Opportunities for Broadband and Cloud Services in Ontario's Animation and VFX Sector

Final Report

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Prepared for:

CASO

COMPUTER ANIMATION STUDIOS OF ONTARIO

Prepared by:

Nordicity

CASO is a non-partisan, not-for-profit industry association committed to the growth and international competitiveness of Ontario's animation and visual effects industry, through advocacy, professional development, and marketing initiatives.

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Executive Summary

In view of the changing demands in work practices brought by COVID-19 in the visual effects (VFX) and animation sector and trends in broadband and cloud technologies in Ontario, the Computer Animation Studios of Ontario (CASO) asked Nordicity to explore the potential opportunities that are most likely to contribute to a competitive advantage for Ontario's animation and VFX industry. This project examines the relationship between the current broadband speed capacity and the growth opportunity of the VFX and animation industry in Ontario.

More specifically, CASO asked the Nordicity team to review the trends and changes of cloud technologies in the animation and VFX sector and broadband development in Ontario, and to explore the current work practices of CASO member companies. Finally, this study maps the availability of high-end broadband capacity across Ontario as it relates to the bandwidth needs of key animation and VFX functions. The report aims to be a crucial reference for Ontario companies that seek to expand to other parts of Ontario or to develop a more remote or hybrid working environment in their post-pandemic plan.

As this report will illustrate, **there is an opportunity for Ontario's animation and VFX industry to grow without needing to expand commercial space through adopting a long-term hybrid working model.** Further, the continuous broadband capacity rollout across the province presents opportunities for workers and companies to spread across the province. The results of the report indicate that there are sufficient demands for employees to pivot towards a hybrid or remote work environment and there is sufficient broadband requirement to fulfill that need. The report hopes to elucidate potential opportunities for companies to expand or hire based on the broadband sufficiency if companies pivot to more hybrid or remote work environments.

Market Context

The film and television production industry has seen substantial growth due to a combination of the backlog created by COVID-related shutdowns (in 2020), an influx of investment, and increased consumption of Subscription Video on Demand (SVOD) services. While the theatre box office dropped significantly, **the rising demand for media consumption has increased the demands for animation and VFX production studios to deliver more content in a shorter timeline for consumers**.

The shift to digital and work from home during the pandemic also reflected a more widely entrenched trend and demand than before. This shift is likely to become permanent in many industries. While digital cooperation allows for greater flexibility for employees, and inclusivity and diversity for the companies, it also makes management of a diverse and dispersed team more difficult for many studio heads and managers. The difficulty of establishing boundaries in an employee's work-life balance contributes to the complexity.

Technology drivers of change include adopting 5G and cloud technology. The onset of 5G represents a potential opportunity to alleviate the connectivity issue in rural Ontario, as it can **reach more remote places where broadband installation is either prohibitively expensive or physically impossible**. The operational benefits of a cloud computing model include **lowered capital expenses** (e.g., for hardware and devices)**, lowered IT costs, and opportunities to write off the cloud usage as operating expenses**. In addition, a cloud computing model brings business benefits because it **accommodates a company's scalability by reducing the need to upgrade or purchase new hardware as a company scales up its workforce and workflow capabilities**. While cloud technology seems promising, there are several drawbacks, which include the need to have access to bandwidth in the 50-100 Mbps (or more) range and cybersecurity concerns.

Broadband in Ontario

The research indicates that there are regions in Ontario outside of the Greater Toronto Area (GTA) that can provide the necessary broadband requirements for VFX/animation tasks for employees and companies. **There is untapped potential for growth in other regions of Ontario bordering on the periphery of GTA and other major cities**. The Ontario government recently announced initiatives to close the minimum high-speed internet (50 Mbps) accessibility gap by 2025. The expansion will be aimed towards rural sectors of Northern, Southwestern, and Eastern Ontario.

As shown in the broadband availability map, most surveyed employees are near their respective companies' location in the GTA, or between West Ontario and Central Ontario. The map also shows that where the employees and companies reside, they tend to have access to broadband speeds of at least 50 – 149 Mbps. Thus, there are potential opportunities to roll out high-speed broadband across the province and provide more remote working locations for workers and companies.

How CASO Members Work

There are two key components to the findings of CASO members' work practices.

The company survey component reveals trends in the following:

- **Hiring practices**: 92% of the companies grew their headcounts during COVID-19.
- **Current places of work**: About 62% of the employees work from the same city as the studio; 28% of the employees are not in the same city as the studio (but still in Ontario); and 9% work outside of Ontario.
- **Bandwidth requirements**: The average internet download speed is 1.2 Gbps among the companies who responded to the survey. At the same time, 77% of the company respondents have not upgraded their internet to another faster internet package during COVID. The bandwidth between 50 Mbps and 149Mbps appears to be sufficient for all production tasks except Effects Technical Director (FX TD) and Compositor, which require at least 150Mbps.
- **Company workflow and productivity**: Two thirds (66%) of the company respondents think that their company is no less efficient compared to pre-COVID operations. 50% of those respondents do not find remote working had impacts on collaboration with other companies. Most (83%) company respondents also think there are both negative and positive the impacts from remote working, with **83% of the company respondents indicating they will likely adopt a hybrid model of working** in the post-pandemic world. The top considerations for companies considering this model are building a team/company culture, team efficiency and productivity and data security.
- **Use of cloud services**: More than half (67%) of the company respondents use cloud-based computing technologies, and the top usages for cloud-based computing technologies are **data storage and transfer** and the **cloud computing capacity and process power for activities such as rendering**.
- **Data Security:** 75% of the company respondents report that they have adopted new precautions for data security for remote working; *VPN, upgraded security of the Wi-Fi*, and *strict separation between machines accessing pre-released content and open internet* are the top three most selected practices by the companies adopting new precautions for data security during COVID; 58% of the companies report that the data security precautions would not decrease post-pandemic, 42% of them indicate the willingness to increase the level of data security to meet client demands and industry standards such as Trusted Partner Network (TPN) guidelines.

The employee survey revealed trends in the following:

- **Current places of work**: 88% of respondents say they only work from home/remote.
- **Bandwidth requirements and positions**: Look Development and Texture and Surface positions need more than 1 Gbps and 500Mbps -1 Gbps options, respectively. The second highest bandwidth demands come from Layout and Design (2D/3D Matte Pain, etc.) positions, in which all respondents selected 150 Mbps – 499 Mbps option. 50% of respondents from FX/VFX positions require an internet with no less than 500 Mbps download speed. 67% of respondents from LRC positions select 50 Mbps – 149Mbps option, while 33% of them select150 Mbps- 499 Mbps option.
- **Remote working**: **Less commuting time, reduced living expenses, better work-life balance, and increased focus** are the top benefits that employees enjoy when working remotely. In terms of remote working challenges, the need for a creative environment, the feeling of isolation, longer communication and feedback loop are the top challenges from working remotely. More than half (53%) of respondents prefer to mostly work from home in the future, while 40% of respondents would like a hybrid working model.
- **Work-life balance**: As noted above, several respondents indicate the increased efficiency and work-life balance brought by working remotely. Other benefits desired by respondents include physical comfort and reduced mental stress. The respondents also indicate several challenges resulting from working remotely include blurred boundaries between home and office, longer communication loop and difficulties of managing staff, and feeling out of touch with the artistic and social aspects.

Recommendations

The recommendations outlined in this document are intended to represent drivers of changes for the industry to be aware of and showcase the dependencies between those changes and success.

- **Recommendation #1 Enable effective hybrid working models:** The hybrid-work model presents an opportunity for Ontario animations and VFX companies to lead an effective working model and practice that are appealing to workers. This model also represents an opportunity to spread the industry across the province, given sufficient broadband availability. **A proactive implementation of remote work may require updating studio policies and protocols** to fit the needs of a dispersed workforce to aid management in planning capital expenditures/investments. Furthermore, **leveraging communication tools and technologies that equip workers to work effectively and facilitate asynchronous communication** would help a company succeed in a hybrid environment. Finally, **company culture, employee satisfaction and communication practices need to be reinforced** by transitioning to a long-term hybrid-work model.
- **Recommendation #2 Manage the increasing demands and expectations for data security**: Companies need to adopt new technologies and develop new protocols for greater security. Firstly, companies must maintain open dialogue in terms of clients' demands for data security. Secondly, partnering with Trusted Partner Network (TPN) gives companies access to partner with more clients.
- **Recommendation #3 Advocate for Ontario's broadband infrastructure availability and stability:** CASO should advocate to ensure stable and adequate home internet service maintained by broadband operators. In addition, advocacy for continuous rollouts of high-speed broadband in East and Northern Ontario would present more affordable locations for workers to migrate. As well, the actual broadband performance in GTA has room to improve

to meet maximize production efficiency. Lastly, the purchasing cost of high-speed broadband at residential locations will also need to be addressed.

- **Recommendation #4 Build on a successful industry-government partnership:** Based on our consultations, costs are increasingly becoming a concern for studio owners. On the one hand, the Ontario tax credit only applies to the labour of Ontario residents performed in Ontario. As such, studios may face a financial loss if their workers move outside of Ontario. On the other hand, studio costs continue to rise due to setting up employees for remote work as well as upgrading technologies. For example, long-term investment and initial set up for using cloud technologies are the top concerns for financial considerations. CASO should continue to work with the government to share knowledge about changing business environment to help government understand how their tools and incentives could be updated to better meet policy objectives.

1. Introduction

1.1 Mandate

Nordicity's mandate in this engagement was to:

- Understand the trends and changes of cloud technologies in the animation and VFX sector and broadband development in Ontario.
- Explore the current work practices of CASO member companies, as they continually adapt to the on-going pandemic.
- Develop a map of high-end broadband capacity across Ontario that couples with the feedback from the survey consultation.

The overall objective of this work was to help CASO members better understand and explore the changes and demands in work practices since COVID-19, and potential opportunities that are most likely to contribute to a competitive advantage for Ontario's animation and VFX industry. To that end, the primary focus of this engagement is to summarize the received feedback from CASO members and their employees. In addition to that analysis, Nordicity developed a broadband map to identify and document the findings from the employee survey that can be used by CASO members as business intelligence to future work mode design, as data collection permits.

1.2 Methodology

At the heart of this engagement is the research that includes:

- Desk research – to explore the benefits and challenges brought to animation and VFX sectors resulting from remote working and adoption of cloud technologies; and to develop the survey framework to capture the changes and implications brought by COVID-19 and cloud technologies. Desk research included review of empirical studies, published reports and insights from conferences.
- Consultations (interviews and surveys) – interviews were designed to inform the formation of the surveys for CASO member companies and their employees. The conversations revealed which opportunities are more likely to be pragmatic in the current fiscal environment– and which are most likely to contribute to a competitive advantage for Ontario's computer animation and visual effects industry (e.g., by unlocking access to new talent pools).

  12 completed survey responses were received from the Company Survey, with a further 138 responses collected via the Employee Survey. Further detail on the survey response can be found in Section 4.1.
- Broadband capacity map – Nordicity used data from the National Broadband Data database and the self-reported performance test broadband speed from Measurement Lab (M-Lab).

1.3 Data Limitations

The comprehensiveness of such a report is largely dependent on the data quantity and quality collected. The lack of Company Survey responses prevented the development of more granular and accurate results as well as made it difficult to connect the required bandwidth and production task. In the Employee survey, animation production bandwidth requirements were not reported due to limited responses.

1.4 About the Broadband Availability Map

The Broadband Availability map is an interactive map that highlights the distribution of CASO member companies and their employees in Ontario and the access to broadband internet for different regions and different types of production tasks. For more details, please see section 3.2.

2. Market Context

2.1 Trends in the Global Animation and VFX Industry

In the past five years, the global film and television production industry has seen an enormous influx of investment from Subscription Video on Demand (SVOD) services – recently joined by Disney/Fox and Comcast/Sky after their respective content-inspired mergers. The SVODs' content spending has occurred at a scale that has overwhelmed the capacity of film and television producers at a global scale, driving film and television production booms across most jurisdictions within the industry.

