the most used method for application deployment and OS patching although many IT admin still update master images manually. It would be interesting to see if manual patching and testing will ever become too costly to keep up with increased security demands.
- **706 people supported** the survey and they, on average, completed the survey in 10 minutes, which was conducted globally. Most participants, 32.49%, are in North America, while 18% were in the Netherlands and 10.13% were in the United Kingdom.
- According to the latest data, the financial sector is the leading adopter of Desktop as a Service (DaaS), accounting for 17.12% of the market share. This is followed by the healthcare industry
- **What is the concurrency of your DaaS users?** The largest group of users falls within the 1,000 to 4,999 concurrent users' range, representing 23.65% of the total user base.
- According to 33.78% of respondents, **DaaS is a control plane that is hosted as a service**, with virtual desktops and applications that can be accessed from anywhere. This view of DaaS emphasizes the flexibility and convenience of the service, as well as its ability to be customized to meet the needs of different users and organizations.
- According to our survey of 706 respondents, a significant **majority (58.78%) believe that DaaS (Desktop as a Service) will see further expansion soon.**
- Why do customers use Desktop as a Service? 16.13% use DaaS to support their hybrid/remote work and work from anywhere initiative.
- One of the **main challenges** of implementing Desktop as a Service is the cost, which is a concern for 21.56% of respondents.
- According to our survey, 36.62% of respondents have their application data and backend services located in a **hybrid architecture.**
- When examining the solutions being used, it becomes clear that **Microsoft Azure Virtual Desktop (AVD) is the most popular choice among respondents**, with nearly 20% using or planning to introduce it. Citrix DaaS and Citrix VADs on AVD follow close behind, with 18.87% and 12.79% of respondents respectively.
- Most respondents use a single user operating system for desktop as a service, with **Windows 10** being the most popular choice at 49.32%
- According to our survey, the most popular **multi-user operating system for desktop as a service is Windows Server 2019**, with 22.97% of respondents using it.
- Nearly half of the respondents (48.06%) reported **patching their systems once per month.**
- The typical size of the OS disk for Workload VMs varies, but **128GB** seems to be the **most common.**
- End-users can access the Virtual Desktops and Applications powered by DaaS through various methods, with the **most popular being through Microsoft Windows as an endpoint Operating System**, used by 27.63% of respondents in our survey.
- It is common for companies and/or end-users working from home to use **dual monitors** with Full HD (1920x1080) resolution, as 40.88% of respondents reported using this configuration.
- In our survey, **Microsoft Teams was found to be the most popular platform**, with 46.62% of respondents using it. Zoom came in second, with 21.79%
- Microsoft **FSLogix** is a **commonly used** solution for this, with 28.60% of respondents utilizing it.
- Microsoft **Defender** for endpoint was the most **popular solution** with 23.28% usage, followed by Windows Defender (part of the Windows operating system) at 19.12%.



Introduction

Welcome to the 2023 edition of the End User Computing State of the Union.

Our independent research team at "VDI Like a Pro" has traditionally focused on on-premises virtual applications and desktops, however, we have noticed a significant shift towards the use of hybrid and public cloud End User Computing services, particularly Desktop as a Service (DaaS), in recent years.

In response to this trend, we have launched the "DaaS Like a Pro" research project to study the deployment, configuration, and usage of DaaS solutions. The results of this research provide valuable insights into the real-world trends and patterns of end-user computing (EUC) solutions, including DaaS with workload virtual machines in public clouds and on-premises.

We believe that the information presented in this report will be useful for those interested in implementing DaaS solutions within their own organizations.

By analyzing the results of this survey, it is possible to gain a better understanding of the current state of the end-user computing industry and identify key trends for the future.

The survey covers various important topics, such as Desktop as a Service (DaaS) usage and solutions, security, devices, single and multi-session operating systems, instance types, GPUs, manageability, and tools.

These findings provide a comprehensive overview of the key initiatives and challenges facing the EUC community in 2023 and beyond.

The survey was conducted with the support of 706 participants and the EUC community, and the results are available to all, offering unbiased and independent data that can be used to inform and guide EUC roadmap development. This is a major accomplishment and demonstrates the importance of collaboration and community efforts in driving industry progress.

About DaaS Like a Pro

Independent research organization DaaS Like a PRO started the State of the Union Survey back in 2013, with the goal to provide an annual insider view of the End User Computing (EUC) market.

The State of the Union Survey, conducted by independent research organization DaaS Like a PRO, is an annual assessment of the End User Computing (EUC) market. Led by experts in the field, including Ruben Spruijt of Nutanix Frame, Mark Plettenberg, Dennis Damen of Nextthink, and Christiaan Brinkhoff of Microsoft, the survey aims to provide a comprehensive overview of the industry and track changes and trends over time.

This year, the survey received an impressive 706 responses, making it one of the largest research initiatives in the EUC market. The survey closed on October 10, 2022, and the results are available to all in a whitepaper on the DaaS Like a PRO website.

The insights from the survey have also been shared at various industry events and user groups, Microsoft Ignite, VMWorld, ExpertsLive, Citrix Synergy, NVIDIA GTC, E2EVC, Nutanix .NEXT and various user groups.

If you are interested in using the data from the survey, please don't hesitate to contact any of the team members for more information.

Teamwork

A community project cannot be successful without inspiring individuals and dynamic companies. Here are some that made this possible this and past years!

- Login Consultants & PQR for running earlier surveys as ProjectVRC
- Login VSI, Atlantis Computing and FRAME for running earlier surveys as TeamVRC
- Actual Tech Media (ATM)
- Many other community friends on LinkedIn and Twitter

Team and contact

Welcome to DaaS Like a Pro! We provide you with accurate, concise, and practical information about Desktop as a Service (DaaS). Our whitepaper which can be downloaded at www.daaslikeapro.com is filled with valuable information resources to help you navigate the world of DaaS and make informed decisions.

We strive to continuously improve our content, so if you have any feedback, please don't hesitate to reach out to us. Whether you have comments, corrections, or suggestions for improvements, we want to hear from you. Simply send an email to Mark Plettenberg (mark@mark-online.nl), Christiaan Brinkhoff (mail@christiaanbrinkhoff.com), Dennis Damen (dmdamen@live.nl), or Ruben Spruijt (ruben@rspruijt.com) with the title of the document, the version number, and the page you are referencing.

Your input is greatly appreciated and helps us to ensure that DaaS Like a Pro remains a valuable resource for you and others in the DaaS community.

Leaderboard

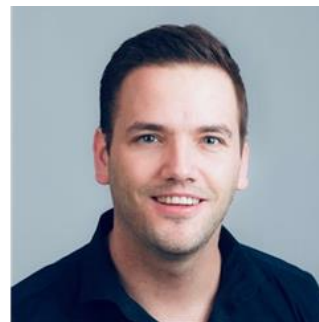
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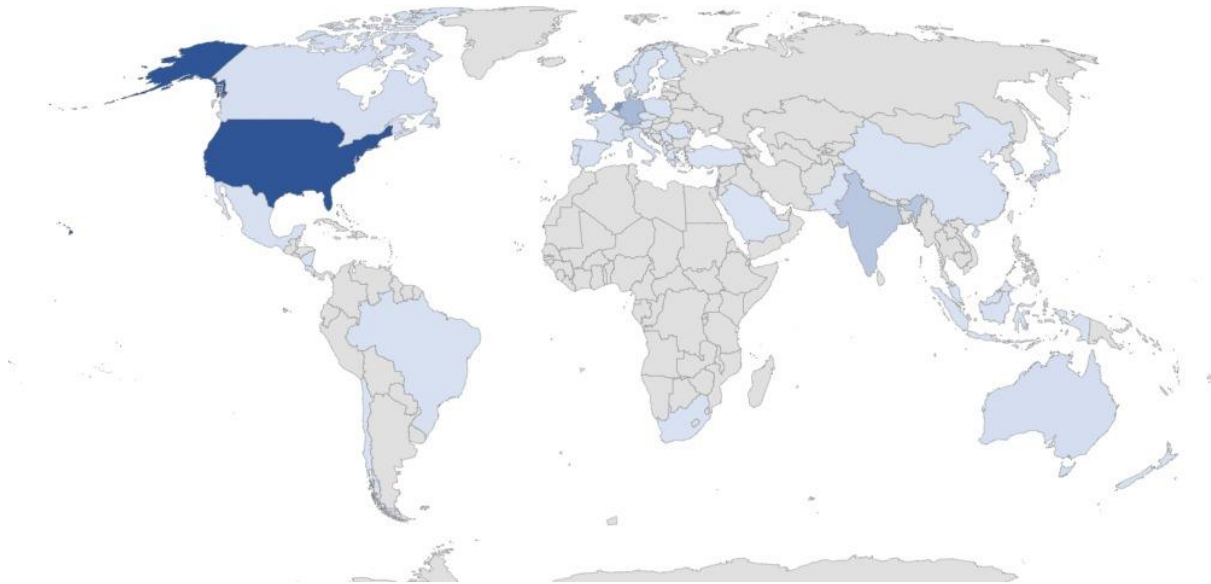


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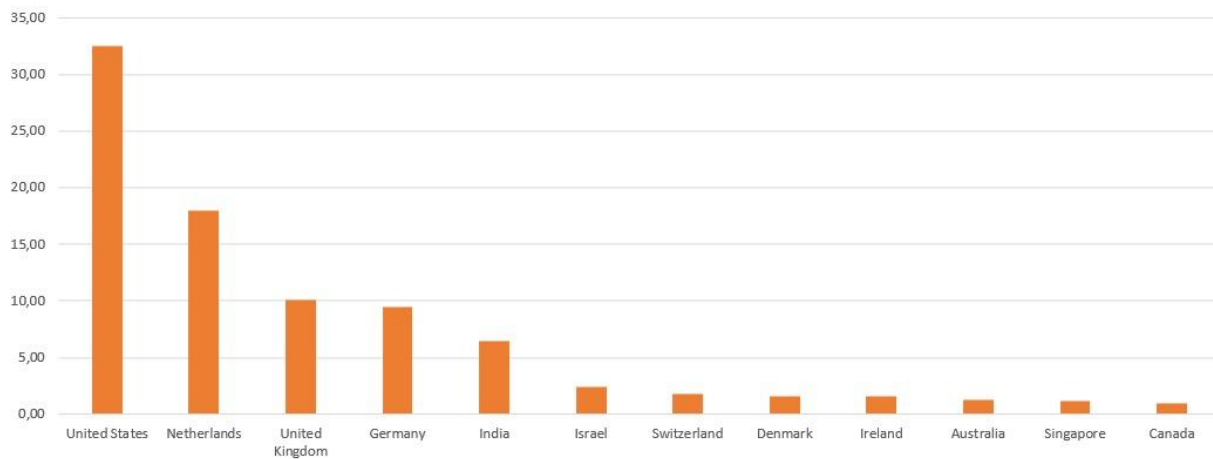
Participant information

A total of 706 people participated in the survey, which was conducted globally. Most participants, 32.49%, were located in North America, while 18% were in the Netherlands and 10.13% were in the United Kingdom. The response rate was measured based on the participants' IP addresses. On average, participants completed the survey in less than 10 minutes.

Participants per country



Participants per country





What vertical are you in?

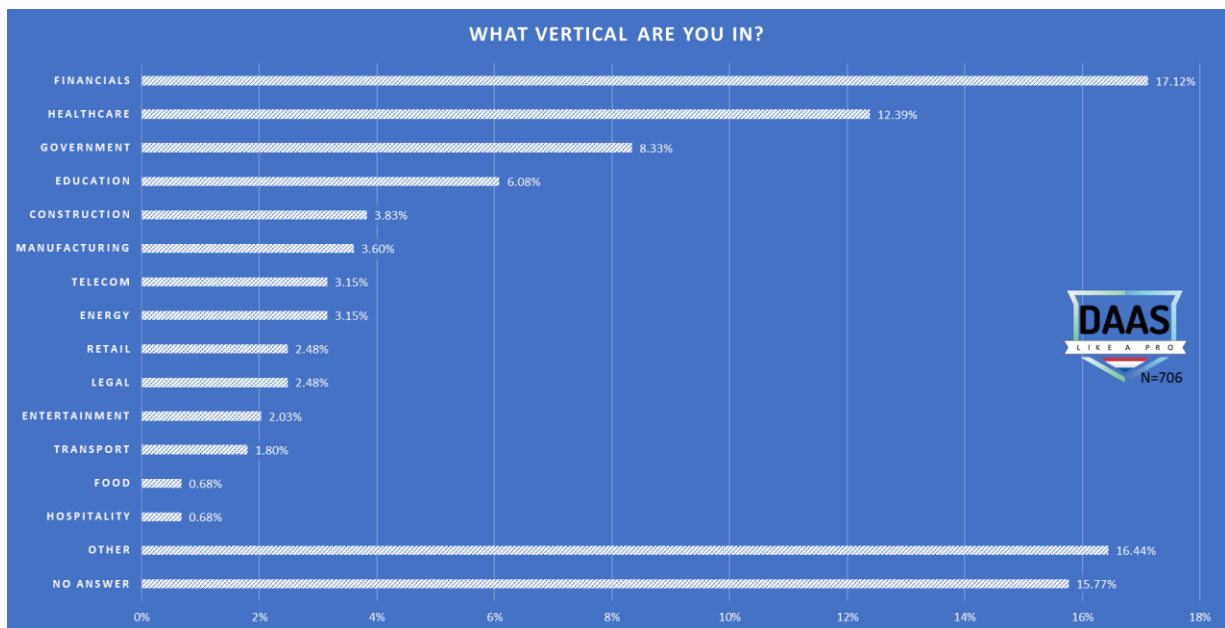
According to the latest data, the financial sector is the leading adopter of Desktop as a Service (DaaS), accounting for 17.12% of the market share. This is followed by the healthcare industry, which accounts for 12.39% of DaaS usage.

The government sector also shows a significant adoption rate, with 8.33% of the market share.

However, the results of the "VDI Like a Pro" 2021 study paint a slightly different picture. In this study, healthcare companies came in second place with 14.41% adoption rate, followed by technology firms at 14.29%. Financial services ranked third, with a 12.36% adoption rate.

It is worth noting that there are some discrepancies in the adoption rates of DaaS and Virtual Desktop Infrastructure (VDI) among different industries. This could be due to a variety of factors, such as the specific needs and requirements of each sector.

Regardless, both DaaS and VDI are being widely adopted by businesses across a range of industries.

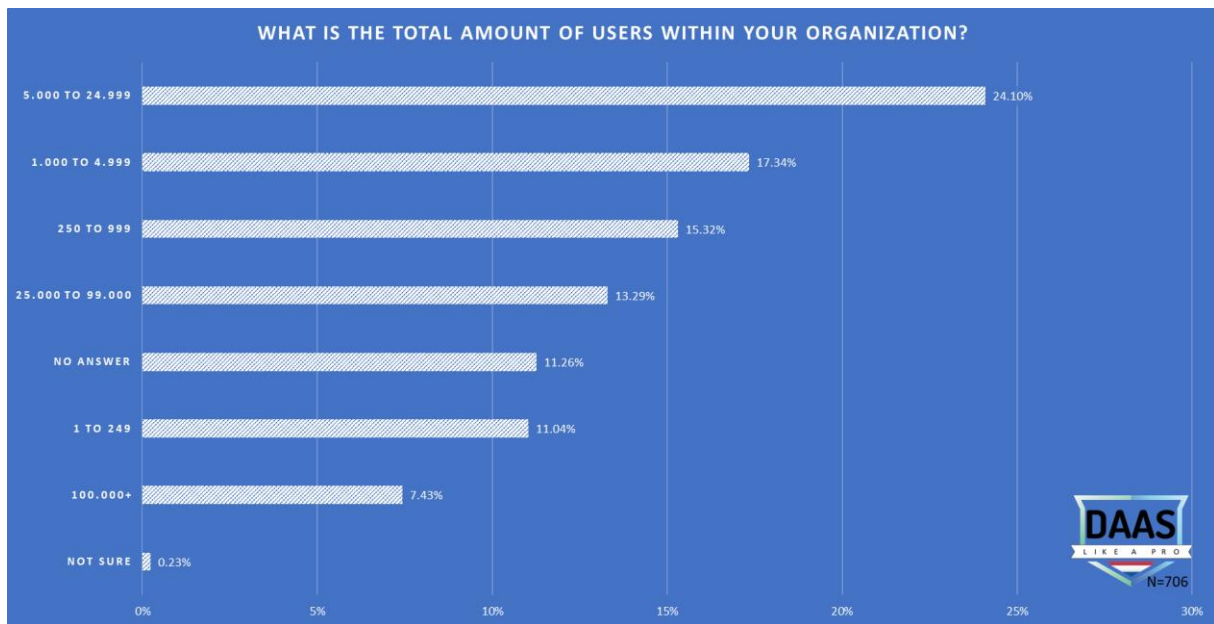




What is the total number of users within your organization?