The COVID-19 pandemic had a variety of effects on the film, television, and media production industry. On the one hand, box office receipts decreased significantly (thereby reducing the revenue potential theatrical films, while the production of films had to be reduced (in 2020) due to COVID safety measures and travel restriction.[1] On the other hand, demand for media consumption on TV and streaming platforms grew as populations across the world with strict lockdown measures consume more television and streaming media.[2] **The increased demand for media consumption has also increased the needs for animation and VFX production companies to provide more content for viewers**, because animation is the most efficient method of creating content during a time of strict physical distancing and lockdown measures.[3] One report indicates writers and directors are becoming more open to VFX-heavy productions.[4] Furthermore, COVID-19 led to greater demand for children and education content as lockdown measures forced children's entertainment to be more focused on media content (rather than playing with friends).[5]

Even with the increase of production demand from the animation and VFX industry, there was a temporary decline in production during early and mid-2020 due to shifting work environment changes from in-office to "work from home". A CASO report published in April 2020 suggested that there was a momentary fear that the bottleneck and delay on live production may lead to decline of post-production and VFX work until January 2021.[6] However, the film and television industry shifted focus to forms of production that could be accommodated during a pandemic, such as virtual production and animation.[7]

According to David Shepheard, Commissioner and Director of the Vancouver Film Commission, the pivot to digital and work from home during the pandemic has enabled more collaborative teams to work in a global context and that may be a permanent shift in the whole industry.[8] That digital collaboration, while allowing more inclusivity and diversity, also increases the complexity of managing a diverse and spread-out team for many studio heads and managers. Some of the complexity comes from the difficulty to create boundaries in an employee's work-life balance.[9] Likewise, there was a fear in the production bottleneck that post-production studios may suffer due

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[1] Forbes, *The Impact COVID-19 Had on The Entertainment Industry In 2020*

[2] Nielsen, *COVID-19, Tracking the Impact on Media Consumption*

[3] CBC, *The Animated Advantage: How Canadian Cartoonists Are Staying Home and Staying Busy*

[4] Mordor Intelligence, *Global Animation and VFX Market - Growth, Trends, COVID-19 Impact, And Forecasts (2021 - 2026)*

[5] The Wrap, *Hollywood Scrambles to Meet Surging Demand for Animation, Children's Content During Coronavirus*

[6] CASO, *Brief For The Standing Committee On Industry, Science And Technology Study Of The Canadian Response To The Covid-19 Pandemic*

[7] Variety, *VFX and Post Houses Execute Seamless Pivot in Coronavirus Era*

[8] Vancouver Sun, *Hollywood North: Animation and VFX are opening up to change under COVID-19 and social movements*

[9] Today, *How To Set Boundaries with Your Co-Workers, Boss and Yourself During COVID-19*

to the lack of physical production.[10] The shift to remote work also increases the complexity of onboarding new and preexisting employees to new software tools, work ethics, pipelines, and deliverables. For some managers, that complexity also means a greater demand for team management, meetings, and deliverable updates remotely.[11] Overall, the need for more collaboration, technology, and remote managing style has been a challenge for these studios, even though the pivot from physical to remote work is more seamless than most industries.

2.2 Trends in Cloud Computing and Animation/VFX

While internet access has been a concern in more rural parts of Ontario, there are some indications that 5G technology can be used to solve the access issue.[12] 5G technology is a powerful telecommunication technology that can help resolve the issue of connectivity in rural Ontario and provide a technological solution for the VFX/animation industry. Although 5G internet speed can be comparable with most broadband highspeed internet, 5G technology's main advantages over most current connectivity technology stem from two features: accessibility and latency.[13] In terms of accessibility, 5G can potentially access more rural areas where broadband installation may be more costly or physically impossible. In terms of latency, 5G technology has the capability to lower connection latency, which means consumers can access and send information faster than the traditional 4G technology and even some wired broadband connections. Lower latency means faster connection between the user (or user's computer) with a particular server. Faster connection allows **access to cloud computing and communication software more easily** and with less disconnection. Currently, the progress of 5G technology in rural areas has garnered some steam to move forward, but the coverage is still relatively geared towards more populated areas.[14] However, a recent announcement by Rogers to expand 5G into the rural parts of Southern and Eastern Ontario,[15] and the Ontario government pushing for more high-speed internet by 2025.[16] These developments suggest that improvements in Ontario's connectivity may allow animation/VFX employees to move to more preferred areas without worrying about location and internet accessibility.

Based on the discovery interviews and various articles written on the industry and the COVID-19 pandemic, the most frequently used tools by companies during the pandemic can be divided into two categories. There are tools that are dedicated for *communication and project management* (e.g., Teams, Zoom, Asana, Trello)[17] and those that function as *operational and development platforms* (e.g., Teradici, LoUPE by Tangent Labs, Avid).[18] These tools are required to simulate in-office collaboration, work processes, and company culture in a "work from home" environment. Despite their differing uses, **all these tools require an appropriate amount of broadband connection for employees to stay connected with the company during work hours.** Connectivity, especially high-speed

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[10] CASO, *Brief For The Standing Committee On Industry, Science And Technology Study Of The Canadian Response To The Covid-19 Pandemic*

[11] Post Magazine, *The Effects of COVID-19 on the VFX Industry*

[12] The Globe and Mail, *How 5G Is Helping to Connect Rural Communities*

[13] Dell Technologies, *How 5G Transform Cloud Computing*

[14] The Globe and Mail, *How 5G Is Helping to Connect Rural Communities*

[15] Globe Newswire, *Rogers Brings 5G to Five New Ontario Communities, Including Windsor, Nipissing and Parry Sound*

[16] Ontario, *Historic Investment Plan Ensures Access to High-Speed Internet for All*

[17] Variety, *VFX and Post Houses Execute Seamless Pivot in Coronavirus Era*

[18] FX Guide, *Star Trek Discovery In COVID*

broadband, remains a critical factor for the success of the animation/VFX industry. This requirement is especially true for companies that use cloud-based technology in the workflow process, such as storage, rendering, or animating.

Adoption and implementation of cloud-based technology have been accelerated in recent years, especially during the COVID-19 pandemic. For instance, **Microsoft saw the equivalent of an estimated two years of cloud technology adoption and digital transformation happening within two months during the pandemic.**[19] Cloud technology allows business operations to continue seamlessly without the need to be physically on-premises. Cloud technology can be further categorized into three different parts: public cloud, private cloud, and hybrid cloud.[20] Both public and private cloud platforms are computational resources (storage, management, or rendering) that are offered by a third-party company that handles the maintenance, support, and upgrades needed to run those cloud services. Public cloud allows anyone who signed up to the service to use the servers at any time, while a private cloud denotes server capacity reserved specifically for individuals or companies (i.e., no one else can access these servers for cloud computing). The hybrid cloud technology combines both public and private cloud platforms to serve the needs of the company on a more cost-effective scale (i.e., computational technology is mostly used in public servers, while highly sensitive data can only be processed in the private servers).

The types of cloud technology that can be utilized by the VFX/animation industry are based on different production pipeline and needs of a company. The most popular workflows that can utilize cloud technology include animating content, code rendering and special effects, and transcoding.[21] For animation, cloud technology can help with remote creators' access to digital assets and/or help them to create or edit content remotely without the need of powerful hardware. For rendering and special effects work, cloud computing performs the necessary computational process that is usually utilized by a Graphics Processing Unit (GPU) hardware. For transcoding, the media product may be required to be converted from one format to different formats of various sizes and quality. Much like the other workflow needs, cloud technology can provide the computational need to convert content from one format to another without the need for the content creator to have access to powerful processing hardware.[22]

The accessibility of cloud technology without the need for costly and powerful hardware means remote work can be easier for employees of VFX and animation companies. While cloud technology seems promising, there are several drawbacks, which includes bandwidth requirements of between 50-100 Mbps (or more).[23] Even so, there are tremendous **benefits for companies shifting to a cloud computing system**.[24] Capital expenses can be reduced because there is a lower need to invest in powerful machines. Operating expenses can also be written off as business expenses as cloud technology can replace the need for powerful but depreciating hardware. Further (operating) costs can be reduced on IT because there is also less need to maintain or upgrade computers beyond what is necessary to access the cloud computing platform. Because there is little need to upgrade or purchase new and expensive hardware as a company scales up its workforce or workflow capabilities,

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[19] Forbes, *How the Pandemic Has Accelerated Cloud Adoption*

[20] Microsoft Azure, *What Are Public, Private, And Hybrid Clouds?*

[21] Weka, *How to Build a High Performance VFX Studio in the Cloud*

[22] Dacast, *Cloud Transcoding: What It Is and Why It's Important*

[23] Frame.io, *Making the Move to a Remote VFX Workflow: Part 2*

[24] Frame.io, *Making the Move to a Remote VFX Workflow: Part 3*

cloud technology helps the scalability of a company, especially for VFX and animation companies that have inconsistent contracts.

Cloud technology also allows employees to work remotely when working on singular tasks like animation or rendering without the need to be on-premises to produce the content. That means companies can free up workspace for other team-related activities, or even provide hybrid-work environments. While cloud technology is promising, companies maintain reservations about full adoption of the system because doing so may require an overhaul of their work process and companies are concern about cybersecurity measures of cloud computing.[25]

2.3 Impact of COVID-19 on Animation and VFX Studios

While there are mixed indications of the industry's condition during the pandemic (see Section 2.1), the pandemic has affected how studio heads and industry workers view company culture, workflow, and work-life balance. In May 2021, CASO hosted an event titled "Studio 2.0: the Future of Work and the Workplace".[26] The guest speakers were Dennis Berardi (Mr. X), Darren Cranford (Krow VFX), Jeff Bell (Tangent Animation), Juan Lopez (Pipeline), and Jennifer McCarron (Atomic Cartoons/Thunderbird Pictures) and was moderated by Ben McEvoy (Friends and Enemies). During the event, studio heads and managers discussed how studios adapted during the COVID-19 pandemic, how the industry functioned during the pandemic, what current and future employment looks like, and key challenges the studios are facing.

All the studios agreed that the **physical shift from on-site work to "work from home" (WFH) came relatively seamlessly**, as most content creation can be performed digitally. As Ontario nears an end to the pandemic, some studio heads **plan to implement a hybrid model**, where employees will work from home for about two or three days per week while appearing on-site for project coordination, team meetings, and other people-facing work. Other studio heads are a little more wary about a permanent work from home or hybrid model because a **physical studio creates a type of company or corporate culture** that is very difficult to imitate in a WFH or hybrid model structure.

Studios have also expressed **concerns with recruiting, onboarding, and retaining new talent**. In the past, **recruiting managers** would attend various physical student events or observe student projects, but the pandemic has made these recruitment processes more tenuous. **Onboarding** a new employee is more difficult online than in-person because it becomes more difficult to introduce the newcomers to the company's culture and idiosyncrasies. **Retention** rates may possibly decrease as well since talents have more flexibility and freedom to choose the studio they want to work for without the added barrier of moving to a studio's location.

Animation/VFX studios also learned about how **rapidly the industry can adopt new technologies**. Not only do the animation/VFX companies have to adapt to new communication tools, but these companies also must adopt new digital and remote technologies to perform the tasks needed to create content. Such technologies allow them to pick up shorter projects, provide overlapping and stacking of teams between projects, and create more cost effective and less equipment investments.

The webinar also discussed the key challenges of post-pandemic Studio 2.0. While the industry is pandemic resistant, studios are still cautious of how changes can directly affect the way they work.

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[25] Foundry, *Cloud Service Models and How They're Impacting the VFX Industry*

[26] CASO, *CASO Presents: The Future of Work & Workplace*

Sudden lockdowns can deter workflow progress again, and the fluidity of the digital workspace can create problems in work retention.

The webinar's speakers provided a clear example of what they envision Studio 2.0 will look like: **more hybrid-like work model, more care, support, and attention directed to staff, rapid adoption of cloud-based technology, and more flexibility in internal operations.** However, the webinar did not address other outlying concern such as broadband requirements for talents as companies become more reliant on cloud-based technology. As such, part of this study attempts to fill in that gap of how crucial internet broadband infrastructure is in the increasing adoption of cloud-based technology by animation/VFX studios across Ontario.

Indeed, a survey conducted by the Association for Canadian Studies in May 2021 found that 82% of Canadians who have worked from home during the pandemic have found the experience to be very or somewhat positive, while just 20% want to return to the office every day.[27] Also, Montreal studio Eidos (Square Enix) announced that they would switch to a 4-day work week model after having already implemented a hybrid (remote/office) model, potentially initiating a wave of changes in the industry.[28]

While some studios debated the prospect of a hybrid or fully remote studio in the aftermath of the pandemic, some studios fully embraced the adoption of cloud technology into their work pipeline. One example is the studio Industrial Brothers adoption of cloud technology by Qumulo. When the pandemic struck, the studio went fully remote with the help of Qumulo by replicating the studio's work pipeline into the Amazon Web Services (AWS) cloud computing system.[29] The process took a month to transfer and onboard employees into the cloud system.[30] The shift was not only successful, but the adoption of cloud technologies allows the studio to decide how to proceed with the social distancing process in their physical office and their new potential to scale up their studio with more ease.[31]

The impact of the pandemic allows the VFX/animation industry to reconsider how to approach their employees' wellbeing, technological adoption, and work culture in a more drastic way. That said, access to sufficient broadband speed will be crucial in many of these considerations, given that most of the tools needed to continue remote work require high-speed internet to be used effectively (or at all). The project aims to provide a bridge for broadband availability and the studio's ability to shift to a new studio 2.0 format.

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[27] CP24, *Survey show only 20 per cent of workers want to return to office full-time post-COVID*

[28] Kotaku, *Eidos Montreal Announces Workers Switching to Four-Day Weeks*

[29] AWS, *Staying Animated with AWS*

[30] Qumulo, *Industrial Brothers Keeps Animation Rolling with Qumulo in the Cloud*

[31] Digital Media World, *Industrial Brothers and Qumulo Shift Production Pipeline to the Cloud*

3. Broadband in Ontario

3.1 Ontario's broadband initiative policy trends

While around 89% of Ontario population has access to high-speed internet,[32] there are still an estimated 700,000 household that lack such access.[33] Even so, there are various initiatives to improve accessibility and network connection in Ontario. In July 2021, the **Ontario government aims to close the minimum high-speed internet (50 Mbps) accessibility gap by 2025** and has invested nearly CA$4 billion to achieve that goal.[34] Most of the expansion will be aimed towards rural areas in Northern, Southwestern, and Eastern Ontario. This investment announcement is part of Ontario's *Supporting Broadband and Infrastructure Expansion Act - 2021*, legislation that aims to remove barriers to ensure deployment of high-speed internet infrastructure.[35] Rogers also recently announced their intention to expand the company's 5G coverage towards Eastern Ontario as part of the Ontario Government initiative to provide high-speed internet.[36] Explornet also recently announced that the broadband provider is expanding out their gigabit internet service in Southwestern Ontario.[37] Ontario also aims to work with other existing initiatives, programs, and projects to expand the high-speed internet accessibility by 2025 through investment funding and development management.[38]

3.2 Broadband Availability Map

The development of the Broadband Availability Map was initially based on the National Broadband Data database that is available free to the public.[39] This data is based on the coverage information across Canada by broadband service providers. The team extracted the data found on Ontario and categorized the data into the 512 Forward Sortation Area (FSA) of Ontario. While the National Broadband Data divides out their reported speeds based on a frequency scale from 1 Mbps to 50 Mbps (the scale goes as: 1/5 Mbps, 5/10 Mbps,10/25 Mbps, 25/50 Mbps, 50 Mbps or more), the scale ultimately stops at 50 Mbps. Given that many animation and VFX tasks require speeds significantly greater than 50 Mbps, additional data sources were required.

As such, to calculate more accurate number of FSA with broadband frequency speed of above 50 Mbps, the team extracted the self-reported broadband speed from Measurement Lab (M-Lab).[40] Because the team was only looking to represent the highest frequency of test speeds above 50 Mbps in any given FSA, a method was developed to use the Structure Query Language (SQL) to extract test speeds in Ontario above 50Mbps. The team then extrapolated the highest speed test, average speed test, and the median speed test of each FSA in Ontario from that data.

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[32] Statista, Most Popular Types of Internet Connections at Home According to Online Users in Canada as of March 2020, By Province

[33] Ontario, *Historic Investment Plan Ensures Access to High-Speed Internet for All*

[34] *Ibid.*

[35] Ontario, *Supporting Broadband and Infrastructure Expansion Act, 2021*

[36] Globe Newswire, *Rogers Brings 5G to Five New Ontario Communities, Including Windsor, Nipissing and Parry Sound*

[37] Newswire, Xplornet's *Metro Loop Delivering Gigabit Internet Speed in Haldimand, Ontario*

[38] Ontario, *Ontario Connects: Bringing High-Speed Internet to Every Community*

[39] Canada, *National Broadband Data*

[40] Measurement Lab, *About*

The team then merged the two databases into one for the purpose of creating a Broadband Availability Map for this project. Any FSA with a speed of 50 Mbps in the National Broadband Database was then replaced by the median speed from the M-Lab data.

The government database presents an accurate depiction of what the most frequent internet speed is, based on the 1-50 Mbps scale. Therefore, the decision was made to utilize a combined government database and self-reported speed test from M-Lab. Based on that frequency distribution and mapping, the team took the FSAs that have 50 Mbps as their most frequent measurement and determine where the middle value (median) of each is located. The frequency from the National Broadband Database and the median value from the self-reported tests database create a more realistic internet speed value that people could acquire at a specific FSA. The combination of frequency plus median in the creation of the map offers a more realistic point of view of what type of internet speed a VFX/animation employee can obtain if they choose to move to a specific location. Based on the self-reported results, FSAs with "50 Mbps or more" frequencies also contain maximum tests of above 500 Mbps, but those tests may come from users with the most expensive internet service (or a speed test coming from a business area rather than a residential area), rather than a more holistic depiction of the most accessible and affordable internet service. The use of frequency and median speed help create a more realistic view of how internet speed looks like in each FSA.

The map below (Figure 1) illustrates that most CASO member companies are in the City of Toronto, with a few members located in St. Catharines and Ottawa. The following map (Figure 2) shows where the Toronto-based companies can be found in that city.

Figure 1: CASO member companies' distribution

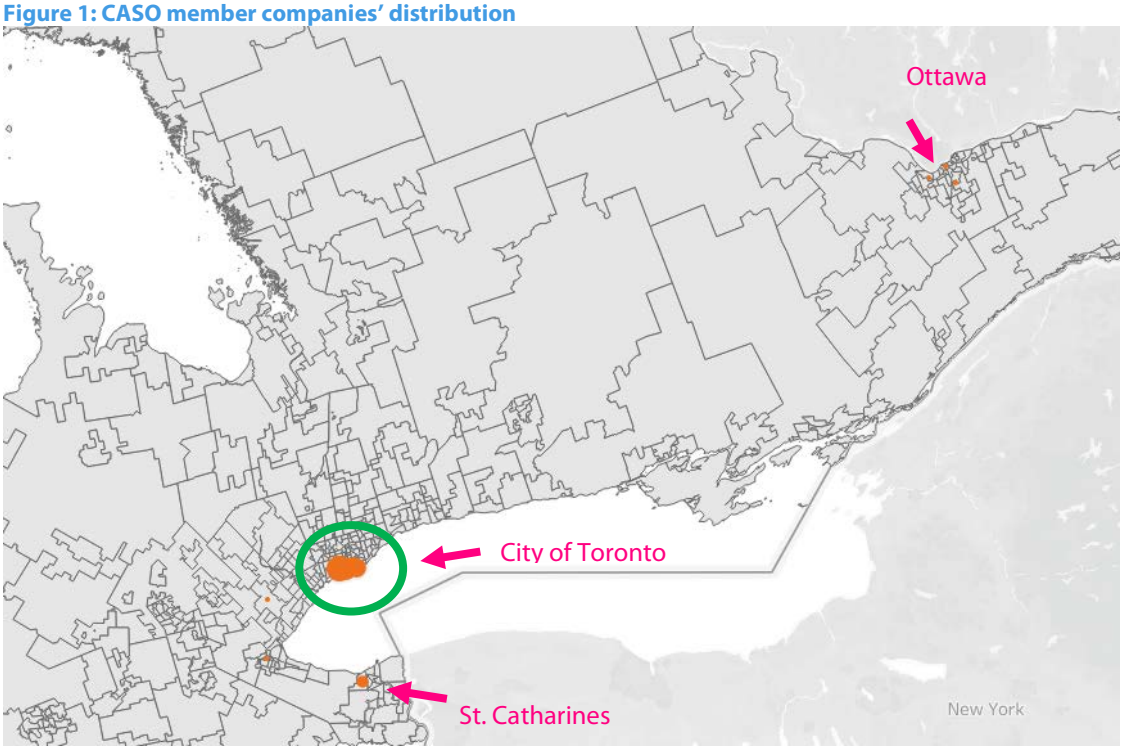


Figure 2: CASO member companies' distribution (zoomed in in the City of Toronto)

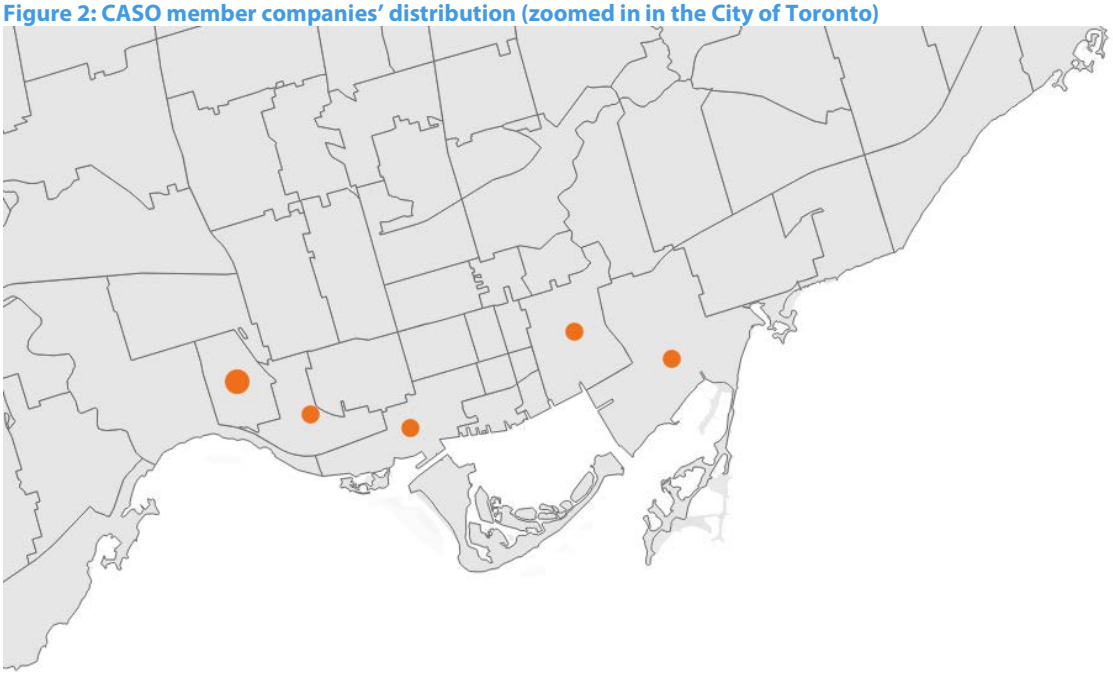


Figure 3, Figure 4 and Figure 5 highlight the overall distribution of animation and VFX employees' current remote work locations. The distribution of employees largely aligns with the distribution of the companies and centers around the companies' locations in Ontario. The distribution indicates that most of the employees reside in the Greater Toronto Area (GTA). The scope of the remote working locations reaches as north as Barrie and Collingwood, as east as Peterborough and Belleville, as south as St. Catharines, and as far west as Georgetown and Hamilton.