According to the 2021 "VDI Like a Pro" survey, companies with a size ranging from 5,000 to 24,999 employees make up the largest percentage of VDI users at 24.10%. This is followed by companies with a size ranging from 1,000 to 4,999 employees, which make up 17.34% of VDI users.

Organizations with 250 to 999 users come in third, representing a smaller percentage of VDI users. However, when it comes to the adoption of DaaS (Desktop as a Service), the data shows a slightly different trend. The survey found that organizations with 1,000 to 4,999 users make up the largest percentage of DaaS users at 23.36%, followed by those with 5,000 to 24,999 users at 21.88%. It is worth noting that DaaS is a relatively newer technology compared to VDI, which could explain why larger organizations tend to have a higher adoption rate of VDI.



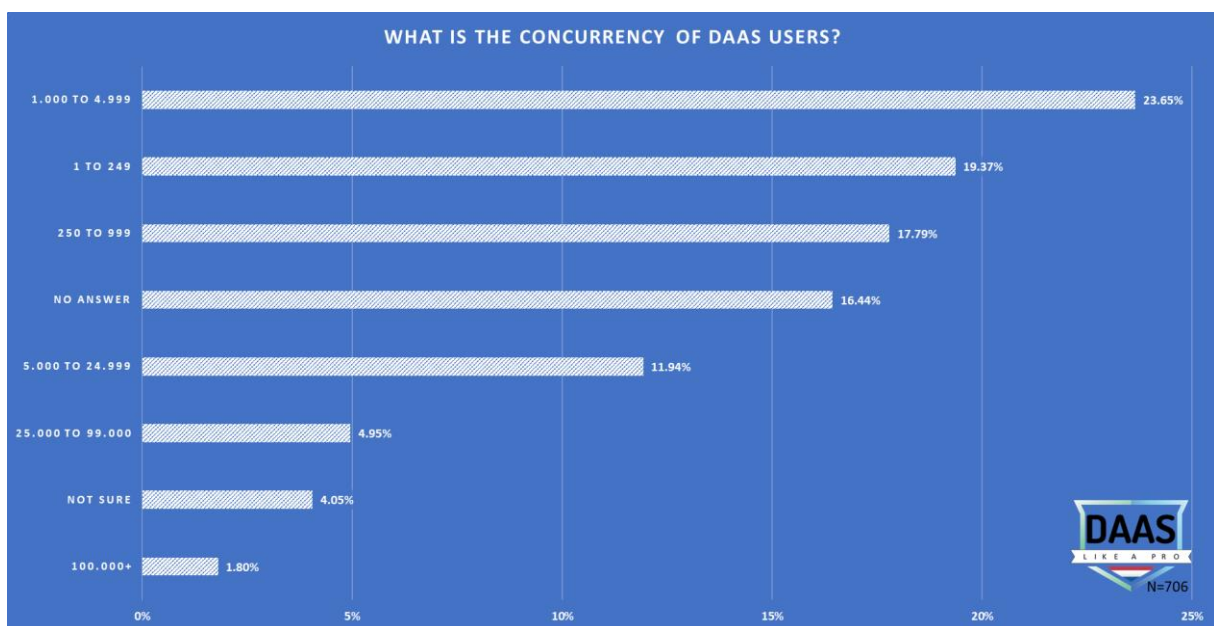


What is the concurrency of your DaaS users?

One of the key considerations when evaluating the usage of Desktop as a Service (DaaS) within an organization is the number of users who are utilizing the service. While the total number of users is an important factor to consider, it's equally important to understand how these users are utilizing DaaS daily.

According to our data, the largest group of users falls within the 1,000 to 4,999 concurrent users' range, representing 23.65% of the total user base. This is followed by the 100 to 249 user group, which accounts for 19.37% of users, and the 250 to 999 concurrent user group, which represents 15.32% of users.

As is common with many cloud services, it's easy for organizations to start small with DaaS and then quickly scale as needed. This flexibility allows companies to easily adapt to changing business needs and grow at a pace that makes sense for their specific needs.

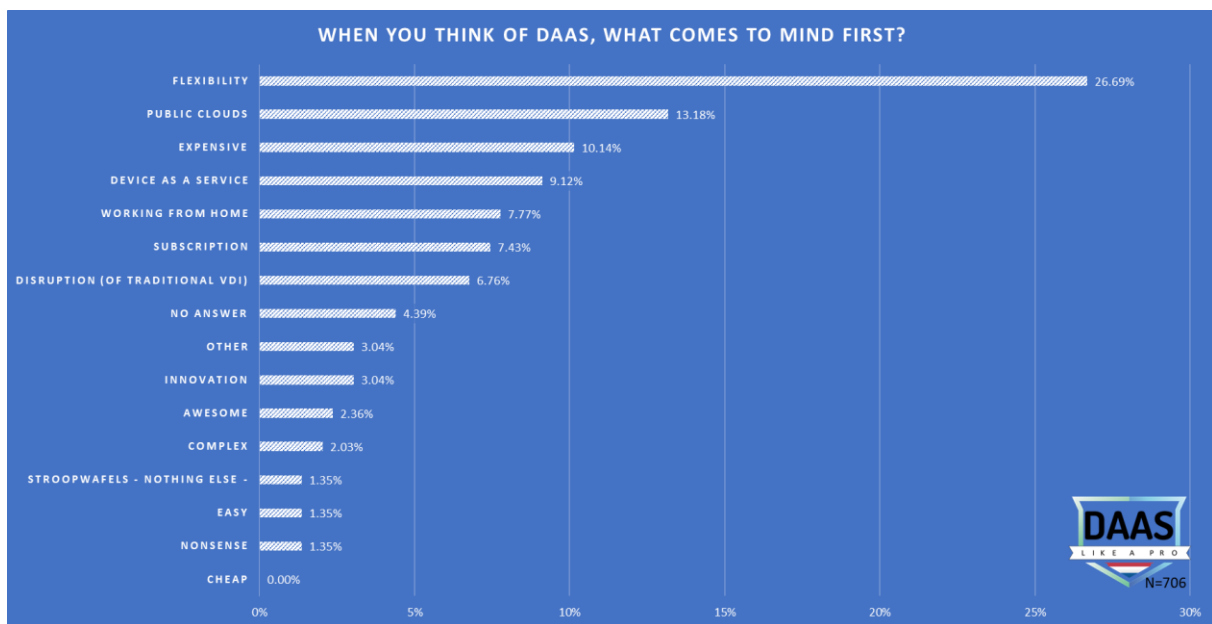




When you think of DaaS, what comes to mind first?

When considering DaaS (Device as a Service), the top three things that come to mind for most people are flexibility (26.69%), public clouds (13.18%), and cost (10.14%). It's worth noting that responses related to affordability and ease of use were relatively low. This suggests that while flexibility and access to public clouds are important considerations for many when it comes to DaaS, cost is still a concern.

It's also important to be aware that DaaS can mean different things to different people. For some, it may refer specifically to the delivery of devices (e.g., laptops, tablets, etc.) as a service, while for others it may encompass the delivery of both devices and related services (e.g., maintenance, support, etc.). It's crucial to ensure that everyone is on the same page when discussing DaaS, as misunderstanding can lead to confusion and miscommunication.





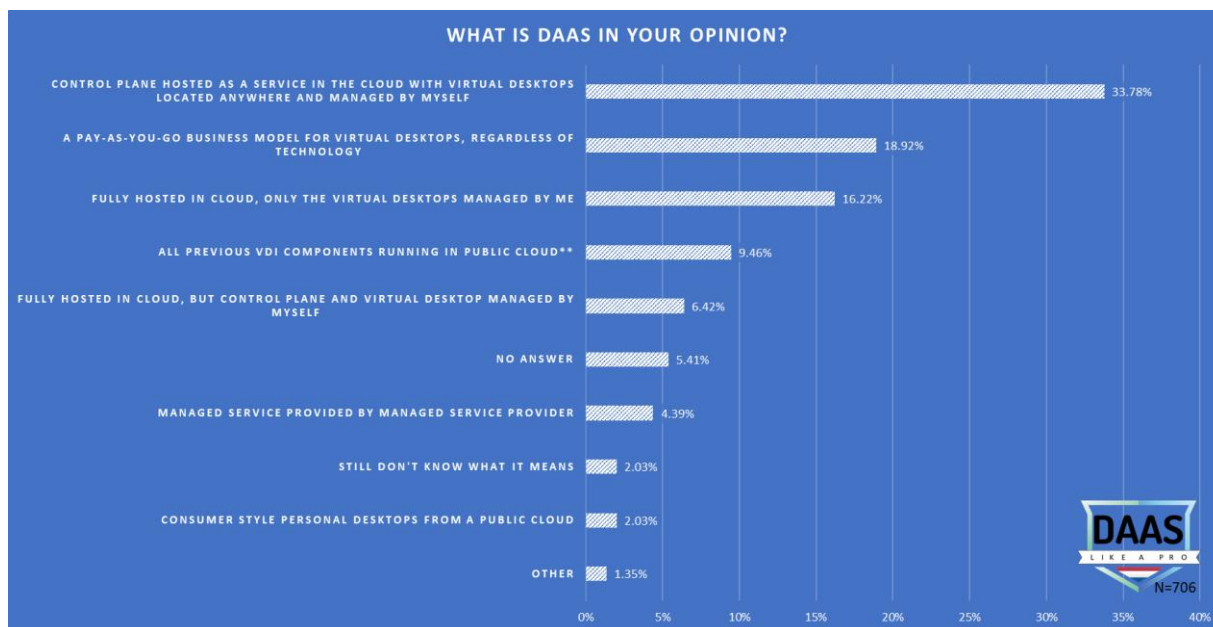
What is DaaS in your opinion?

There are several different ways that DaaS can be defined and understood, and the answers given by respondents in this survey reflect that diversity. According to 33.78% of respondents, DaaS is a control plane that is hosted as a service, with virtual desktops and applications that can be accessed from anywhere. This view of DaaS emphasizes the flexibility and convenience of the service, as well as its ability to be customized to meet the needs of different users and organizations.

For 18.92% of respondents, DaaS is more closely associated with a pay-as-you-go business model, in which users only pay for the virtual desktop and application resources that they use. This approach is appealing for businesses that want to avoid upfront costs and manage their expenses on a more flexible, usage-based basis.

Finally, 16.22% of respondents believe that DaaS is fully hosted in the cloud, and that virtual desktops are managed by the user themselves. This view emphasizes the self-service aspect of DaaS, as well as the control and flexibility it gives users over their own virtual desktop environments.

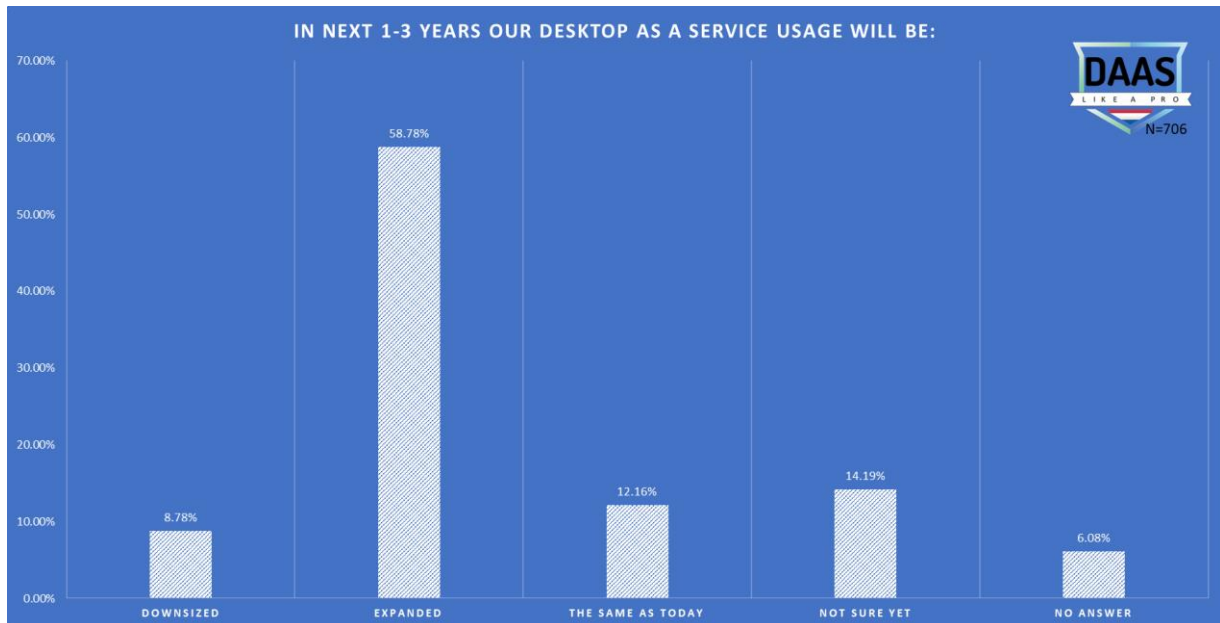
Overall, DaaS is a highly flexible and customizable service that offers a wide range of benefits to businesses and organizations. Whether it is seen as a control plane, a pay-as-you-go model, or a self-service cloud-based solution, DaaS is a powerful tool for enabling remote work and collaboration, as well as optimizing IT resources and costs.





In the next 1-3 years our Desktop as a Service usage will be:

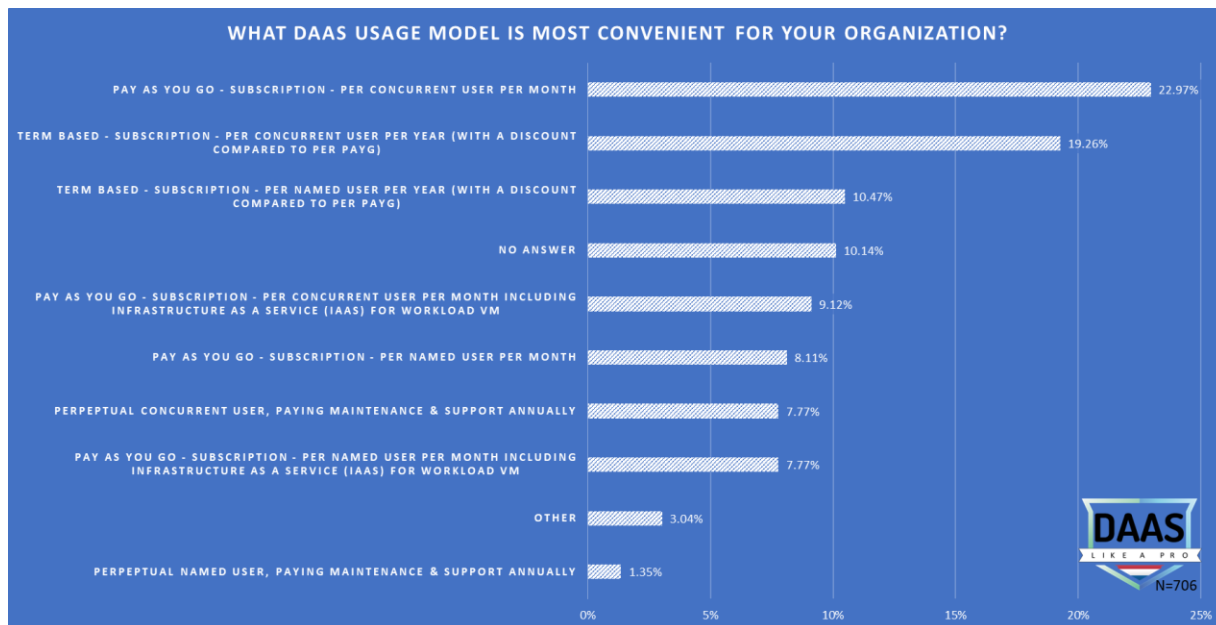
According to our survey of 706 respondents, a significant majority (58.78%) believe that DaaS (Desktop as a Service) will see further expansion soon. Meanwhile, 14.19% of respondents were unsure about the potential growth of DaaS, and 12.16% believe that its usage will remain the same as it is currently. These results suggest that DaaS is expected to have a bright future, potentially signaling exciting times ahead for this technology.





What DaaS usage model is most convenient for your organization?