Figure 3: Distribution of CASO members' employees who responded the survey

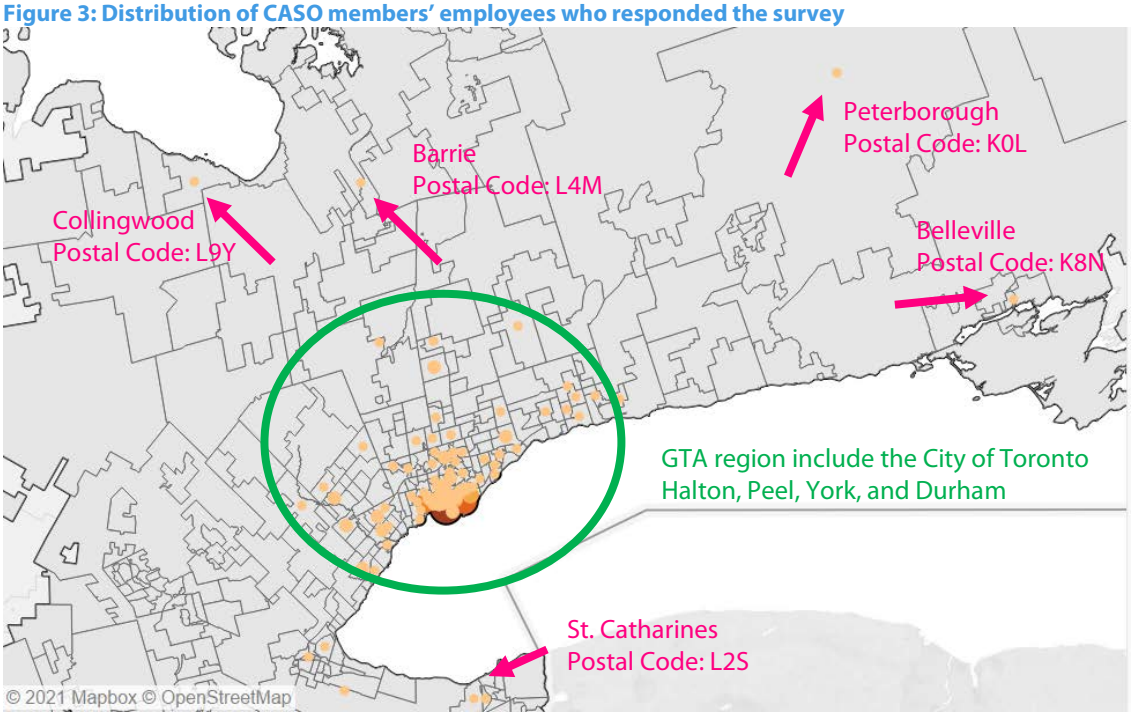


Figure 4: Distribution of CASO members' employees who responded the survey (zoomed in at GTA area)

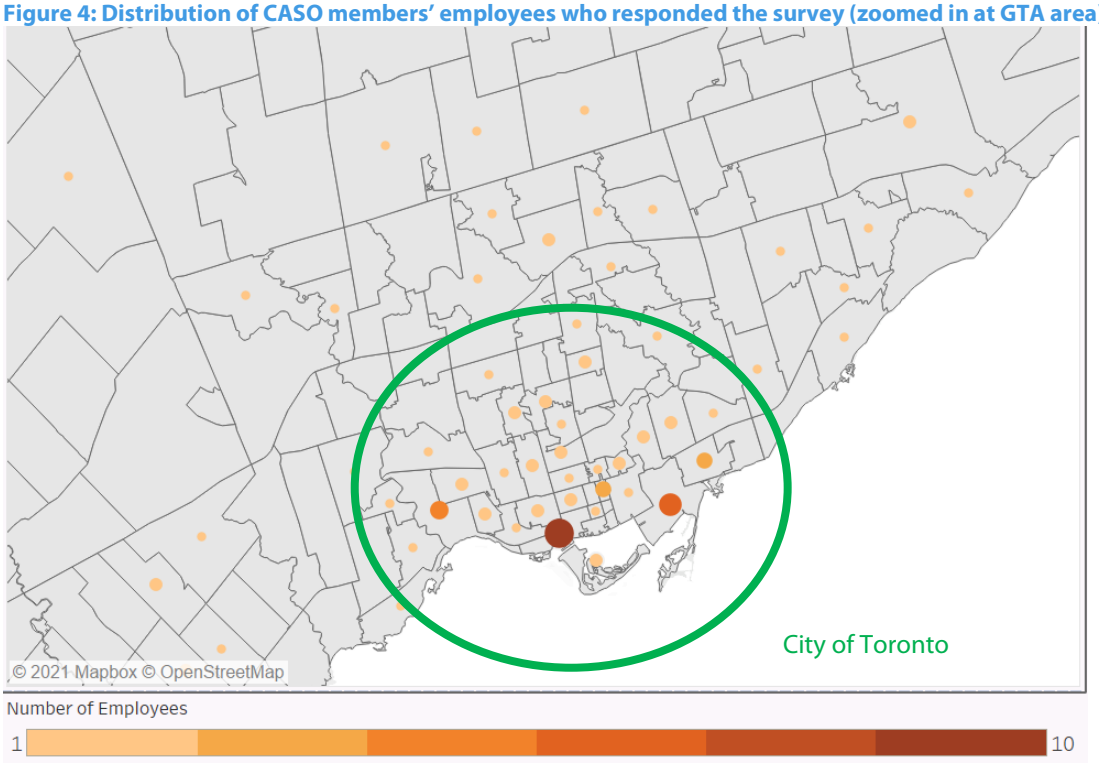
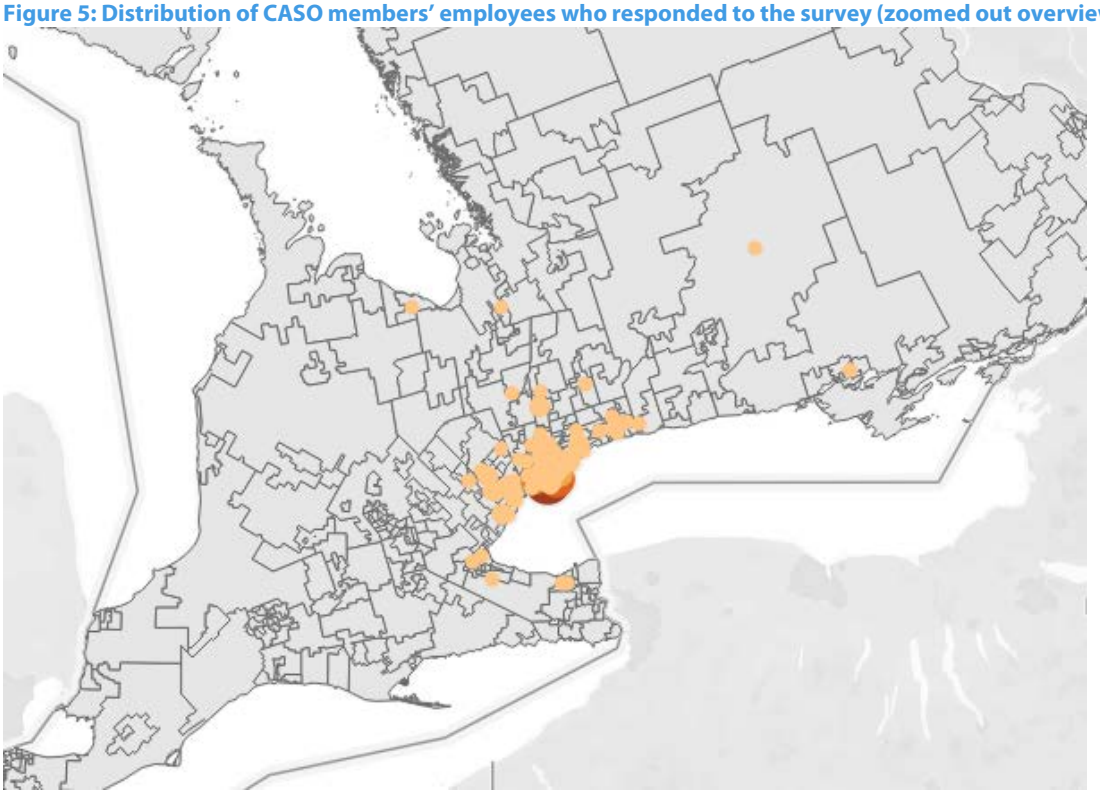
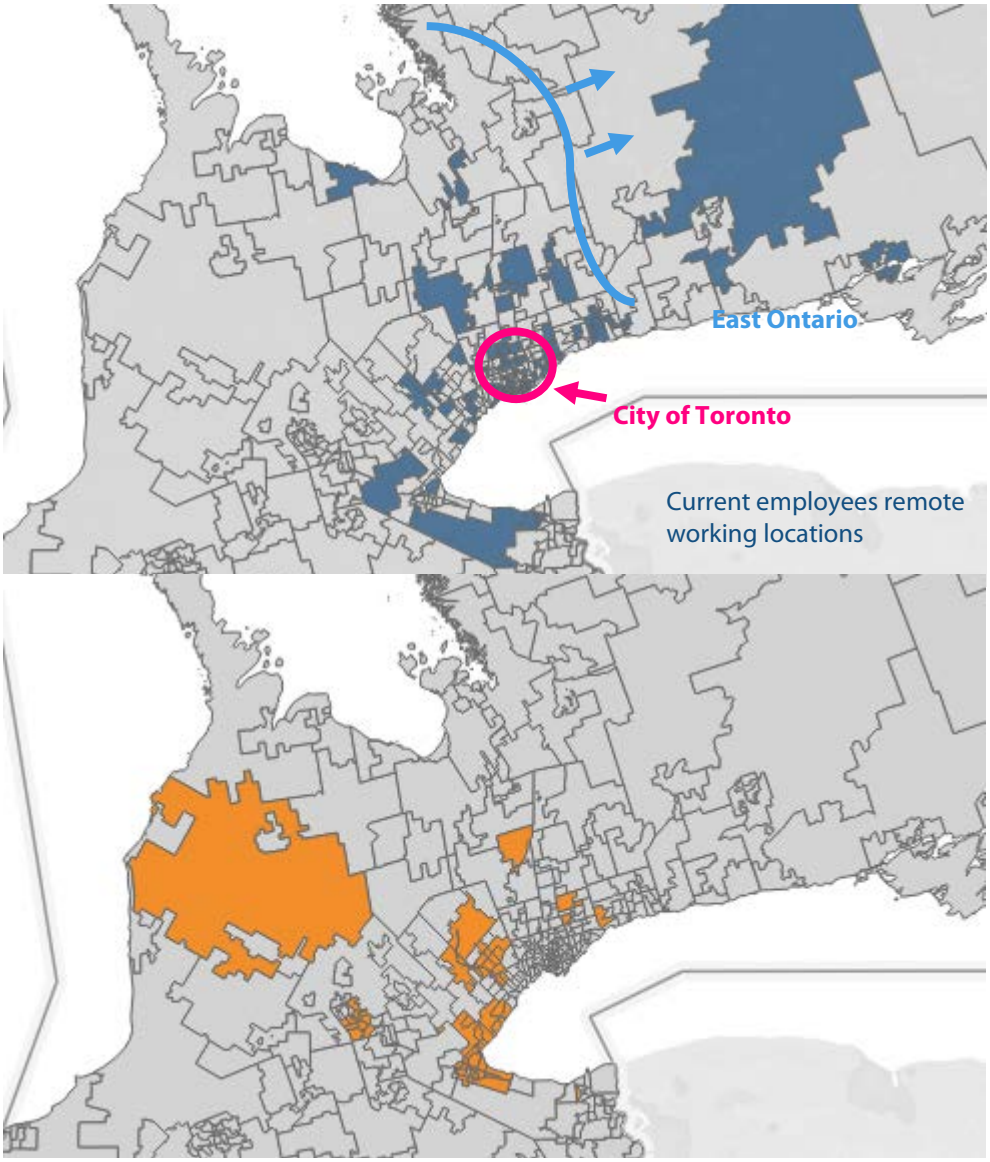