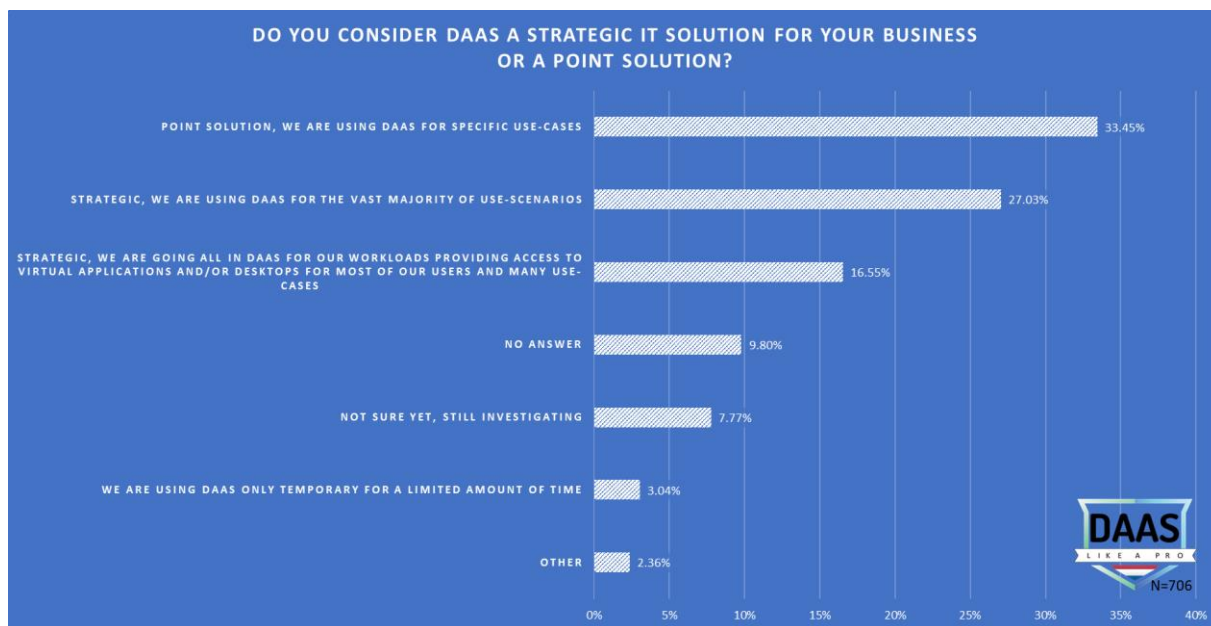
Desktop as a Service (DaaS) offers various options for usage and payment. According to our survey results, the most popular model is the pay-as-you-go subscription with concurrent users per month, chosen by 22.97% of respondents. The second most popular option is a term-based subscription with concurrent users per year, selected by 19.26% of respondents. The third most popular choice is a term-based annual subscription with named users, preferred by 10.47% of respondents.





Do you consider DaaS a strategic IT solution for your business or a point solution?

According to the results of our DaaS like a Pro survey, 33.45% of respondents view DaaS as a point solution, meaning it is used for specific, targeted use-cases. However, 27.03% of respondents reported using DaaS strategically for a wider range of use-cases. 16.55% of respondents fully utilize DaaS for many different use-cases, including access to virtual applications and desktops. Overall, it seems that the use of DaaS can vary, with some organizations utilizing it more strategically while others may use it for specific purposes.





What are your most important drivers for adoption of DaaS?

‘Start with why’ is a valuable lesson for many, including DaaS adoption. Why Desktop as a Service?

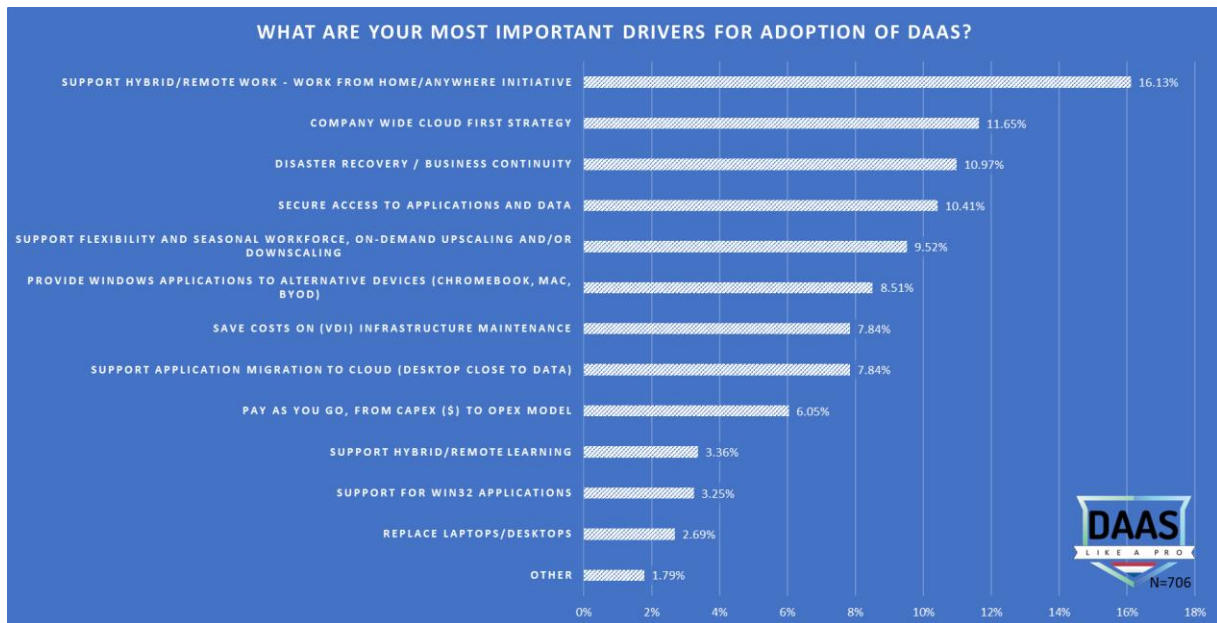
16.13% use DaaS to support their hybrid/remote work and work from anywhere initiative.

A companywide ‘cloud first / cloud smart’ strategy is an important driver for 11.65% of the respondents.

10.97% use DaaS as part of the Disaster Recovery / Business Continuity (DR/BC) driver.

Secure Access to applications and data is an important driver for 10.41% of the organizations.

Finally, the ability to support a flexible and seasonal workforce is an important driver for 9.52% of the respondents.





What are the biggest challenges in your organization caused by using or adopting DaaS?

One of the main challenges of implementing Desktop as a Service is the cost, which is a concern for 21.56% of respondents. Performance or 'User Experience' is also a significant issue, with 15.16% citing it as a challenge. Balancing cost and user experience can be difficult, but it is essential to ensure a successful implementation. Trust in public cloud services is a concern for 7.19% of respondents, while 6.56% reported resistance to change as a challenge in adopting DaaS.

It is important to recognize that change can bring both opportunities and challenges, and it is up to you, me and us to decide whether we build walls or windmills in the face of it.

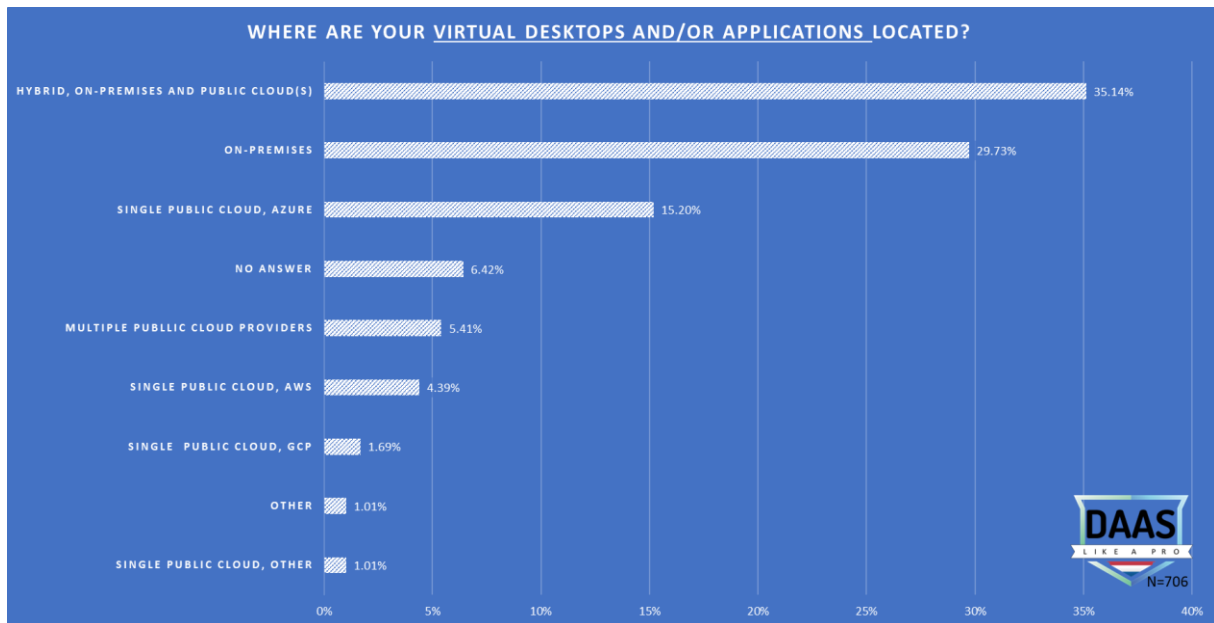




Where are your Virtual Desktops and/or Applications located?

To achieve optimal application performance, it is important to ensure that back-end services and front-end (Windows) applications are connected via a high-bandwidth, low latency network. According to the survey, 35.14% of respondents utilize a hybrid approach, referred to as a "Cloud Smart" approach, where virtual desktops and applications are run both on-premises and on public cloud services based on the specific use case.

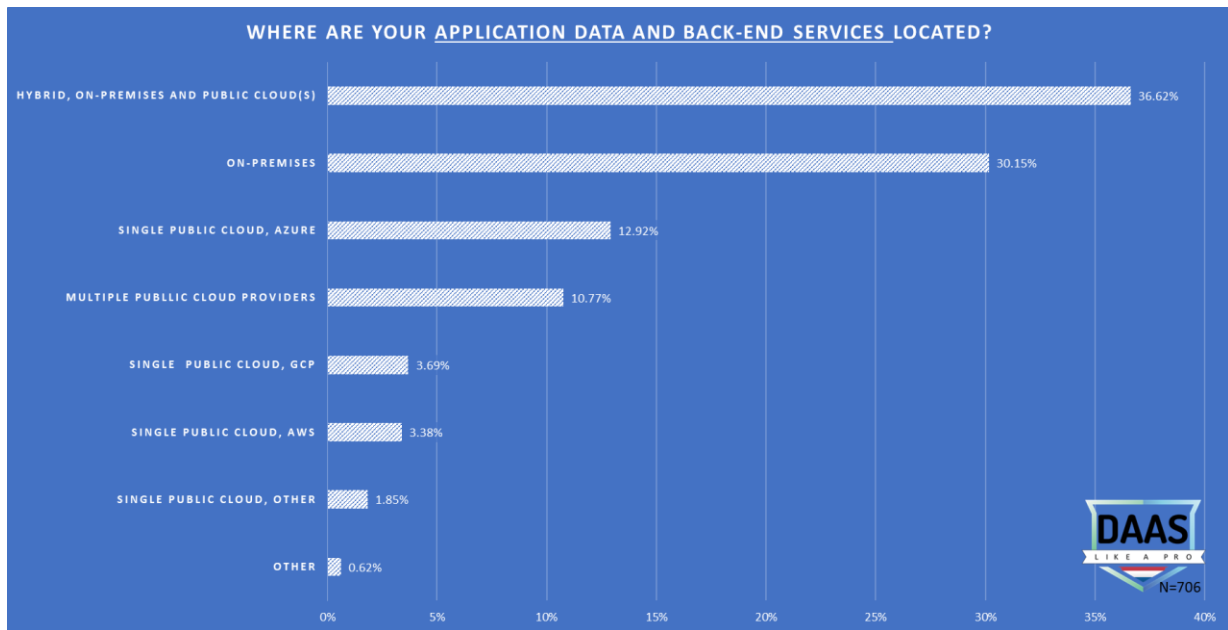
Additionally, 29.73% of organizations run workload VMs on-premises to support virtual applications and desktops.





Where are your application data and back-end services located?

To optimize application performance, it is often best to locate the application runtime and supporting backend systems, such as databases and file services, in proximity with low latency and high bandwidth. According to our survey, 36.62% of respondents have their application data and backend services located in a hybrid architecture that combines on-premises and public cloud infrastructure, while 30.15% use on-premises infrastructure alone. Among respondents who use public cloud providers, 12.92% utilize Microsoft Azure to store application data and run backend services, and 10.7% use multiple public cloud providers.





Which DaaS solution are you using, or will you introduce?

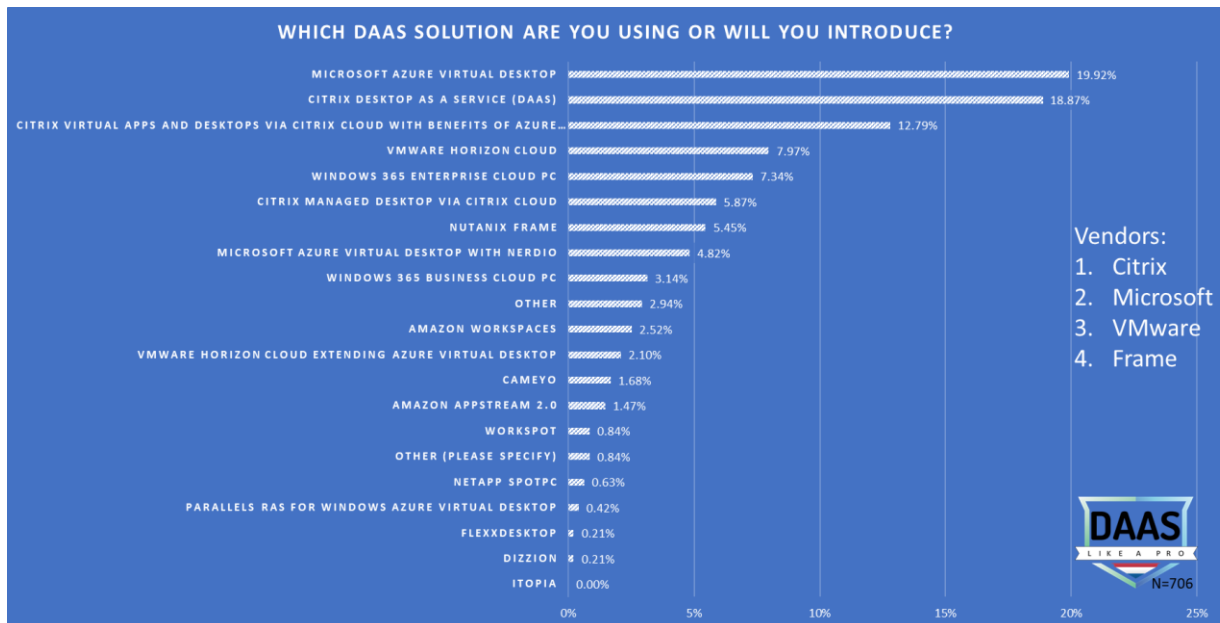
As the market for Desktop as a Service (DaaS) evolves, it is interesting to observe the struggles of established vendors in this space. While these companies have a long history and a strong presence in the industry, they are finding it difficult to adapt to the changing landscape.

On the other hand, smaller and more agile DaaS vendors that were "born in the cloud" can take advantage of these struggles and thrive.

When examining the solutions being used, it becomes clear that Microsoft Azure Virtual Desktop (AVD) is the most popular choice among respondents, with nearly 20% using or planning to introduce it. Citrix DaaS and Citrix VADs on AVD follow close behind, with 18.87% and 12.79% of respondents respectively.

When looking at the vendors rather than the products, Citrix comes out on top, followed by Microsoft, VMware in third place, and Frame in fourth.

It is intriguing to observe that Amazon Appstream and Workspaces have relatively low scores compared to other DaaS solutions. One potential explanation for this could be the lack of a strong presence within the End User Computing community.





What are the most important factors in selecting a DaaS solution?

There are several important factors to consider when selecting a DaaS (Desktop as a Service) solution. The most crucial factor is performance or “user experience”, which was rated as the top priority by 16.12% of respondents.

The second most important factor is manageability, or the “admin experience”, which was rated as a top priority by 15.56% of respondents. This includes the ease of use and administration of the DaaS solution, as well as the level of support and resources available to admins.