Figure 5: Distribution of CASO members' employees who responded to the survey (zoomed out overview)



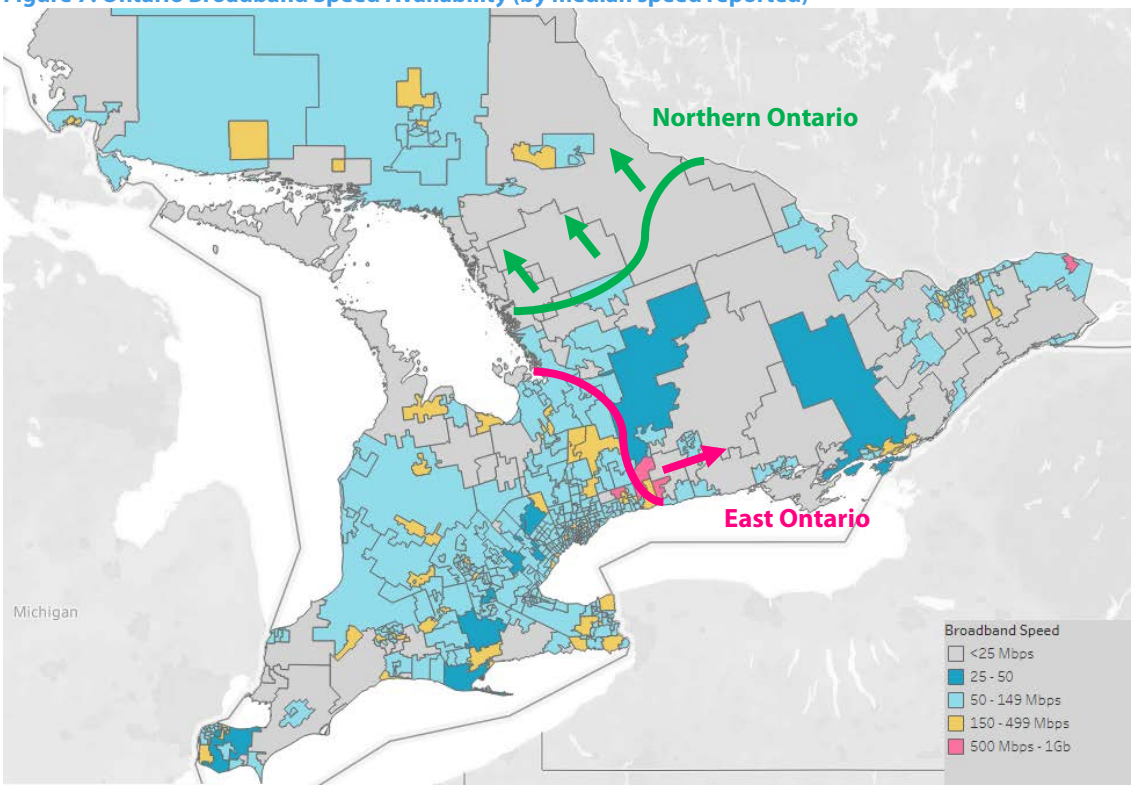
Figures 6 (two maps) shows the comparison of employees' future desired remote work locations and current remote work locations. Employees who have plans to move away are moving away from the City of Toronto, migrating to the GTA area and in some cases reaching West Ontario.

Figure 6: Current and desired working locations of CASO members' employees who responded to the survey



As shown in Figure 7, **most of Northern Ontario has broadband speed available below 25 Mbps**, except for Timmins, Sturgeon Falls, North Bay, Algoma, Sudbury District and Greater Sudbury that have broadband speed available in between 50 Mbps to 499 Mbps. Most of **Eastern Ontario has broadband speed available below 25 Mbps** except for Kawartha Lakes, Frontenac County, Addington County, Loyalist Shores and Southwest Leeds that have median broadband speed reported in-between 25 Mbps and 50 Mbps.

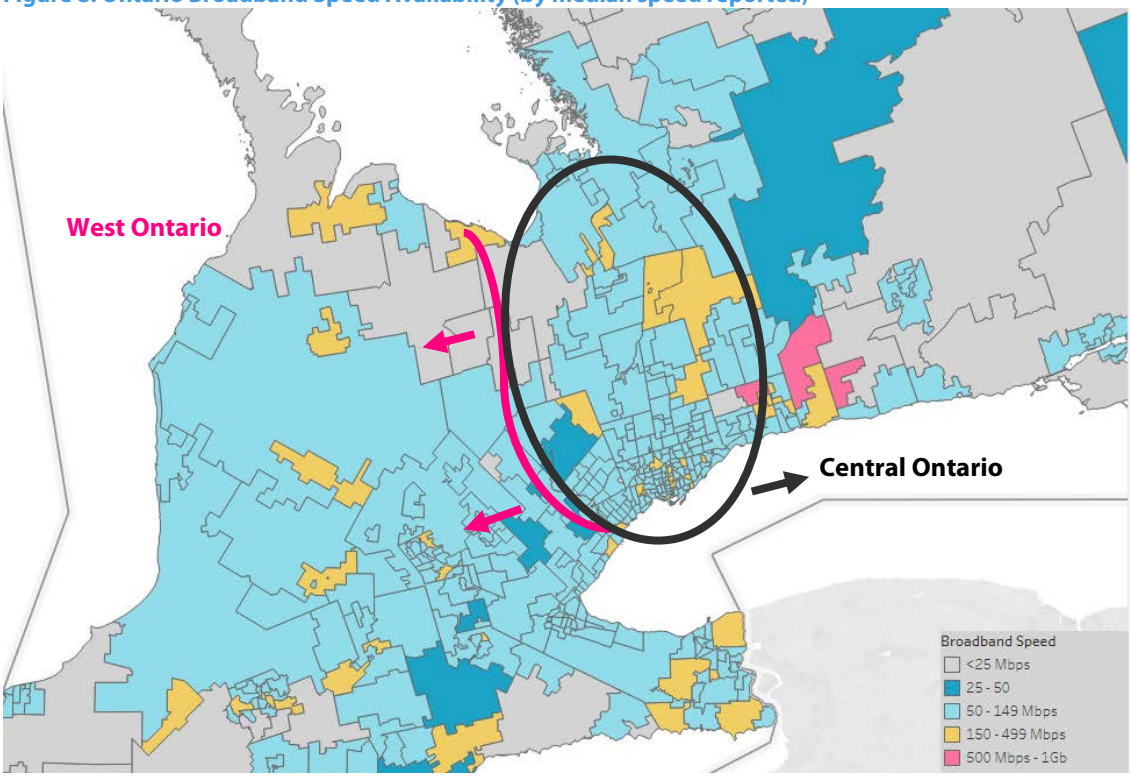
Figure 7: Ontario Broadband Speed Availability (by median speed reported)[41]



Most of Central Ontario and West Ontario have broadband speed available at least between 50 Mbps to 149 Mbps.

[41] Data source: Measurement Lab, Government of Canada National Broadband Data

Figure 8: Ontario Broadband Speed Availability (by median speed reported)[42]



The maps in Figures 9 and 10 show that the employees and companies are largely in areas that have broadband speed at least have 50 – 149 Mbps. The range of broadband speed is at least six times lower in comparison to the average company broadband speed which is more than 1Gb (Figure 12). Figure 5 and figure 7 together also show that the future desired working locations are areas that have at least have 50 – 149 Mbps broadband speed. These maps indicate that while employees are moving away from the city centre, the future locations in general are concentrated in-between Central Ontario and West Ontario, which will have at least 50 – 149 Mbps broadband speed.

[42] Data source: Measurement Lab, Government of Canada National Broadband Data

Figure 9: Distribution of CASO members' employees who responded the survey

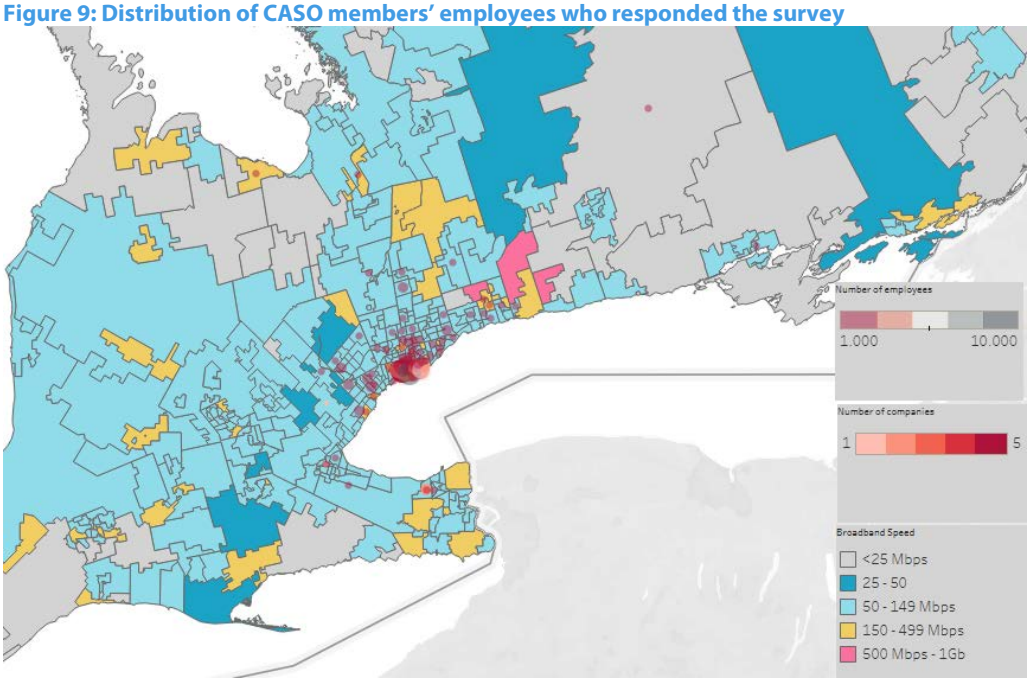
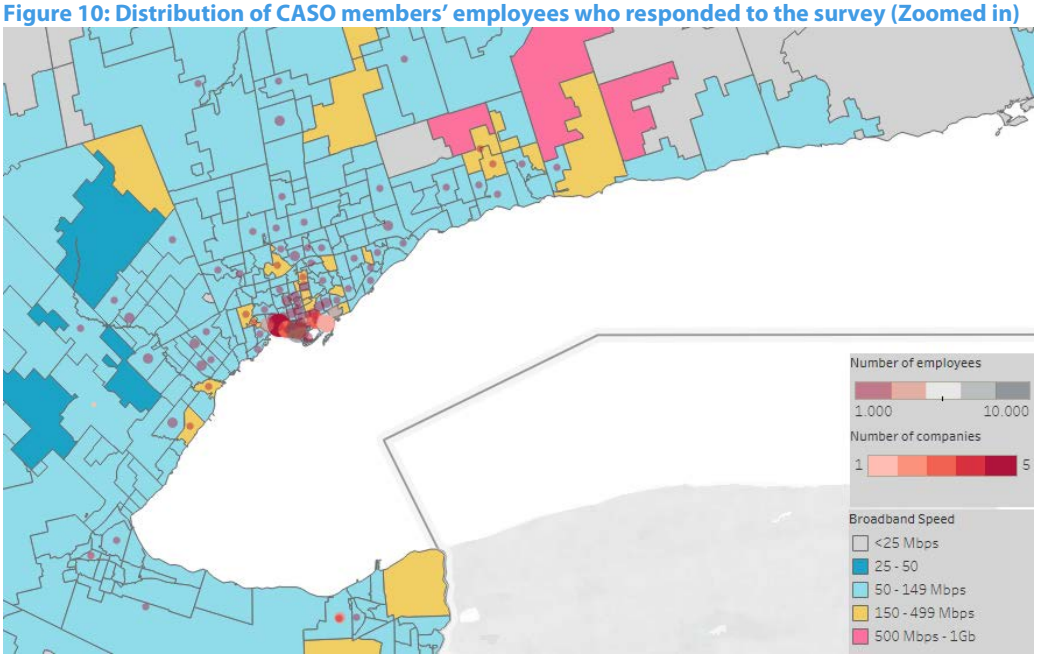


Figure 10: Distribution of CASO members' employees who responded to the survey (Zoomed in)



4. How CASO Members Work

Ontario's animation and VFX industry is characterized by an ecosystem of companies and employees. This section provides an overview of feedback on the current work practices from the CASO member companies and their employees.