Availability and stability are another important factor, rated as a top priority by 13.15% of respondents. This includes ensuring that the DaaS solution is always available, and that data and applications are protected against outages and other disruptions.

Costs, were also identified as a key consideration by 13.01% of respondents. This includes the overall cost of the DaaS solution, including subscription fees, licenses, and any additional costs for support or resources.

Finally, infrastructure support was identified as a key factor by 12.59% of respondents. This includes the level of support and resources available for integrating the DaaS solution into the organization's existing on-premised and public cloud infrastructure.

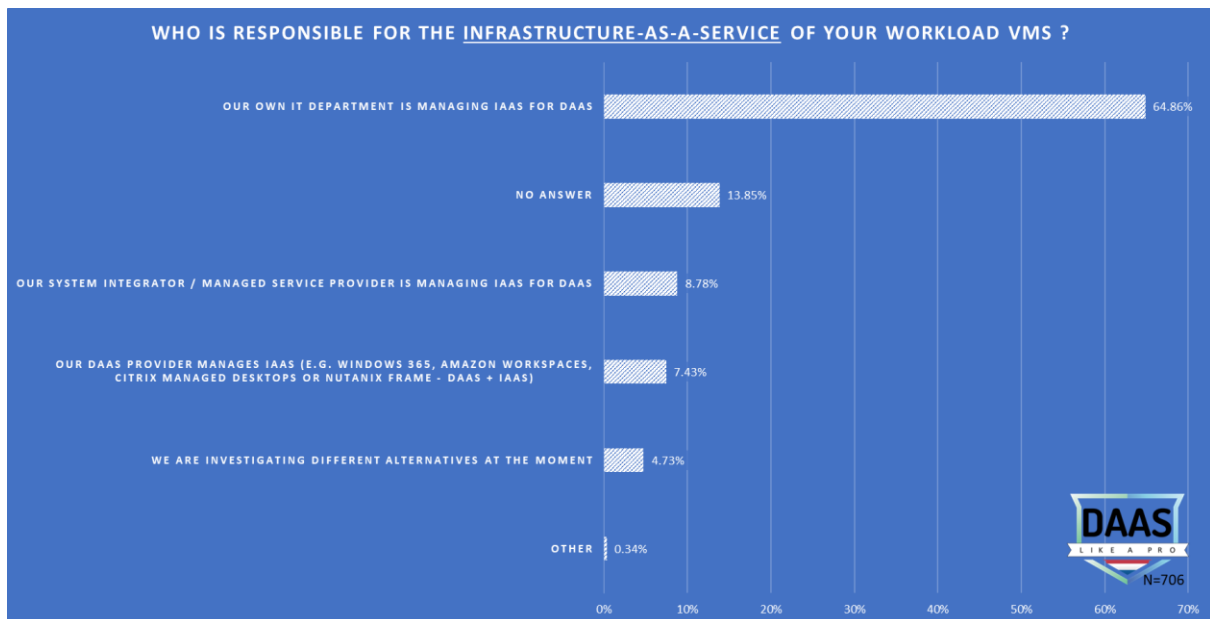
Overall, selecting a DaaS solution requires careful consideration of a variety of factors, including performance, manageability, availability and stability, costs, and infrastructure support. Ensuring that these factors are addressed and properly balanced can help organizations to make the best decision for their needs.



Who is responsible for the infrastructure (IaaS) of your workload VMs?

The responsibility for design, setup, and support of the infrastructure to run workload virtual machines (VMs) for Desktop as a Service (DaaS) often falls on the organization's IT department. According to our survey, 64.86% of respondents reported that their IT department oversees managing Infrastructure as a Service (IaaS) for DaaS workload VMs.

However, it is worth noting that 13.85% of respondents did not provide an answer, and 8.78% reported using a system integrator or managed service provider (MSP) to manage IaaS for DaaS. This suggests that there may be some organizations outsourcing this responsibility to third-party service providers. It is important for businesses to ensure that the infrastructure supporting their workload VMs is properly designed, set-up, and maintained to ensure the smooth operation and performance of their DaaS systems.

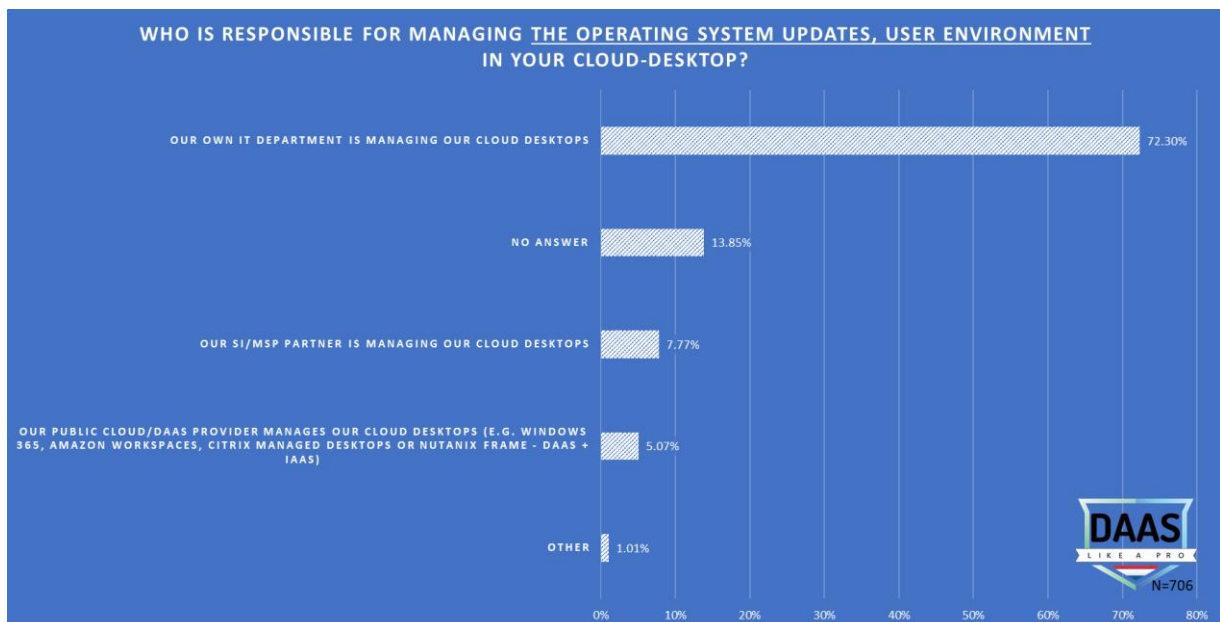




Who is responsible for managing the Operating System updates, User Environment in your cloud-desktop?

According to the results of our survey, the majority (72.30%) of respondents rely on their in-house IT department to manage the operating system, system updates, and user environment for their cloud desktop. However, a significant portion (7.77%) opt to use a system integrator or managed service provider (MSP) for these tasks.

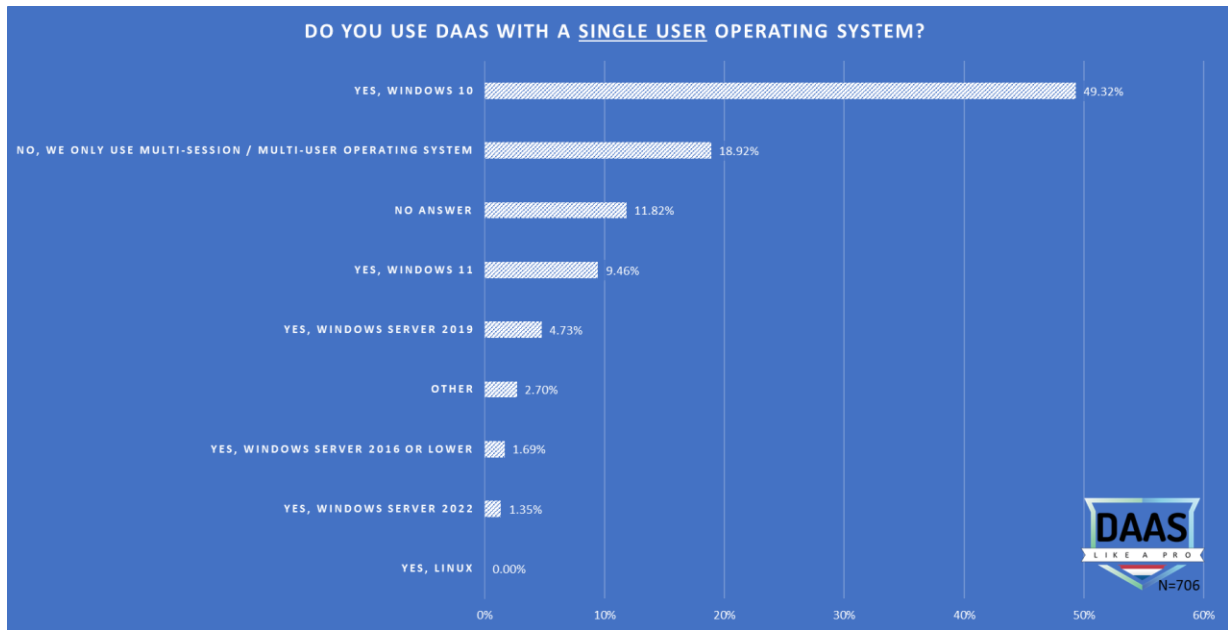
A smaller percentage (5.07%) utilize the services of a public cloud DaaS provider for the management of their cloud desktop's operating system updates and user environment. It is important to note that the responsibility for managing these aspects of the cloud desktop will vary depending on the specific needs and preferences of the organization. Some may prefer to handle these tasks in-house, while others may prefer to outsource them to a trusted third party. Ultimately, it is up to the organization to determine the best approach for managing their cloud desktop in order to ensure optimal performance and efficiency.





Do you use DaaS with a single user Operating System?

According to our survey, most respondents use a single user operating system for desktop as a service, with Windows 10 being the most popular choice at 49.32%. However, a significant portion of respondents (18.92%) opt for multi-user operating systems instead. A small percentage (9.46%) use Windows 11 as their operating system of choice. It is worth noting that while Windows 10 remains the most widely used operating system, the adoption of newer versions such as Windows 11 is steadily increasing.

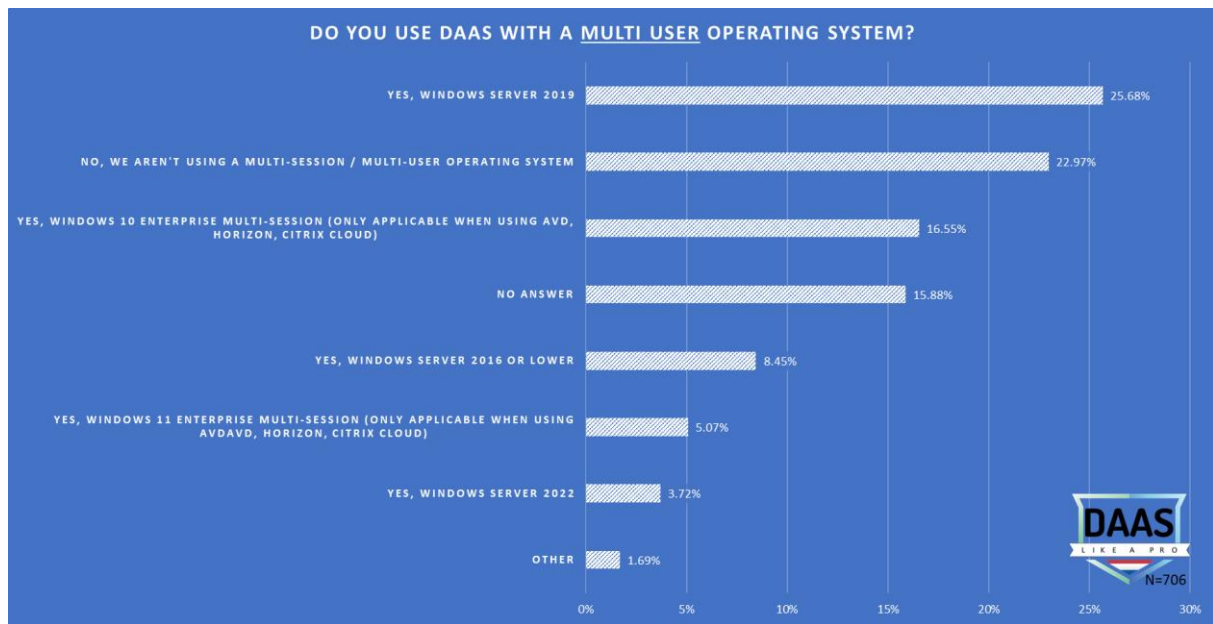




Do you use DaaS with a multiuser Operating System?

Multi-User systems, which allow multiple users to access and utilize a single system simultaneously, have traditionally been popular in virtual applications and desktops. However, as technology advances and business needs evolve, the use of single user operating systems is becoming more prevalent.

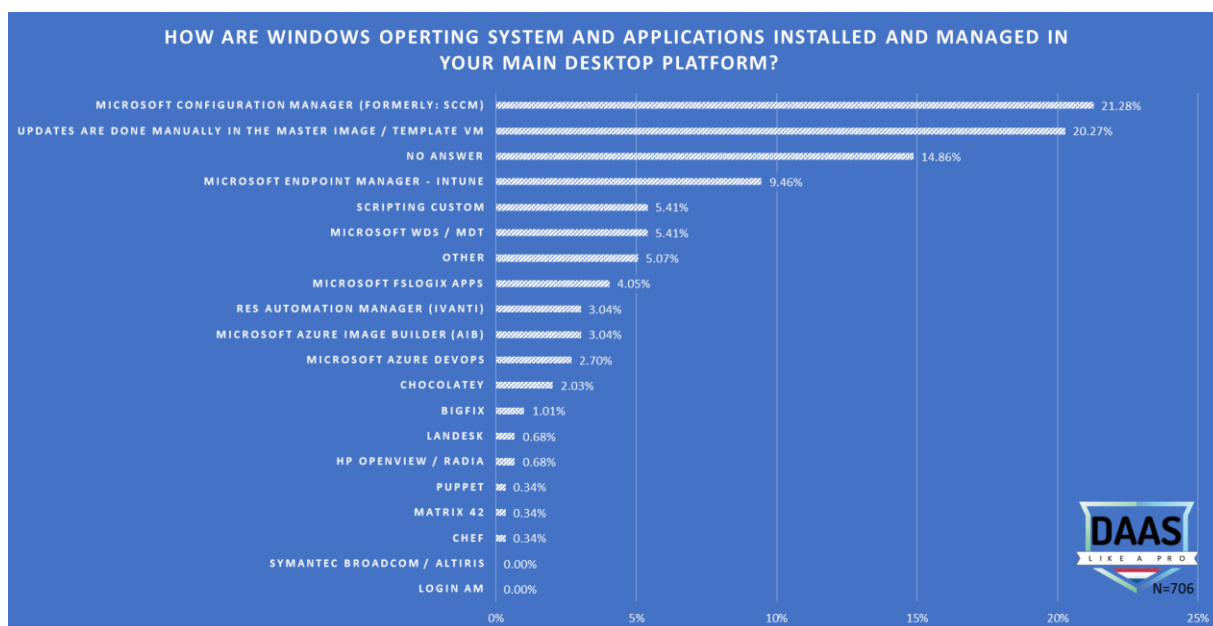
According to our survey, the most popular multi-user operating system for desktop as a service is Windows Server 2019, with 22.97% of respondents using it. However, a significant number of respondents (16.55%) also reported using Windows 10 Enterprise Multi-session. Interestingly, a significant portion (22.97%) of respondents do not use a multi-user operating system at all, opting instead for a single user operating system in their DaaS deployment.





How are Windows Operating System and applications installed and managed in your main desktop platform?

In the (Windows) workspace, the installation and management of Windows operating systems and applications can be done through a variety of methods. One of the most popular methods is using Microsoft Configuration Manager (formerly known as SCCM), which is used by 21.28% of IT admins. However, there is also a significant number of IT admins who opt for manually installing and updating the OS and applications within the master image, accounting for 20.27% of users. This is a decrease compared to the 26.19% reported in the VDI Like a Pro survey from the previous year. Another option for managing Windows systems and applications is using Microsoft Intune / End Point Manager, which has seen an increase in usage by nearly 5% compared to the 2021 VDI Like a Pro survey, with 9.46% of IT admins utilizing this solution.