4.1 Survey Details

The CASO broadband and cloud surveys were open from July 21st to October 4th, 2021. The company survey received 12 complete responses with a total of 1652 employees, a 21% response rate. The employee survey received 138 complete responses, a 50% response rate.

The table below provides a snapshot of the data available, and the sections below describe the availability in detail for each source.

Type of survey	Total number of completed responses	Responses from Animation company	Responses from VFX company
Company Survey	12 companies (~1,652 employees)	7	5
Employee Survey	138	28	138

The table below provides a snapshot of the data available, and the sections below describe the availability in detail for each source.

The results of these surveys are intended to represent the mode of work trends and shifts in Ontario's animation and VFX industries resulting from COVID-19. In detail, the surveys are designed to collect data that help CASO to understand the broadband needs, availability and opportunities that may exist for cloud services to play a role in enhancing the companies to sustain and expand.

The results of this survey are intended to represent findings from which changes/trends can be observed (e.g., desired work mode if COVID-19 restriction is no longer in place, or distribution of current employees in Ontario). As such, the information derived from the survey is presented without any context (e.g., to indicate whether they represent a positive or negative result). This report is not intended to be a comprehensive study on the sector.

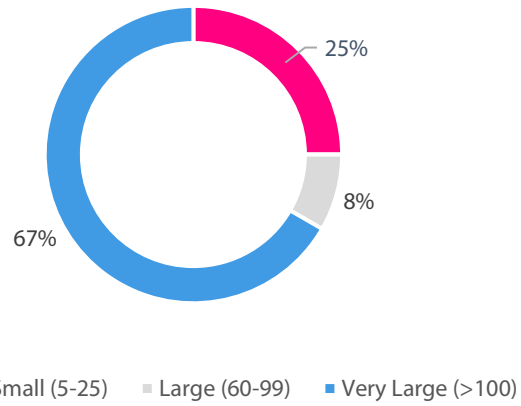
Company Survey

Nordicity categorizes the company size based on the table below:

Company Size	Number of employees
Micro	<5
Small	5-25
Medium	26-59
Large	60-99
Very Large	>100

Among the companies who completed the survey, 67% of companies are in the “very large” company category.

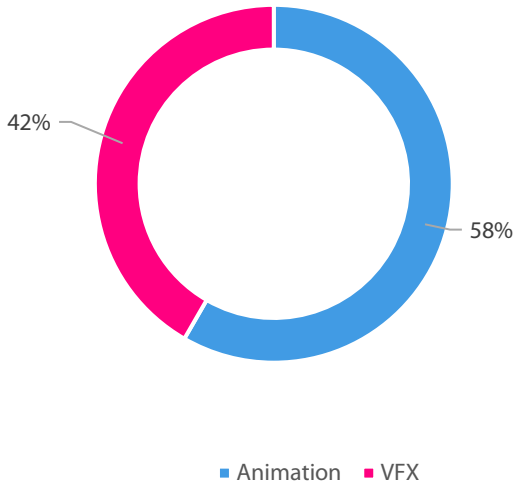
Figure 11: Company size by number of employees
Survey question: How many full-time employees does your studio currently employ?



n=12

58% of all respondents (7 companies) are Animation companies, and 42% of them (5 companies) are VFX companies.

Figure 12: Company type by number of company responses
Survey question: What type of work does your company do?

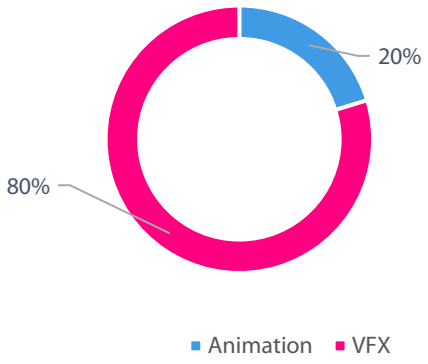


n=12

Employee Survey

Among the 138 employee survey respondents, 80% of the respondents work for VFX and 20% of the employees work for animation companies.

Figure 13: Type of company employees work for
Survey question: Which type of work best describes your company?



n=138

4.2 Company Practices Findings

The company survey was designed to explore the trends to the following topics:

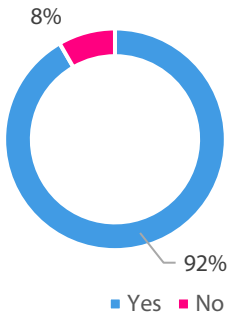
- **Hiring practices**: is the company growing in terms of employee number?
- **Current places of work**: who is working remotely? Where are staff physically located?
- **Bandwidth requirements:** what specific level(s) of broadband (e.g., minimum bitrate) are required to enable remote work (and for what tasks)?
- **Company workflow and productivity**: is it easier or more difficult for individuals within companies to work together? Will companies continue to allow for continued remote working after COVID-19?
- **Use of cloud services**: What (if any) cloud services have companies used to date (and for what purposes)? At what cost levels? How has this experience been (i.e., has it achieved the intended results)?
- **Data Security**: what are the implications for data security brought by working remotely? What are companies doing to address this concern?

4.2.1 Hiring Practices

Most company respondents (92%) reported that they experienced growth in terms of number of employees since March 2020.

Most animation and VFX companies grew their headcounts during COVID-19

Figure 14: Company growth
Survey question: Is your studio growing? Please let us know if the studio has hired new staff since March 2020

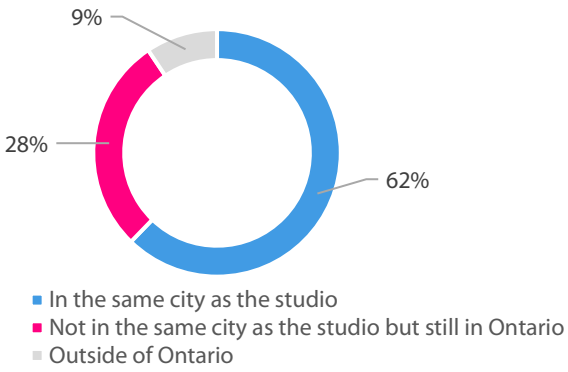


n=12

4.2.2 Working Location

According to the CASO members company survey, more than half of the employees in the industry are largely situated in the same city as the studio, as seen in the figure below. About 62% of the employees are in the same city as the studio. 28% of the employees are not in the same city in Ontario) as the studio, and 9% work outside of Ontario.

Figure 15: Current employee locations (weighted)
Survey question: Where do your staff currently work? Please note, if your company has multiple locations in Canada/the world, this question is for the Ontario-based studio only.



n=12

4.2.3 Bandwidth Requirements

The average internet download speed is 1163 Mbps among the companies who completed the company survey. The following table shows the average internet speed of download and upload.

Figure 16: Average internet speed

Survey question: What is the current internet speed your company has?

Internet Speed	Average
Download Speed	1163 Mbps
Upload Speed	1235 Mbps

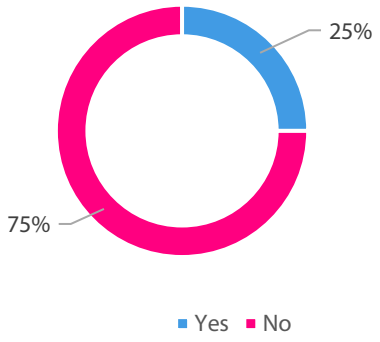
n=11

The following Figure 17 shows that in comparison to pre-COVID, a small number of the company respondents (3 companies) said they upgraded their internet to another faster internet package during COVID. Among the 3 respondents who upgraded their internet, the average cost increased by 77%.

Most (75%) company respondents did not upgrade their internet to another faster internet package during COVID

Figure 17: Internet demand change

Survey question: In comparison to pre-COVID, did your company upgrade to another faster internet package during COVID?



n=12

Figure 18 shows the minimum bandwidth required for completing each type of task in an animation company. It is worth noting that the minimum bandwidth required for each type of task is somewhat dependent on the nature of the work and the true (as opposed to advertised) internet performance. For most of the tasks, 50 Mbps and 149 Mbps are the top selected internet speeds, except for Effects technical director (FX TD) and Compositor roles.

Figure 18: Bandwidth Requirement (Animation)
Survey question: What is the minimum bandwidth required for each type of task?

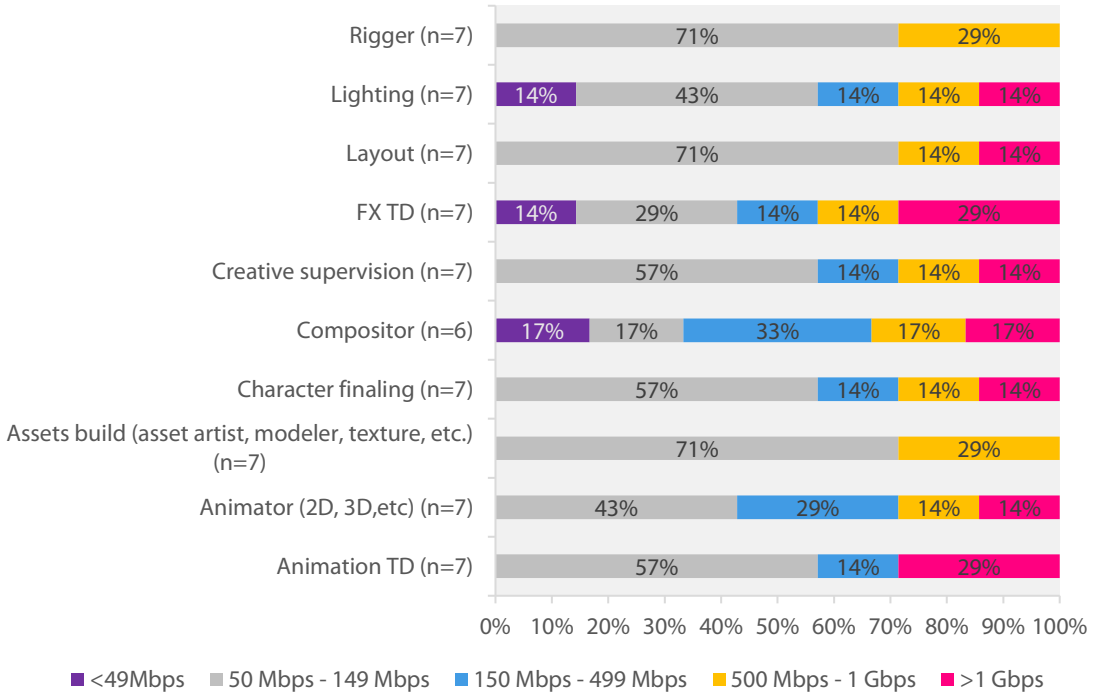
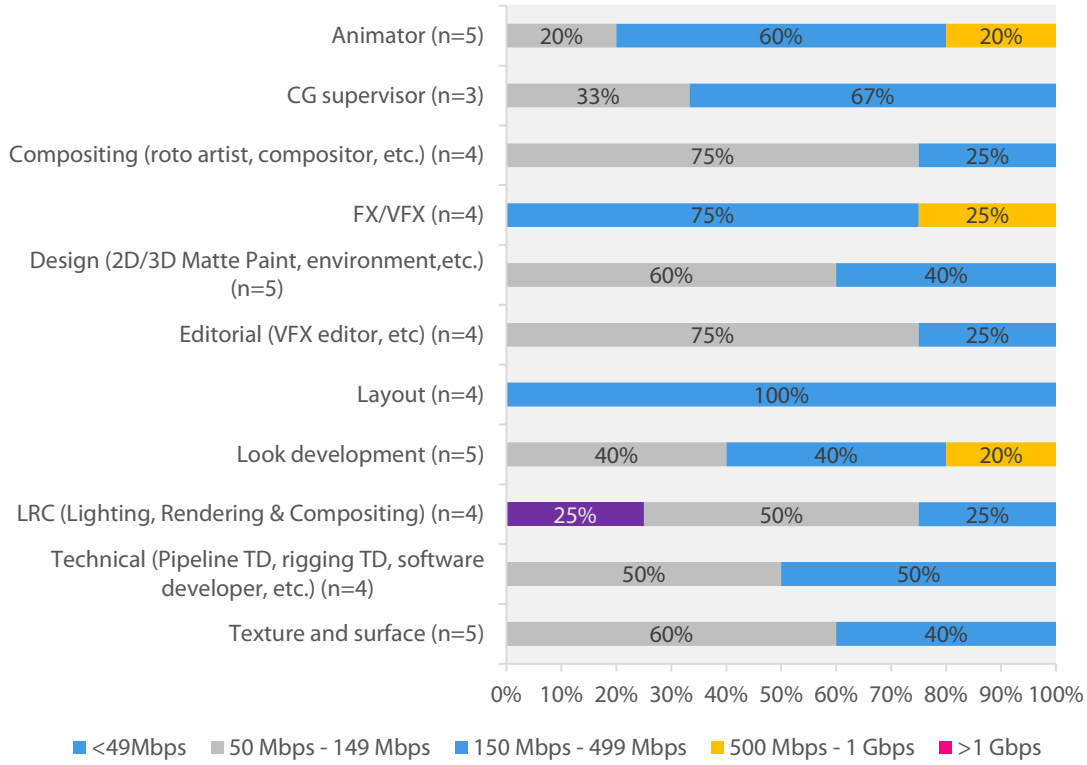