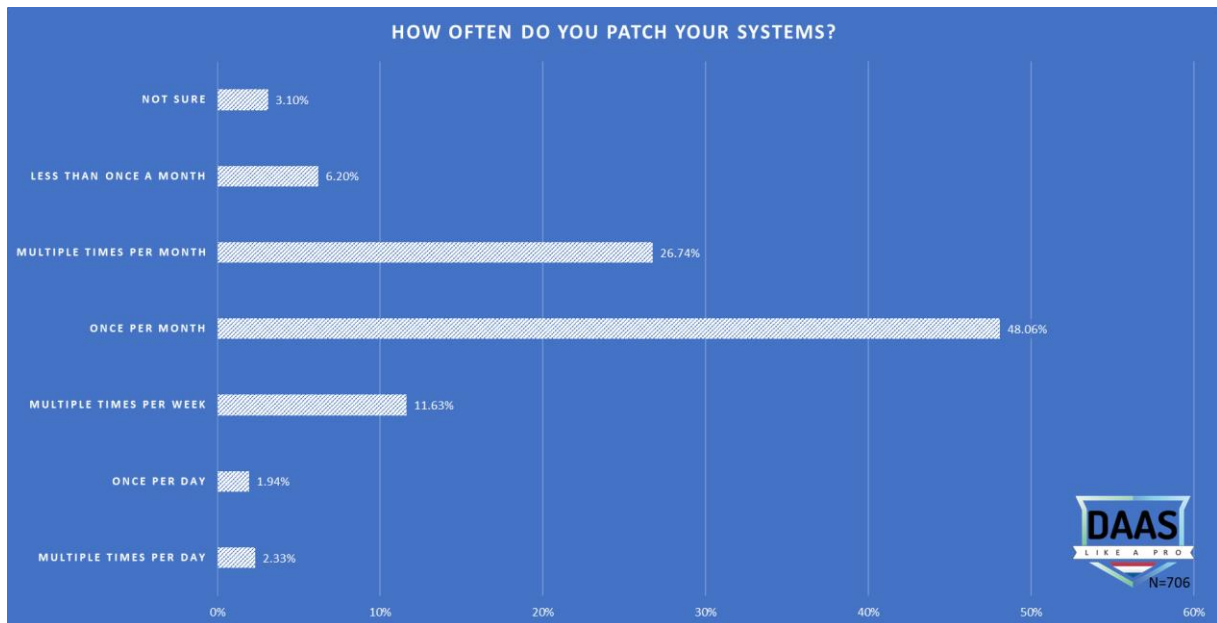


How often do you patch your systems?

According to survey, nearly half of the respondents (48.06%) reported patching their systems once per month, which is similar to the findings of the VDI Like a Pro 2021 study. However, a significant portion of respondents (26.74%) indicated that they patch their systems multiple times per month, which is more than double the frequency reported in the VDI Like a Pro 2021 results.

Additionally, 11.63% of respondents stated that they patch their systems multiple times per week, while only 6.20% reported patching less than once a month.

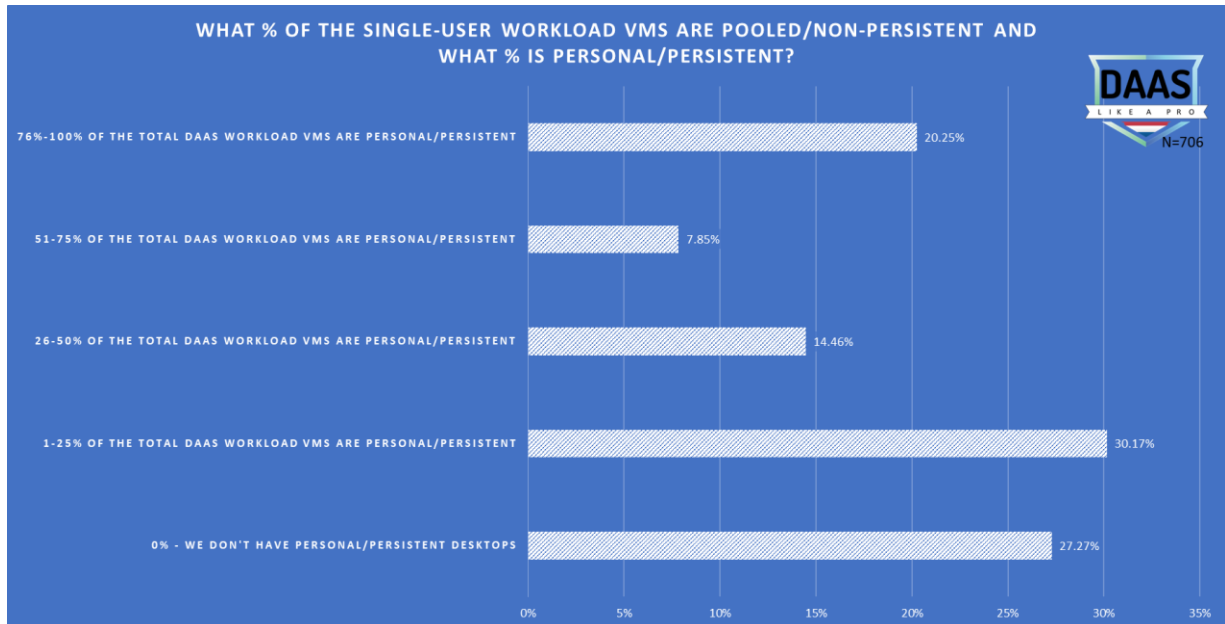
These results suggest that a significant number of respondents prioritize frequent system patching to ensure the security and stability of their systems.





What % of the single user Workload VMs are pooled/non-persistent and what % if personal/persistent?

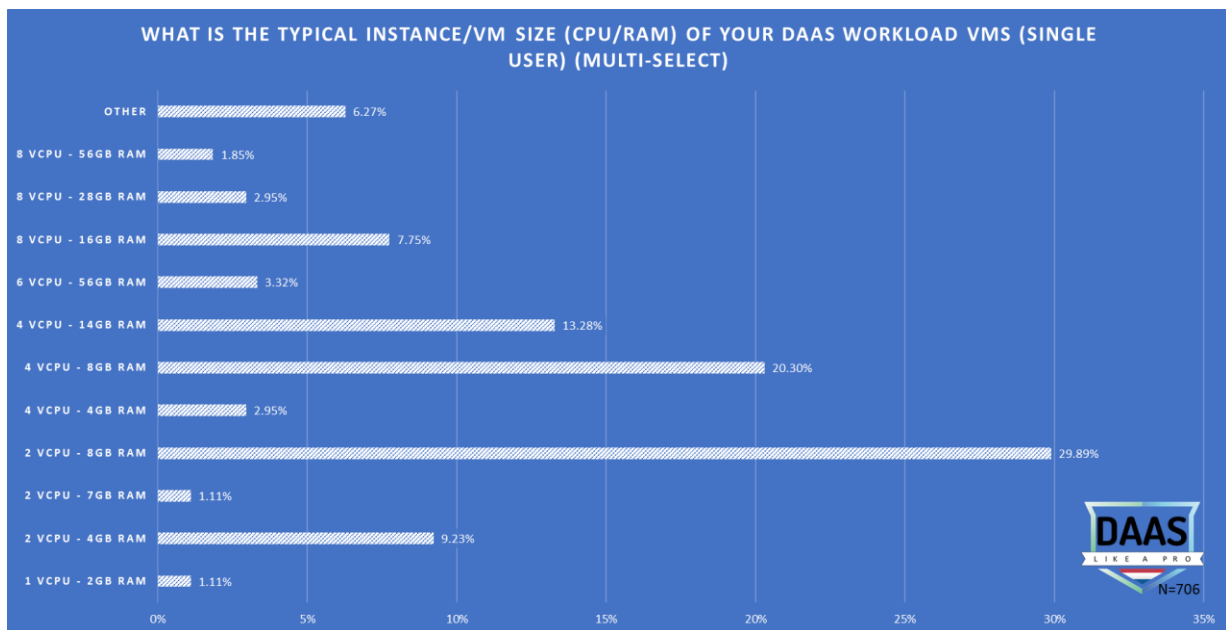
According to the survey data, 20.25% of respondents reported using a majority (76%-100%) of their DaaS (Desktop as a Service) workloads as personal or persistent desktops. Another 30.17% of respondents reported using a relatively small percentage of DaaS workloads as personal or persistent desktops, while 27.27% reported not using personal or persistent desktops at all.





What is the typical instance/VM size (CPU/RAM) of your DaaS Workload VMs (Single User)?

According to our survey, the most used virtual machine (VM) size for DaaS Single User Operating System workloads is 2 vCPUs and 8GB of RAM, with 29.89% of respondents choosing this option. The next most popular choice was 4 vCPUs and 8GB of RAM, chosen by 20.30% of respondents. 13.28% of respondents used a 4vCPUs and 14GB of RAM machine, an Azure NVv4 machine is used here specifically. It should be noted that many respondents chose a mix of different VM sizes, as indicated by the multi-select option in the survey. In the future, we expect that 4 vCPUs and 8GB of RAM will become the default choice for DaaS workloads running on a single user operating system because of Windows 10 and 11, Office, Microsoft Teams etc. resource requirements.

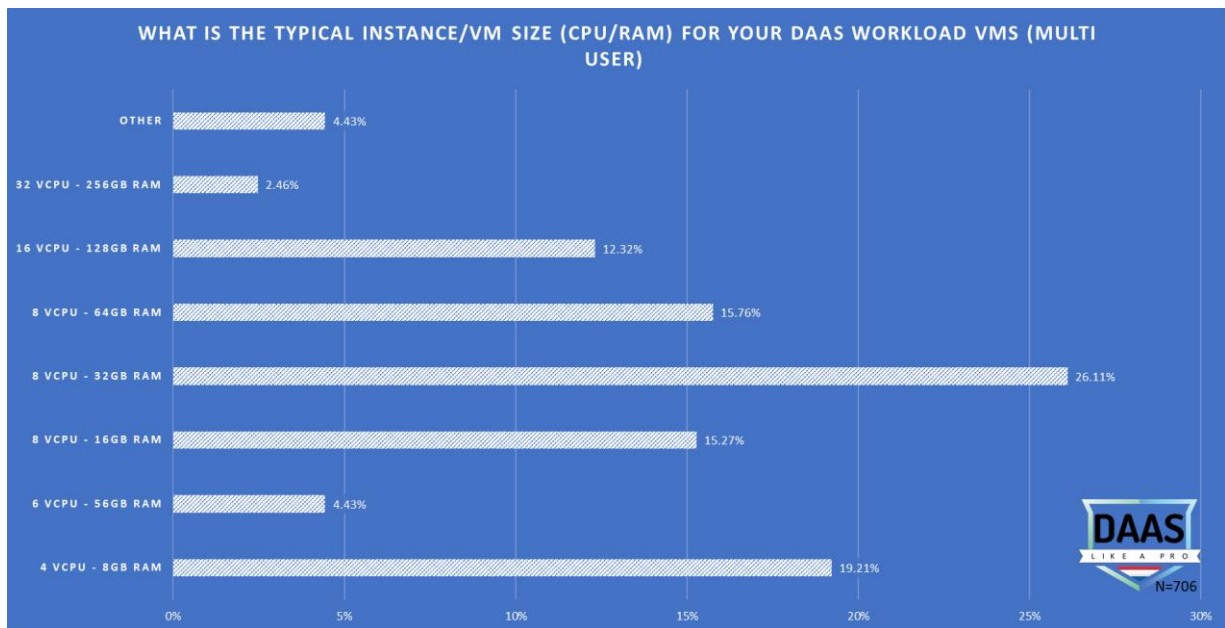




What is the typical instance/VM size (CPU/RAM) of your DaaS Workload VMs (Multi-User)?

The most popular instance size for Multi-User Operating System was found to be 8vCPUs and 32GB of RAM instances, with 26.11% of respondents choosing this option.

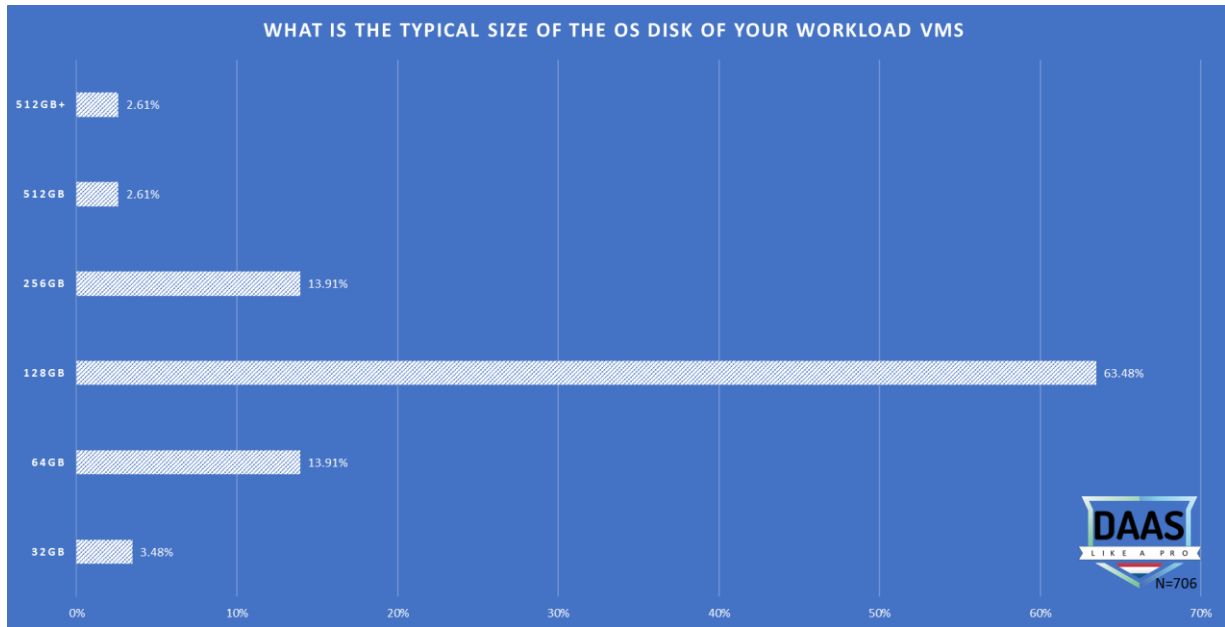
The second most popular size was 4vCPUs and 16GB of RAM, with 19.21% of respondents selecting it. The third most popular size was 8vCPUs and 64GB of RAM, with 15.76% of respondents choosing it.





What is the typical size of the OS disk of your Workload VMs?

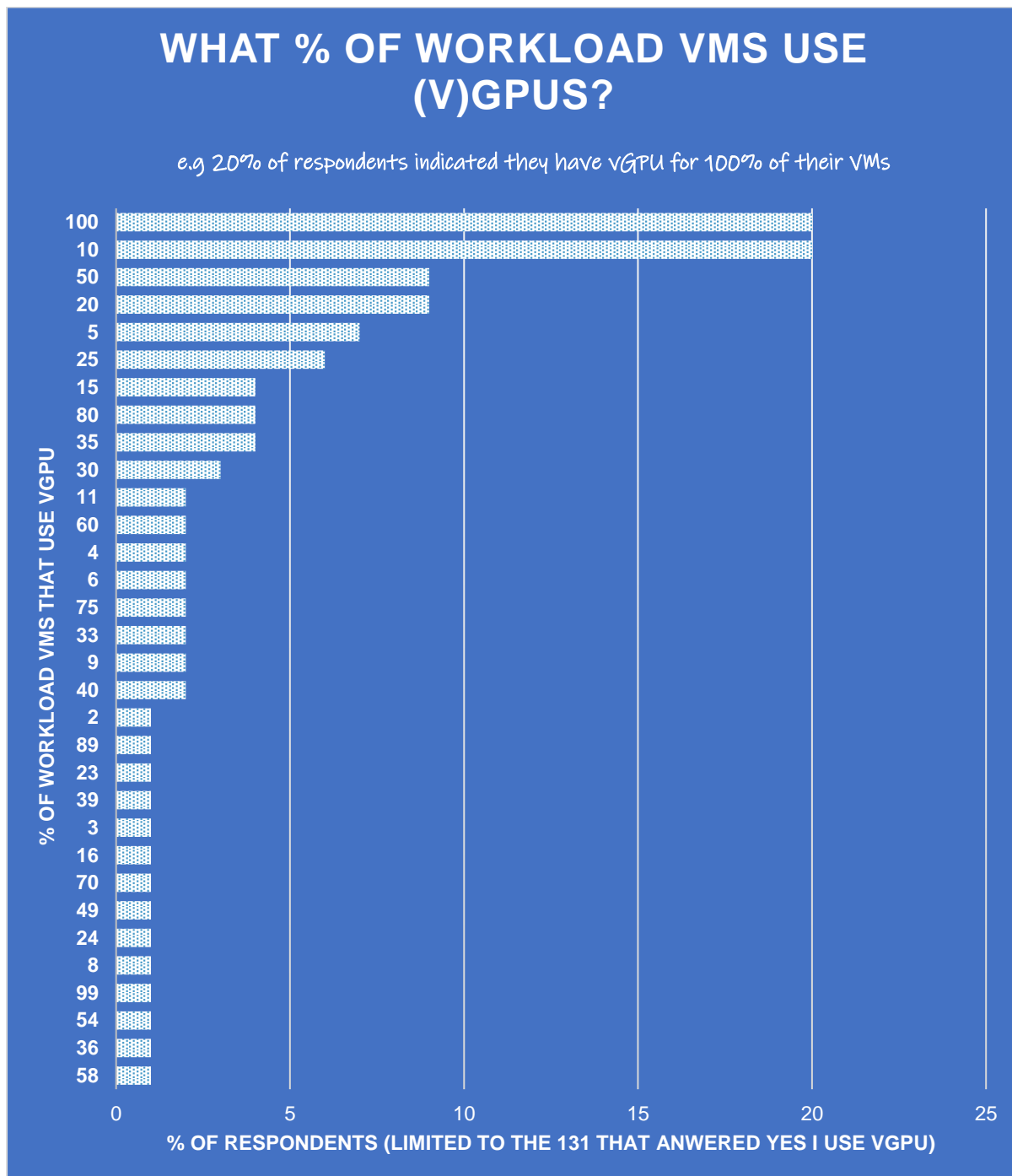
The typical size of the OS disk for Workload VMs varies, but 128GB seems to be the most common according to our survey. 63.48% of respondents reported using 128GB for their OS disk, while 13.91% used 256GB and an equal number used 64GB.





Do you use GPUs for your DaaS use-case and if you do what % of Workload VMs use (v)GPUs?

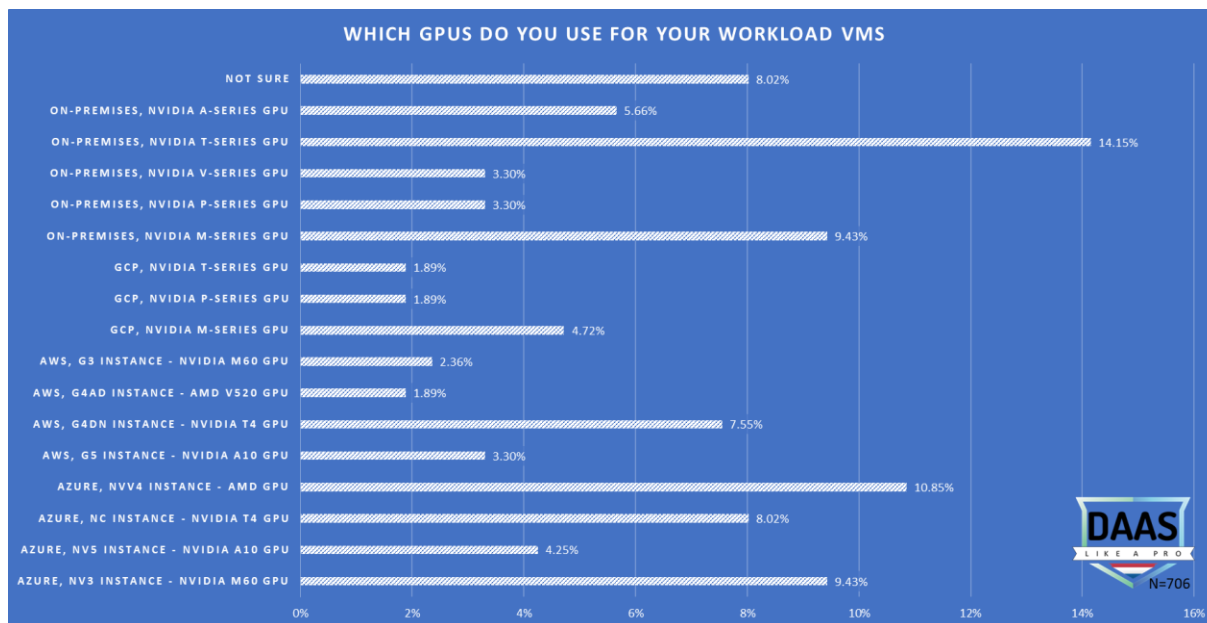
Out of 706 respondents 131 have indicated they leverage vGPUs in their DaaS environment. Overall, vGPUs can be a useful tool for providing high-performance graphics capabilities to users accessing their virtual desktops remotely, but it is important to carefully consider the trade-offs and limitations before deciding to use them as they are quite expensive.





Which GPUs do you use for your Workload VMs?

In terms of workload VMs, it appears that the biggest competition is not necessarily between AMD and NVIDIA GPU, but rather between the CPU and the GPU. Based on our most recent survey data, it appears that on-premises, the NVIDIA T-series GPU is the most popular choice among respondents, with 14.15% using it. In terms of public cloud platforms, Microsoft Azure appears to be the most popular choice, with 10.85% of respondents using AMD-based (MI25) GPUs and 8.02% using NVIDIA T-series GPUs. The NVIDIA M-series GPUs are also used both on-premises and in Azure, with 9.43% of respondents opting for this option.





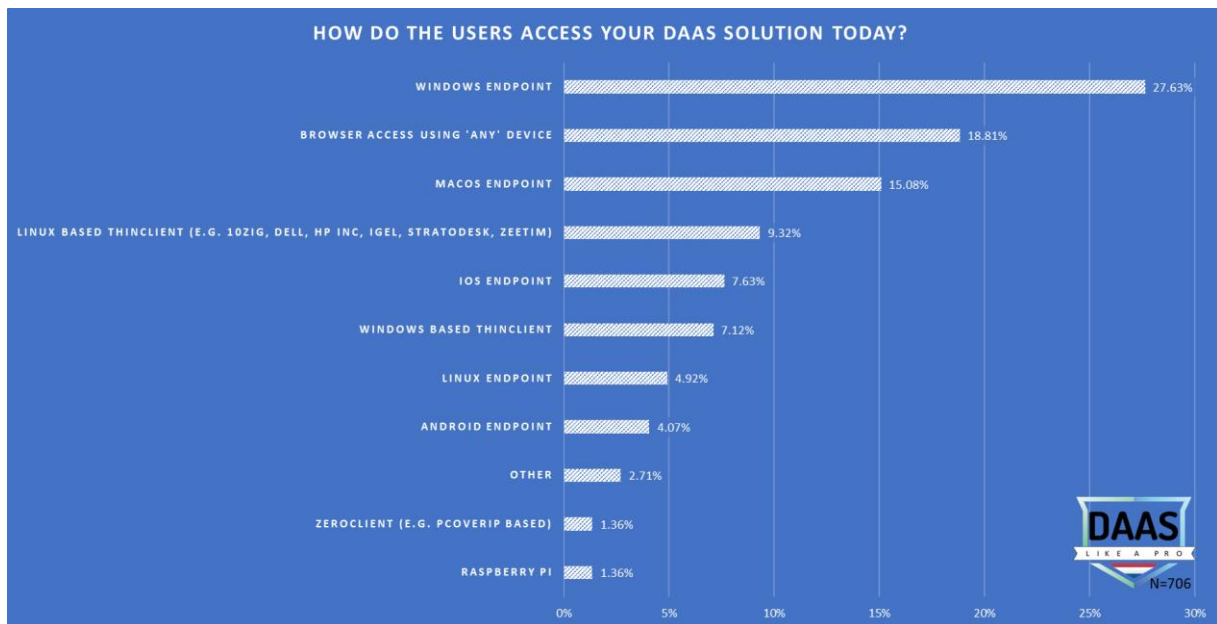
How do the users access your DaaS solution today?

End-users can access the Virtual Desktops and Applications powered by DaaS through various methods, with the most popular being through Microsoft Windows as an endpoint Operating System, used by 27.63% of respondents in our survey.

Browser access was also a popular method, with 18.81% of respondents using it, particularly due to the increasing number of SaaS applications many do use their browser to access all their applications, including Windows applications powered by DaaS.

MacOS was the third most popular endpoint Operating System, with 15.08% of respondents using it, while Linux-based OS such as IGEL and Stratodesk were used by 9.32% of respondents.

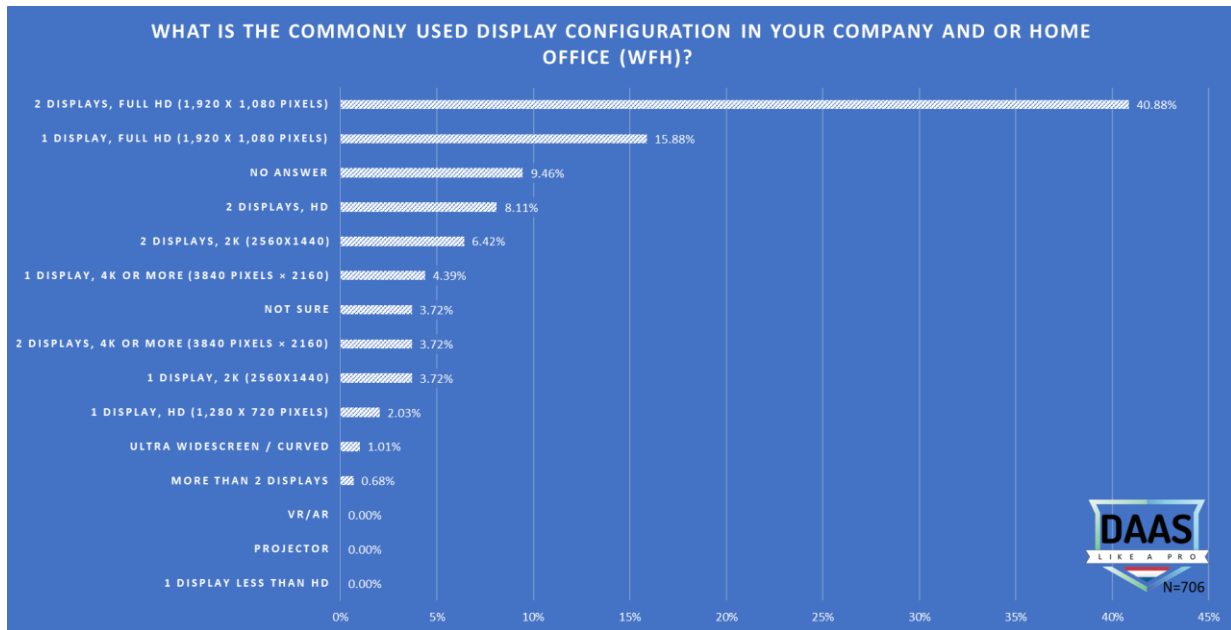
It is common for DaaS deployments to use a combination of these methods for accessing the DaaS solution. It is important to consider the functionality provided by HTML5/browser access and the user experience when choosing a DaaS vendor, as browser access may be the 'fail back plan' for various DaaS vendors.





What is the commonly used display configuration in your company and or home office (work from home)?

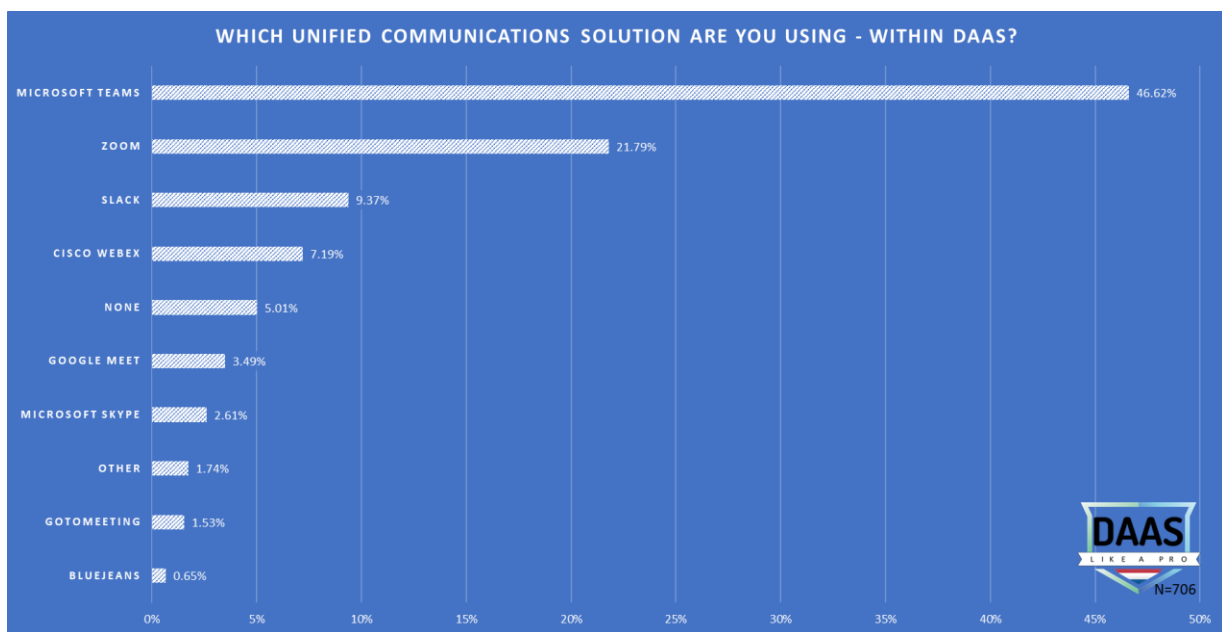
It is common for companies and/or end-users working from home to use dual monitors with Full HD (1920x1080) resolution, as 40.88% of respondents reported using this configuration. This is consistent with the results of the 2021 VDI Like a Pro survey. Single monitors with Full HD resolution are also commonly used, with 15.88% of respondents reporting their use. Virtual reality (VR) and augmented reality (AR) technologies, which allow users to view content on a "monitor on their face," have not yet seen widespread adoption in the desktop-as-a-service (DaaS) space, but it is possible that we may see an increase in their use in the coming years.



Which Unified Communications solution are you using within DaaS?

For many the concept of "work" is no longer limited to a physical location, but rather it is something that can be done from anywhere. This shift has been accelerated by the rise of remote work and the adoption of digital technologies such as unified communications platforms. These solutions, such as Slack, Zoom and Microsoft Teams, allow individuals and teams to communicate and collaborate remotely through voice and video calls, messaging, and file sharing.

The use of unified communications has increased significantly in recent years, particularly with the rise of Virtual Applications and Desktops (DaaS). In our survey, Microsoft Teams was found to be the most popular platform, with 46.62% of respondents using it. Zoom came in second, with 21.79% of respondents using it, and Slack was third with 9.37% usage. It is important to consider the various DaaS unified communications offloading technologies and their requirements when implementing and using these unified communication platforms within DaaS to ensure optimal user experience.



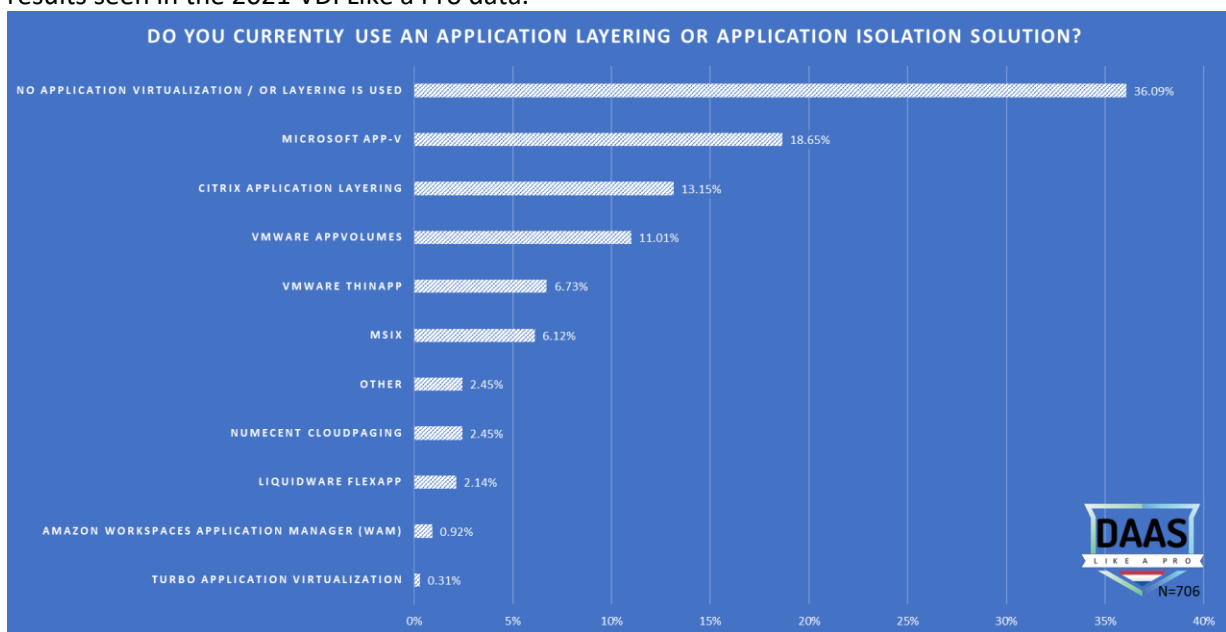


Do you currently use an application layering or isolation solution?