Figure 19 shows the minimum bandwidth required for completing the tasks for each type of employee among responding VFX companies. Like Figure 18 above, the minimum bandwidth required for each type of task is subjective to the nature of the work and true internet performance. As such, the responses for each type of task are not unified. Most respondents reported FX/VFX, Layout, Animator and Look development roles require bandwidth of no less than 150 Mbps.

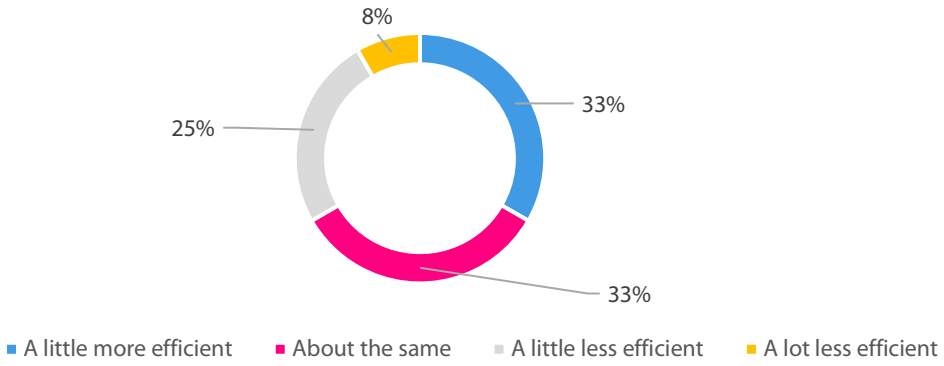
Figure 19: Bandwidth Requirement (VFX)
Survey question: What is the minimum bandwidth required for each type of employee?



4.2.4 Company Workflows and Productivity

Two thirds (66%) of the company respondents think that their company is no less efficient in comparison to pre-COVID. About 33% of the company respondents find that their company is less efficient than pre-COVID.

Figure 20: Efficiency level of the company pre-COVID vs. now
Survey question: In comparison to pre-COVID, what is the efficiency level of your company now?

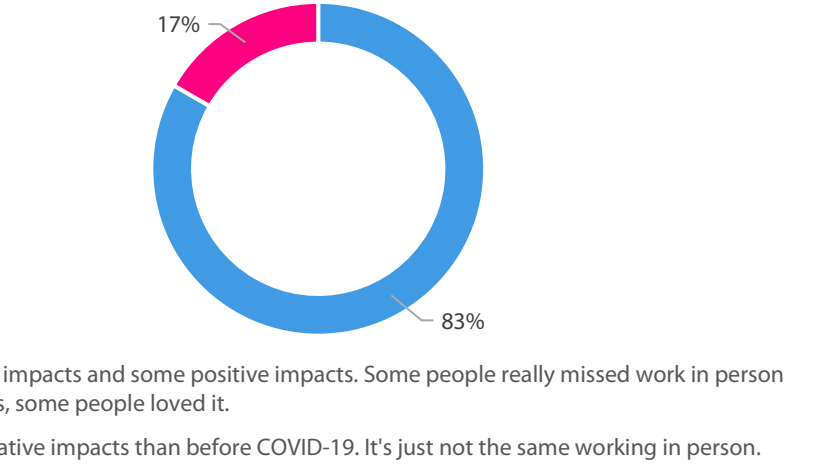


n=12

In terms of team collaboration, a majority (83%) of the company respondents think there are both negative and positive the impacts from remote working. Less than ¼ (17%) of the company respondents think that remote working had a lot more negative impacts than before COVID-19, according to figure 19.

Figure 21: Team collaboration pre-COVID vs. now

Survey question: How did remote working during the pandemic affect team collaboration in the company?



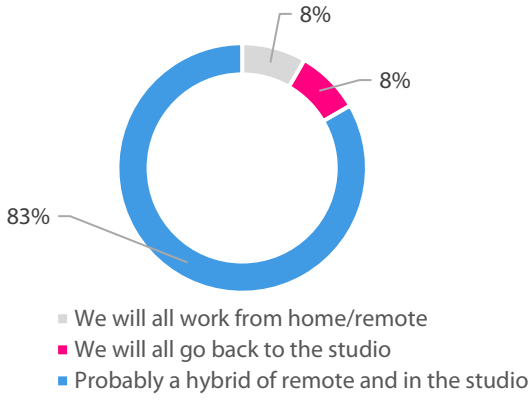
n=12

As illustrated in Figure 22, **most (83%) of the company respondents think that the studio will probably adopt a hybrid model of remote working and studio working**.

Majority (83%) of the company respondents think they will probably adopt a hybrid model of working

Figure 22: Post-COVID work mode

Survey question: Which of these statements is most true for your studio post-pandemic?

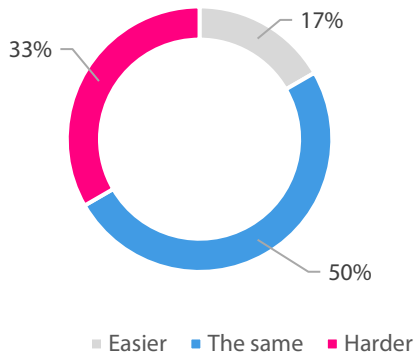


n=12

Half (50%) of company respondents did not find that remote working has had an impact on collaboration *between companies*. About 33% of the company respondents reported that remote work made it hard for them to collaborate between companies, whereas about 17% of the respondents reported that remote work made it easier for them to collaborate between companies.

Though results showed that there is limited positive impact that remote work has had on collaboration between companies, it is worth noting that the answer is dependent upon the company's frequency of collaborating with another company. Without knowing the frequency and history of collaboration among the 50% of company respondents who reported that collaboration remained the same, it is impossible to determine the extent of the impact.

Figure 23: Company collaboration pre-COVID vs. now
Survey question: Has remote working made it easier/harder to collaborate between companies?



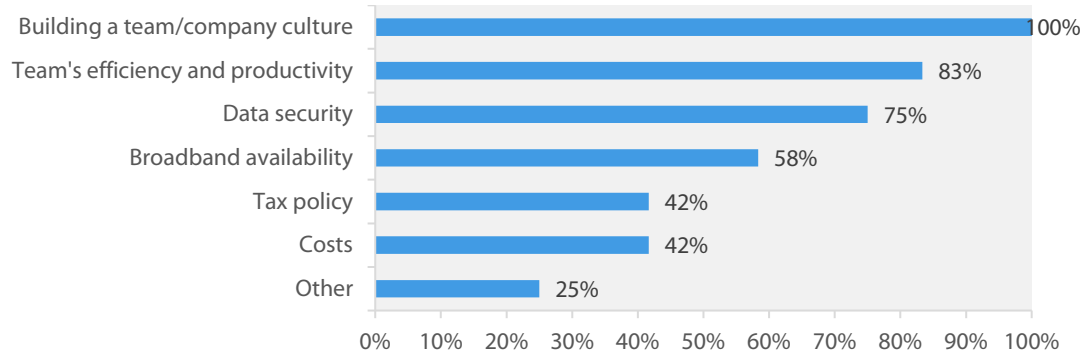
n=12

Figure 24 shows responding companies' considerations regarding whether to keep remote working as an option. This question was posed using multiple selection, and respondents could choose all that apply. The most popular option (selected by all of respondents) was *building a team/company culture*. *Team's efficiency and productivity* and *data security* are the second most popular options (selected by more than 75% of all respondents).

***Building a team/company culture, team's efficiency and productivity* and *data security* are the top three mostly selected considerations when companies think about whether to keep remote working as an option**

Figure 24: Company collaboration pre-COVID vs. now

Survey question: From the company's perspective, what are the considerations for whether to keep remote working as an option or not? Please select all that apply



n=12

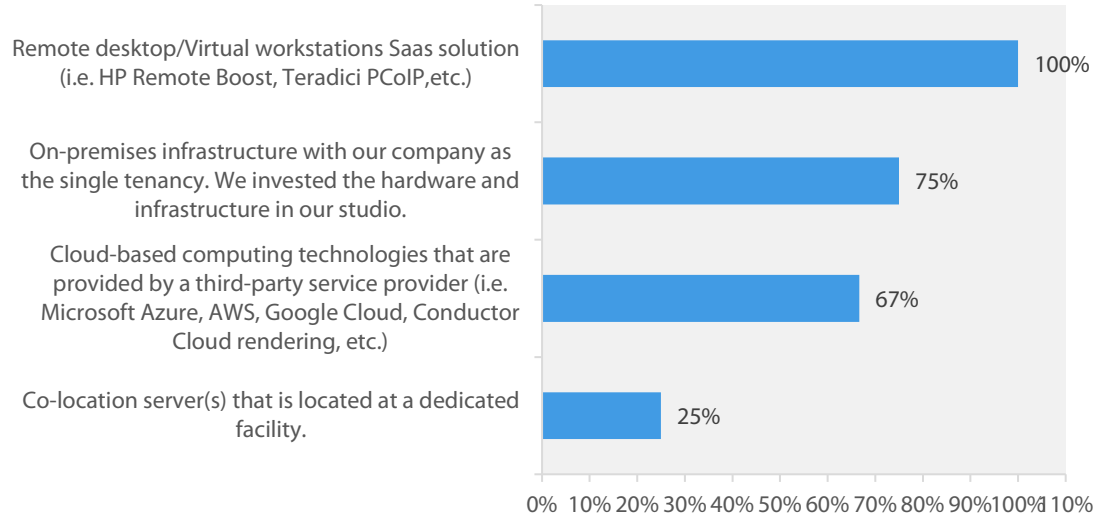
4.2.5 Use of Cloud Services

The figure below shows the type of technologies adopted by companies currently. Companies were asked to select all the technologies that they currently use. **All company respondents have *remote desktop/virtual workstation SaaS solution***. At the same time, on-premises infrastructure is used by more respondents (75%) than cloud-based services' adoption (67%). About one quarter (25%) of the respondents have co-location servers.