Application isolation and application layering are two technologies that can be used to deliver applications to physical PC and the DaaS workload VMs. While both solutions are effective, they work in slightly different ways. Application virtualization/isolation involves running applications in a separate ‘bubble’ or container within the Workload VM, while application layering involves attaching applications as a layer within the Workload VM.

According to our survey data, 36.09% of organizations are currently not using application virtualization/isolation or application layering solutions.

Of those organizations that do, the most popular solution is Microsoft App-V with 18.65% of respondents using it, followed by Citrix Application Layering at 13.15%. A smaller number of respondents, 6.12%, reported using Microsoft MSIX. These MSIX numbers are slightly lower than the results seen in the 2021 VDI Like a Pro data.



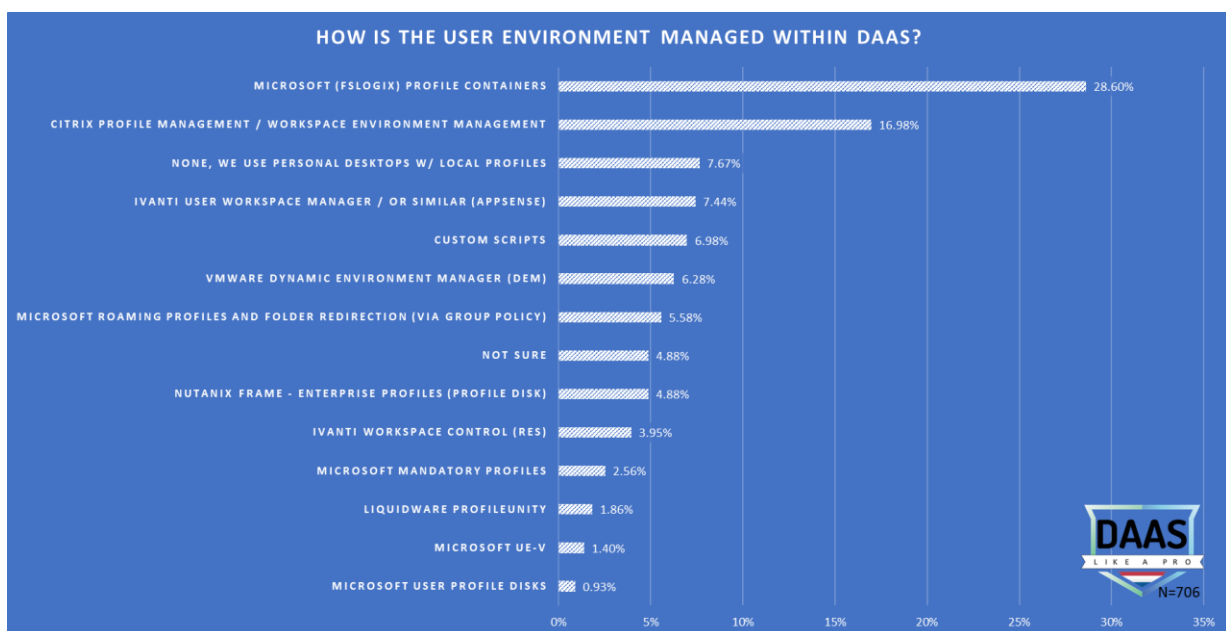


How is the user environment managed within DaaS?

Windows User Environment Management (UEM) is a software solution that helps to set up, configure, and control the complete Windows user environment within a Physical Windows PCs and Desktop as a Service (DaaS) solutions.

One key aspect of UEM is managing and storing Windows user profiles, which can be done through profile containers or disks. Microsoft Fslogix is a commonly used solution for this, with 28.60% of respondents utilizing it. Other popular options include Citrix Profile Management/Workspace Environment Management (16.98%), local Windows user profiles (7.67%), and various other solutions such as VMware Dynamic Environment Management, Liquidware ProfileUnity, Nutanix Frame Enterprise Profiles, and Ivanti User Workspace Manager.

These solutions help to ensure that the Windows user environment is properly managed and configured within a DaaS system, allowing users to access and use their personalized settings and applications

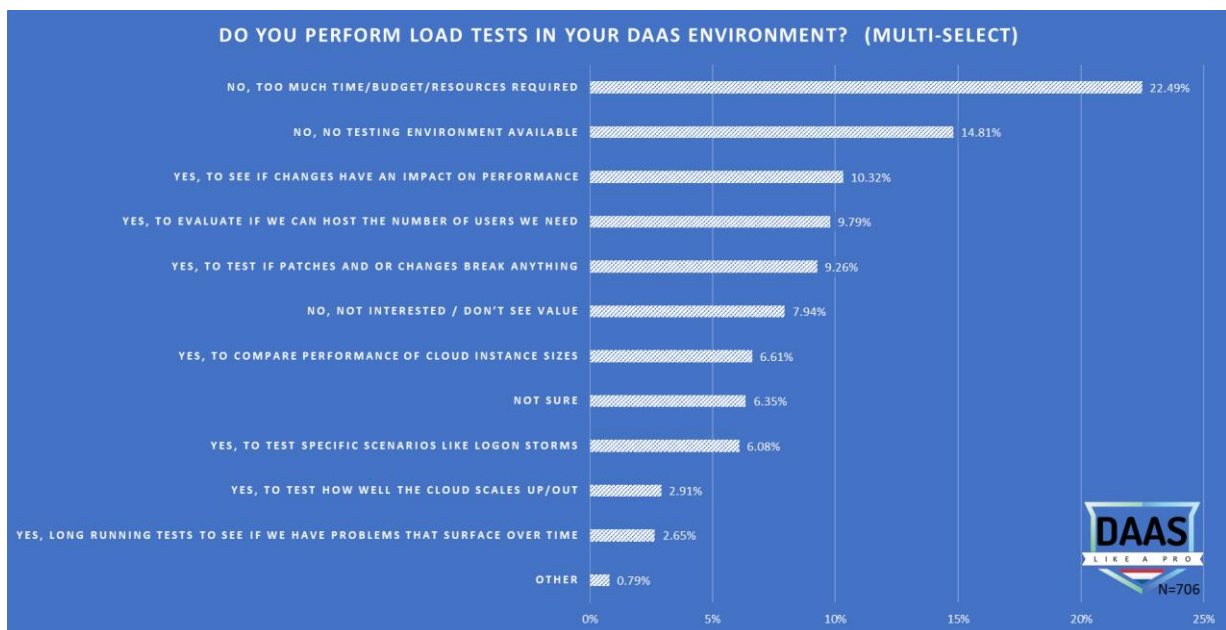




Do you perform load tests in your DaaS environment?

According to our survey results, 47.68% of respondents perform load tests in their DaaS environments. This represents a 9% increase from the previous year's survey results. The importance of load testing cannot be overstated, as it helps to ensure that newly built environments are functioning properly and allows for ongoing monitoring of application and desktop performance from the end-user perspective, particularly after Windows and application updates have been implemented. However, 22.49% of respondents admitted that they do not perform load testing due to time, budget, or other resource constraints.

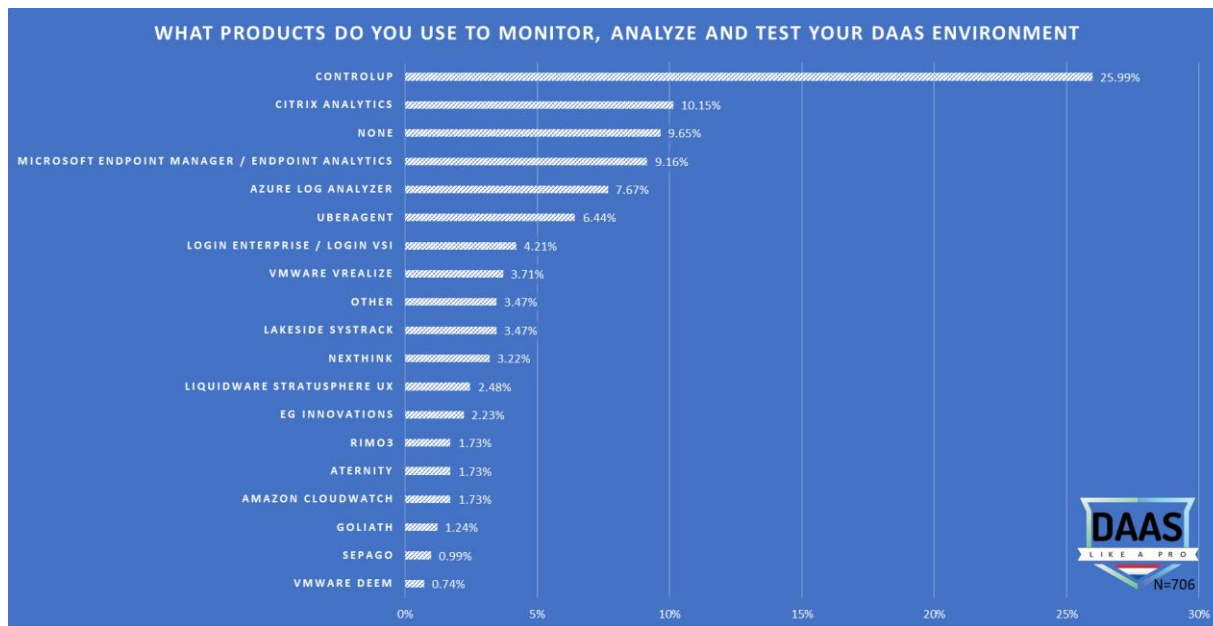
Additionally, 14.81% of participants stated that they do not have a dedicated test environment available for performance testing. It is crucial for organizations to prioritize load testing and allocate the necessary resources to ensure the smooth operation and performance of their DaaS environments.





What products do you use to monitor, analyze, and test your DaaS environment?

It is crucial to monitor, analyze, and test your DaaS platform, including Digital User Experience Management (DEX), as these various processes serve different purposes. ControlUp is currently the leading solution in this market, with 25.99% of respondents using it, which is a significant increase from 9.78% in 2021. This growth is likely due in part to ControlUp's active community. Other popular products used for monitoring, analyzing, and testing the DaaS environment include Citrix Analytics (used by 10.15% of respondents), Microsoft Endpoint Manager (used by 9.16%), Azure Log Analyzer (used by 7.67%), and UberAgent (used by 6.44%).



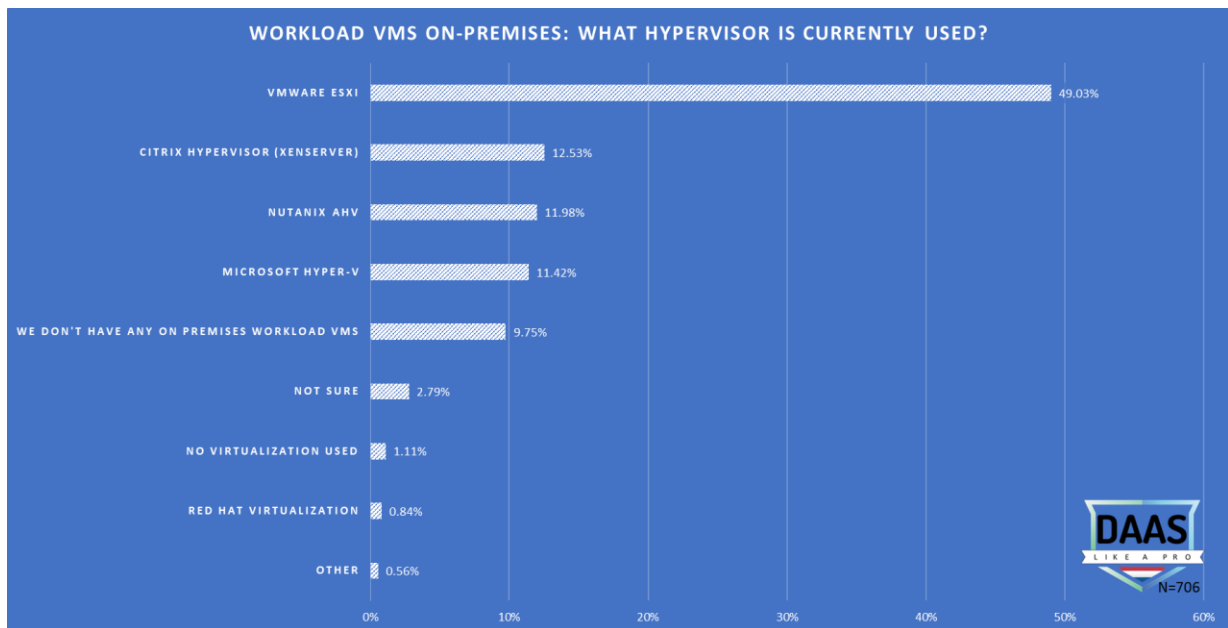
Workload VMs on-premises: what hypervisor is currently used?

According to our data, VMware remains the most popular hypervisor for on-premises workload VMs, with a usage of 49.03% in 2022. However, its usage has been decreasing over the years, from 65.8% in 2014 to 52.25% in 2021.

Citrix Hypervisor usage has also been declining, going from 21% in 2020 to 12.53% in 2022.

Microsoft Hyper-V usage has seen a similar decrease, dropping from 14.29% in 2021 to 11.42% in 2022.

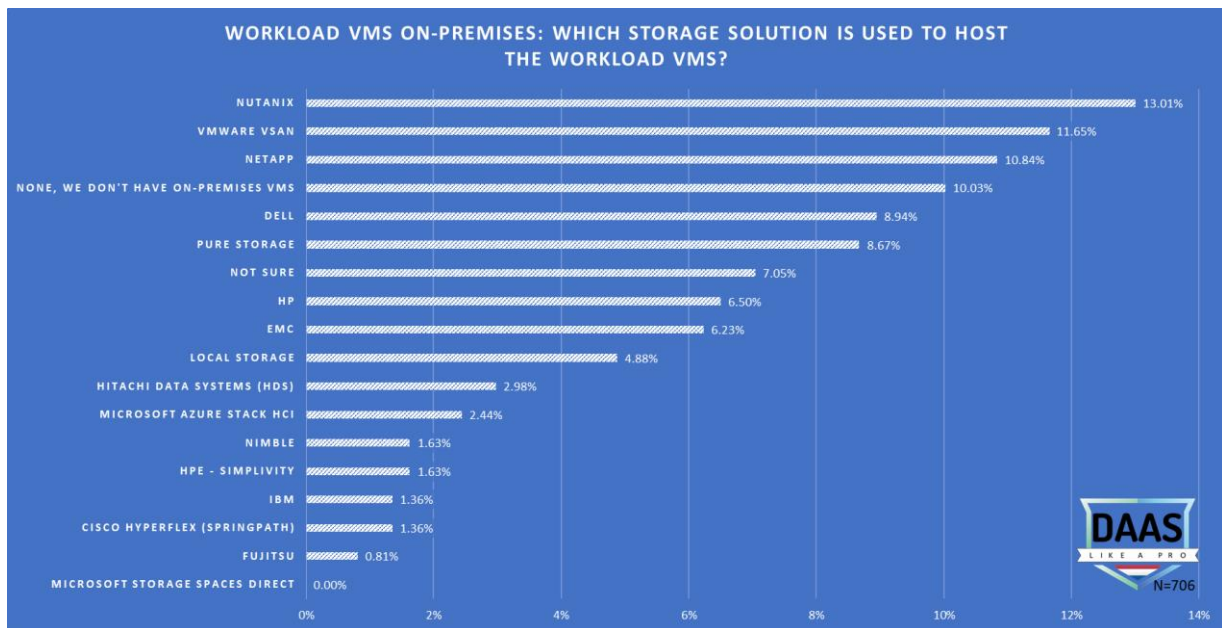
On the other hand, Nutanix has experienced growth in adoption, increasing from 6.13% in 2018 to 11.98% in 2022. It's important to note that it is possible for organizations to use multiple hypervisors and that the decision to switch to a different platform is a long-term commitment that may not happen overnight.





Workload VMs on-premises: which storage solution is used to host the Workload VMs?

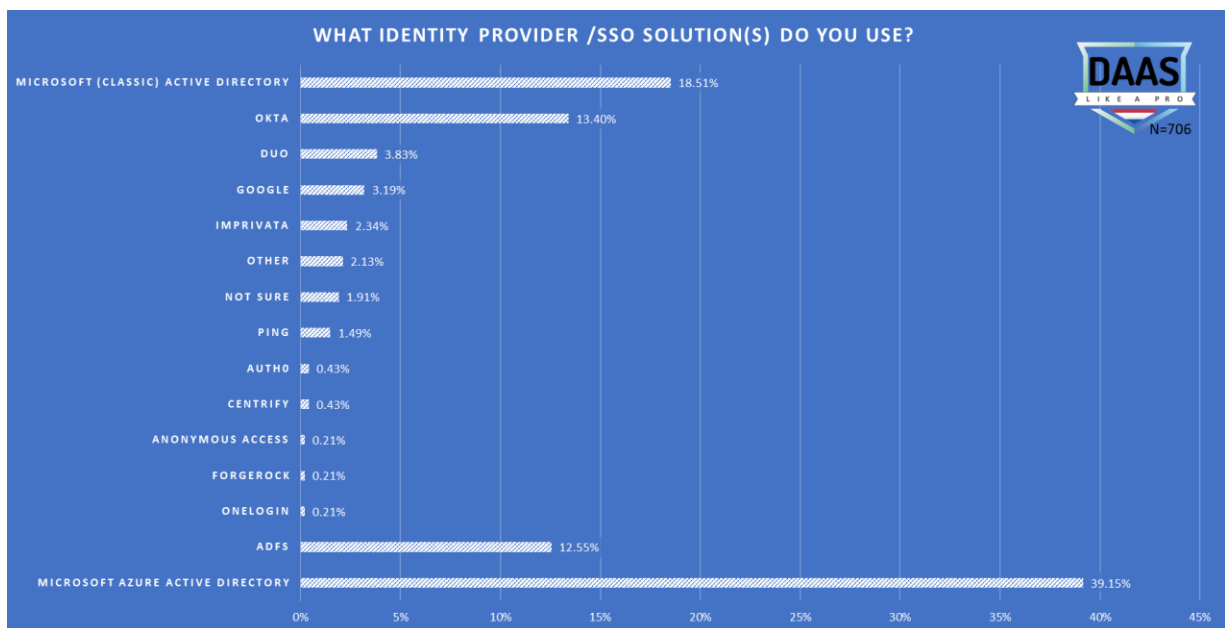
According to our DaaS Like a Pro survey data, Nutanix is the most popular storage solution for hosting workload VMs on-premises, with 13.01% of respondents using their Hyper Converged Infrastructure platform. Coming in second is VMware vSAN, which is utilized by 11.65% of respondents, while Netapp is used by 10.84% of respondents. These storage solutions provide a reliable and efficient way to store and manage workload VMs on-premises.



What Identity Providers / SSO solutions do you use?

Traditional Virtual Application and Desktop solutions often required the use of Microsoft Classic Active Directory for authentication and authorization of end-users.

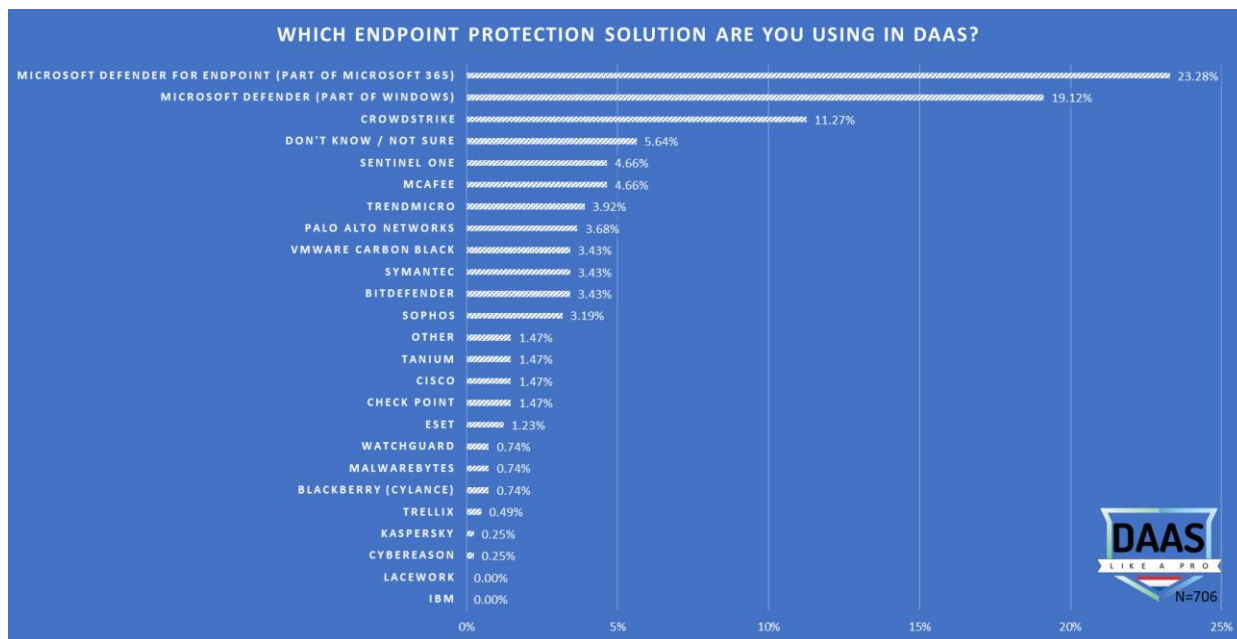
However, with the shift towards SaaS, Modern Unified Device Management, and newer operating systems, more and more organizations are using modern Identity Providers within their workspaces. Some customers use both classic and modern IdPs, while others solely rely on modern IdPs, including in the case of DaaS. Microsoft Azure AD (AAD) is the most used Identity Provider, with 39.15% of respondents utilizing it. Classic Active Directory follows closely behind with 18.51% of respondents using it. This is not surprising as many customers utilize Microsoft technology, such as Office 365 and Microsoft 365. Okta is the second most popular modern IdP, with 13.40% of respondents using it.





Which Endpoint protection solution are you using in DaaS?

As the threat of cyber-attacks continues to grow, it is important for companies to implement effective endpoint protection solutions in their DaaS (Desktop as a Service) environments. Among the respondents surveyed, Microsoft Defender for endpoint was the most popular solution with 23.28% usage, followed by Windows Defender (part of the Windows operating system) at 19.12%. CrowdStrike, with 11.27% usage, is also gaining popularity in DaaS environments, as is Sentinel One with 4.66%. It is worth noting that traditional endpoint protection providers such as McAfee and TrendMicro appear to be losing ground to newer solutions such as CrowdStrike and Sentinel One.



What functionality is missing in DaaS today?

(note: full export – no curation)

- Better alternatives to FAS service.
- Can't think of anything that some Product or other does not already do...
- Variable auto scale percentage configuration
- a decent on-prem option. Too much focus on Public-Cloud-Only solutions where that is not where most of our workloads are or will be for at least 5 years. Limited number of providers can genuinely deliver hybrid-cloud solutions at a reasonable cost.
- Device sync .. sync states between remote/local devices.
- Easy SSO with windows hello for business
- Wider pure/true "consumption" options from Citrix (for Citrix DaaS) and VMware (for Horizon Cloud) rather than "subscription"
- A better integration with Microsoft Endpoint Manager than today, especially for AVD. A payment model focused on Concurrent users (but fixed cost) and shorter terms; a month might be too long for some use cases. GPU at fixed cost.
- Better support for DAAS by UC vendors (MSFT, Zoom, GMeet, etc). Some have limited support need to be more feature complete)
- Solid app layering, but it's improving.
- Easy HA/DR scenario for DaaS; e.g. setup environment A in W-EU and B in N-EU, let data replicate and easy access for end-users
- "A seamless way to feed apps from local system through the desktop rather than redirecting USB/Audio etc. If you could deliver Teams, Zoom etc. to the physical machine but have the messages, calls etc. appear on the virtual desktop rather than redirect the other way then there should be no need to try to work magic with audio pass through. Perhaps even give the option to redirect to the physical machine instance when they try to use their web camera. All local resources used.
- More self-service features and information provided to the users e.g. Your internet connection may be having issues, there is high latency, but it is not your home connection thus there is a service disruption you can't do anything to remedy yourself. "
- Camera redirection on more operating systems i.e. Chrome OS
- Scanning Twain passthrough. Fabulatech usb redirection
- Don't know enough to answer
- Now nothing comes to mind
- Connector less deployments to all clouds
- Easy DR implementation of DaaS across multiple regions
- Application Performance Management, insights in application performance or OS performance issues.
- Easy DR
- Failover when (GPU) instance types are not available to other region"
- Biggest problem we see is capacity of GPU instances in e.g. Azure
- Very limited automation/auto scaling within platforms such as AVD.
- Lots of vendors (except Microsoft) are approaching a DevOps way with automation. I.e. Citrix Cloud is really hard to manage from a non-GUI perspective. For us it's mandatory to have no admin rights and deploy stuff via DevOps due to regulations of the Dutch Bank. So, we can do auditing and logging.
- Privilege Access Management
- Learning modules for getting started



- Full Disaster Recovery - Failover
- Better DR capability, VMware needs a better multi-cloud console. Need DaaS macOS VMs, self-provisioning, better IaC options and have more Marketplace images that have more apps baked in.
- Simple application management
- Comprehensive and inclusive solution that can offer management of compute, user and applications that operates active/active geographically dispersed environments.
- Better network monitoring built-in, vda not registering correctly while a user was already assigned to the desktop
- None in ours. It does what we want.
- VR - AR
- I would love to see more PWA (Progressive Web App) functionality within Cameyo. They have made some huge strides lately, but the one missing piece is to be able to associate file types with their PWAs. For example, if I download an Excel file and open it, I'd like the Cameyo Excel app to be able to open it by default.
- In AVD, the ability to create VMs in Autoscale, instead of just powering on/off already created VMs
- VDI solution served and managed as containers
- At the moment, it is a single pane of view for performance across multiple hypervisor environments
- Offline Support is the most requested feature... Full video/voice redirection (not only HTML5)...
- Image Management
- Simplified application installation and patching.
- Easy management of OS and app updates on Citrix MCS
- "I would like the Microsoft Remote Desktop Client to store Display settings at the root of the application so when you have multiple pools, the parent dictates the setting (Like the way the Microsoft Remote Desktop Connection Manager v2.90 has within it).
- Perhaps using RDP Shortpath with Azure Virtual Desktops and Windows 365 will reduce odd selections of the Microsoft Gateway. Why send me on 1300 miles to from MN to connect to the Central Region?"
- Proper Application Deployment/Management Solution.
- Proper UEM solution for some of the DaaS providers.
- Proper Maintenance Orchestration Solution.
- Cost insights and optimization.
- Advanced/E-2-E Monitoring Solutions.
- BCDR of the Cloud Control plane is lacking.
- Oh yeah, most of the stuff is still pretty immature. "
- High performance and GPU
- Running a typical hospital VDI desktop in a DaaS requires substantial network connectivity to our private cloud in order to access private services and medical modalities. This is typically not discussed in many DaaS proposals. We would also need to build our own vDisks
- Session virtualization. Essentially v-motioning a live user session to another host.
- Support for GPU accelerated applications
- more automation for patching and updating.
- None



- Cheap Thin Client Availability with Teams Media Streaming, Team Features, Single-Sign-On
- not sure. App layering is still a challenge ahead.
- Proper region separation of cloud infrastructure. Ex Ctx cloud has only 3 regions to choose from.
- Cost management, Budget Predictability
- Nothing I guess. But i just prefer managed devices for our employees.
- Keeping applications, user data and their devices close to each other delivers the best performance.
- Maybe one day a complete DAAS solution for all our students, but i think it's better to just give/lease them a nice laptop with locally installed applications."
- Functional video conferencing support
- Terribly lacking in Image Management capabilities
- Support for applications that can only run (supported) on a certain version of Windows and use a certain version of Microsoft Office. With the provider auto updating the environment the supportability of the application is at risk.
- Waiting for Windows 365 Boot
- Unified communications functionality
- Feature parity in Microsoft Teams with a physical device. Users often complain that they don't have enough features in Microsoft Teams.
- Treating user sessions as container-like objects! If a session host is no longer necessary, the user session should be portable to another - whether in the same host AVD pool or not, the same region or not, the same public cloud provider or not...

Workspace initiatives, feedback, comments

(note: full export – no curation)

- Some of the questions have a lot of potential answers. Narrow it down more, spilt questions, or have people select 5 instead of 3 max answers.
- Some questions were not flexible enough for large organizations that use multiple solutions and strategies.
- It isn't that bad. :-)
- Great Survey.
- Cost of maintenance and licensing
- The question ""What clients are you using to access DaaS"" should allow multiple choice.
- As usual, great survey. Thanks for putting this together for the community!"
- There are a couple of duplicate questions and some where multiple answers would be relevant e.g. with endpoint OS - this is varied.
- Thanks "
- very focused on customer rather than SI's/MSP's/CSP's/GSI's who I assume carry the widest number of enterprise customer deployments.
- thank you for your work to the community!!
- Great that you are doing this! Thank you!
- All good
- "Might be worth adding following Questions to Survey:
 - Number of Applications within Environment
 - Average Duration of Application Packaging
- Keep up the great work !"
- Network - Netscaler vs F5 for example
- Solid survey. We are very happy with Sentinel One & ControlUp.
- I love this survey!
- Thank you for the opportunity.
- I'm new to DaaS but I think this was a great survey and I'm glad you are doing it.
- All good. Thanks
- thank you all for your effort and time you invest!!
- 🍷
- I see lots of people working in a WFH scenario with a remote display and their laptop display. Maybe that's something to add to the monitoring question. Since there was no other box.
- Survey looks thorough.
- Keep up with the survey!
- It was good. The only question that was a bit confusing was the persistent/non-persistent %.
- I have filled in some answers like it is for our current VDI on premise solution. Sometimes not fully clear what's expected for an answer. But anyway: keep up doing this great stuff! It is still becoming complexer any year."
- Its a good survey, most of options are listed
- You should have a virtual Wall that introduces people the world over to the culinary mysteries of Dutch expedited take out.
- Thanks guys, regards.
- For me Its OK
- Keep it going
- Thanks for excellent survey



- Great so far!
- I find the term DaaS confusing. Do you mean cloud based only or do you use DaaS for on-premises as well
- A number of questions asked did not have 'no' or 'do not have' type answers and I had to choose something we do not currently do.
- For 'What is your use case for GPUs', 'all above' would be a nice addition. Keep the work up!
- I have no comment for me great thanks for your work so
- Thank you for taking the time to create this survey and reporting the results to DaaS' group of users.
- Some of you may be able to guess the customer. Keep it private please.
- Questions are sometimes limiting the answers
- Thank you for running these surveys each year.
- Great
- Yes
- Some questions did not specify a max of 3 answers until submit button is pressed.
- I would be interested in what drives other businesses to use (or stop using) certain DAAS solutions or combination of solutions.
- Great survey!
- keep up the amazing work. thanks!
- yes I will be ready for next time to provide feedback
- Keep up the good work. This survey is amazing.
- Way too many options for each question and some of them were nonsensical which will skew results
- Definitions for certain questions to be able to answer better



What are your most important End User Computing (EUC) initiatives for 2023 and beyond?

The Top 3 of most important **Workspace initiatives for 2022+ are:**

1. Cloud
2. Desktop as a Service
3. Azure

2021:

1. Desktop as a Service
2. Microsoft Office 365
3. IT-Self Service

2020:

1. Desktop as a Service
2. Application container technologies
3. Microsoft Office 365

2019:

1. Windows 10 migrate from Win7/8
2. Microsoft Office 365
3. Desktop as a Service

2018:

1. Windows 10 migrate from Win7/8
2. Desktop as a Service
3. Microsoft Office 365

2017:

1. Windows 10 migrate from Win7/8
2. Microsoft Office 365
3. GPU Technologies

2015:

1. Upgrade Virtual Applications and desktop platform
2. BYO Initiative
3. Enterprise Mobility Management



Thanks!

We would like to thank you for participating, sharing and donating your valuable time to the community, hope to see you back next year!

Christiaan, Dennis, Mark and Ruben