More than half (67%) of the company respondents use cloud-based computing technologies

Figure 25: Technology setup

Survey question: What setups are being used in your company currently? Please select all that apply

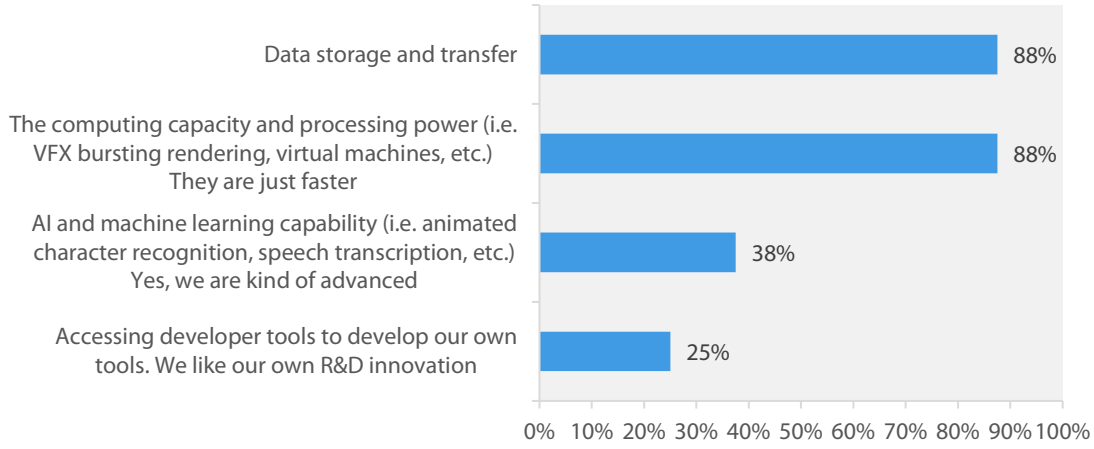


n=12

Among the companies that use cloud-based computing technologies, *data storage and transfer* was chosen most often (88% of those who use cloud-based technologies). Similarly, to *data storage and transfer,* the cloud *computing capacity and processing power* for activities such as rendering has the same percentage of respondents. Additionally, the open-end responses explained that cloud rendering allows the companies to boost their rendering power per need for a specific limited term, showing flexibility of using the cloud technology on an as-needed basis.

Figure 26: Technology usage

Survey question: (If you use cloud-based technologies) What do you use cloud-based computing technology for? Please select all that apply

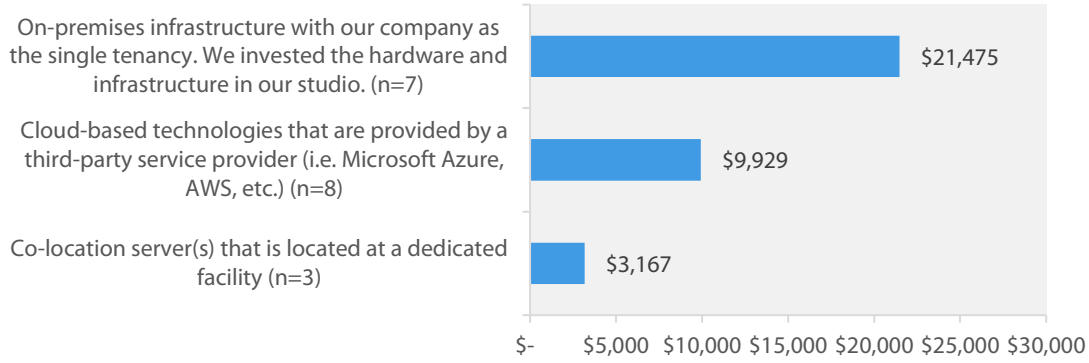


n=8

On average, companies spent $21,475 per month for on-premises infrastructure, $8,688 for cloud-based technologies and $3,167 for co-location servers.

Figure 27: Technology cost

Survey question: On average, how much does each of the service(s) below cost you per month?



The following table summarizes the minimum and maximum monthly expenditure for each type of technology.

Figure 28: Technology cost by minimum and maximum monthly expenditure

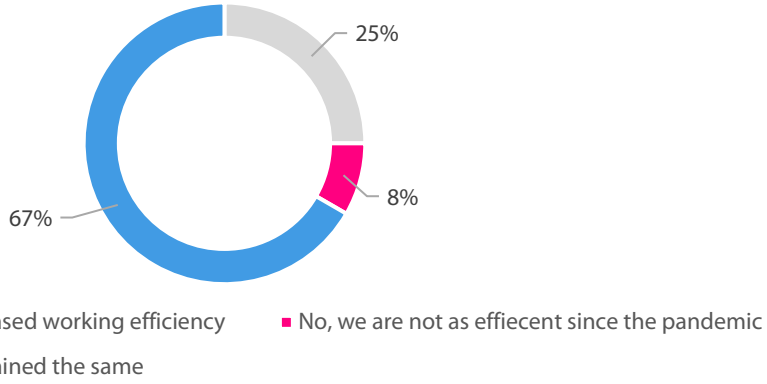
Type of technology	Minimum monthly expenditure	Maximum Monthly expenditure
Cloud-based technologies that are provided by a third-party service provider (i.e., Microsoft Azure, AWS, Google Cloud, Conductor Cloud rendering, etc.)	$1,000	$28,000
On-premises infrastructure with our company as the single tenancy	$500	$75,000
Co-location server(s) that is located at a dedicated facility	$1,500	$6,000

n=12

With the use of the technologies mentioned above, more than half (67%) of the company respondents think the efficiency remained the same during the pandemic, as shown in Figure 29 on the next page. One quarter (25%) of the respondents think that these technologies/services helped with working efficiency during the pandemic.

Figure 29: Technology and working efficiency

Survey question: Have any of these technologies/services helped with working efficiency during the pandemic?



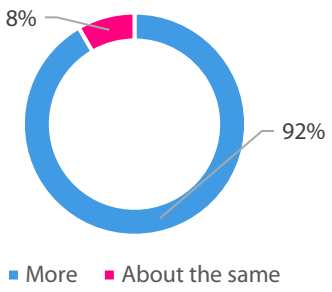
n=12

92% of the company respondents reported that the company's monthly cost spent on technology is more than pre-COVID (figure 28). **Among the companies that reported spending more on technology now than pre-COVID, the technologies (software and hardware) on average cost about 37% more than pre-COVID time.**[43]

[43] Company respondents were asked to provide an estimate of the percentage number on how much more they spend monthly on technology during the pandemic than before.

Figure 30: Technology cost now vs. pre-COVID

Survey question: On average, is your company's monthly cost on technology (software and hardware) more or less than before COVID?

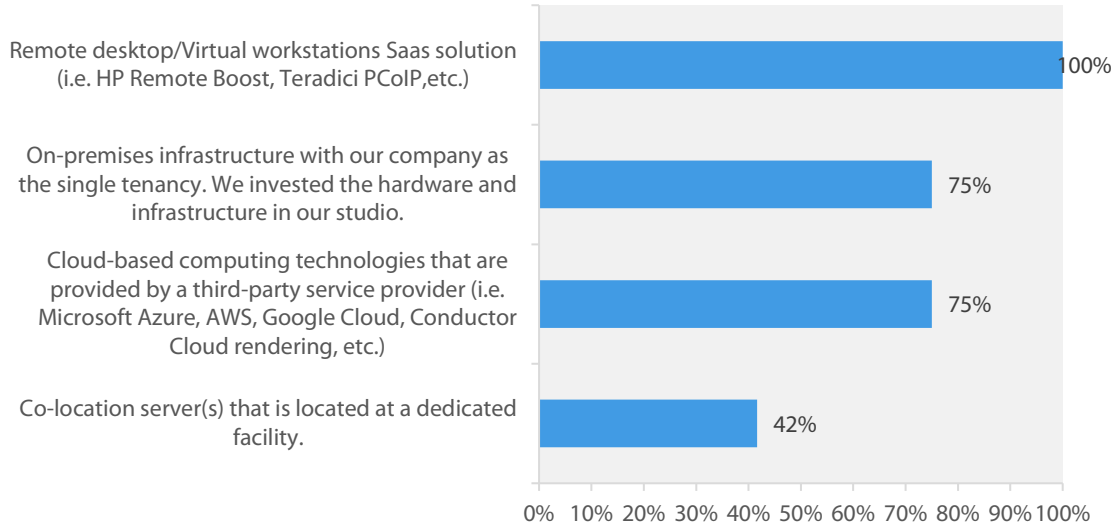


n=12

All company respondents indicated that the remote desktop/virtual workstations SaaS solution would likely remain after the pandemic. 75% of the company respondents reported that on-premises infrastructure and cloud-based computing technologies will remain after the pandemic.

Figure 31: Technology post-COVID

Survey question: Which of these services will likely remain after the pandemic? Please select all that apply

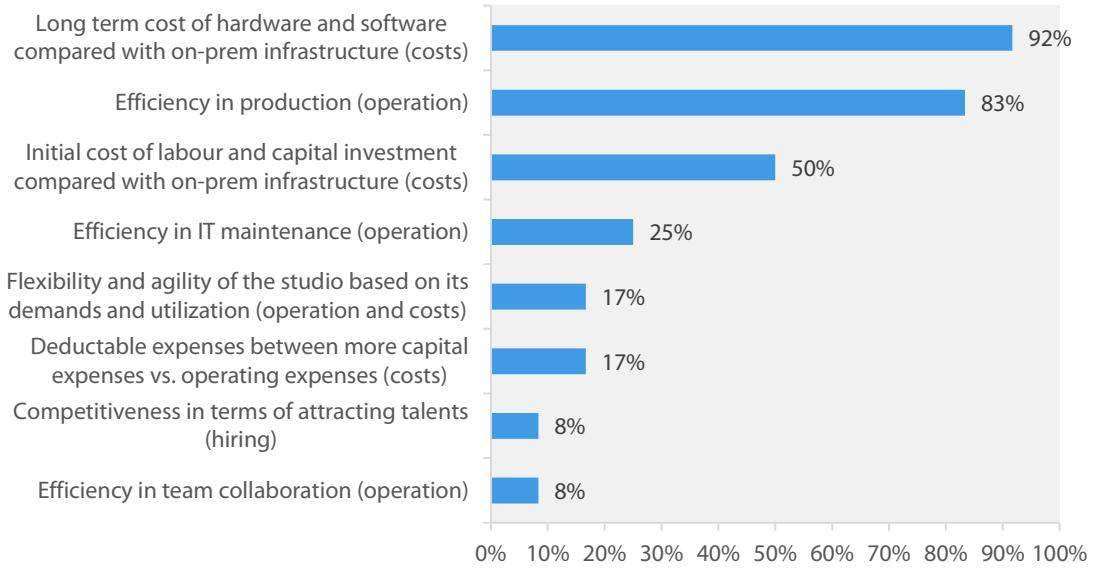


n=12

Figure 32 shows companies' considerations regarding the adoption of cloud-based computing technology. The question was posed as a multiple selection, and respondents could choose up to their top three choices. The most popular option (selected by 92% of all respondents) was *long term cost of hardware and software compared with on-prem infrastructure,* which corresponds to companies' increased technology costs in comparison to pre-COVID. The second most selected option is *efficiency in production* (83% of all respondents). *Initial cost of labour and capital investment compared with on-prem infrastructure* was also a popular option (50% of all respondents). Indeed, the open text responses showed **that the initial investment for setting up the cloud-based services can be as high as $1.5 million**.

Long-term cost, efficiency in production, and initial cost of labour and capital investment are the top selected priorities for companies when consider whether to adopt cloud-based computing technology

Figure 32: Considerations for adopting cloud-based computing technology
Survey question: What aspects would you consider when deciding whether to adopt cloud-based computing technology? Please select the top three priorities



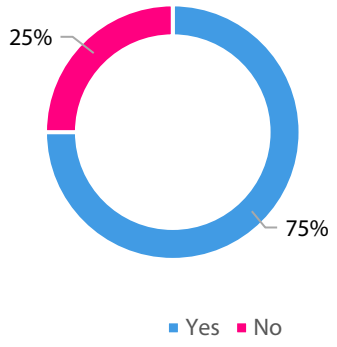
n=12

4.2.6 Data Security

The following chart shows that 75% of company respondents reported that they adopted new precautions for data security for remote working.

Three quarters of responding companies reported that they adopted new precautions for data security for remote working

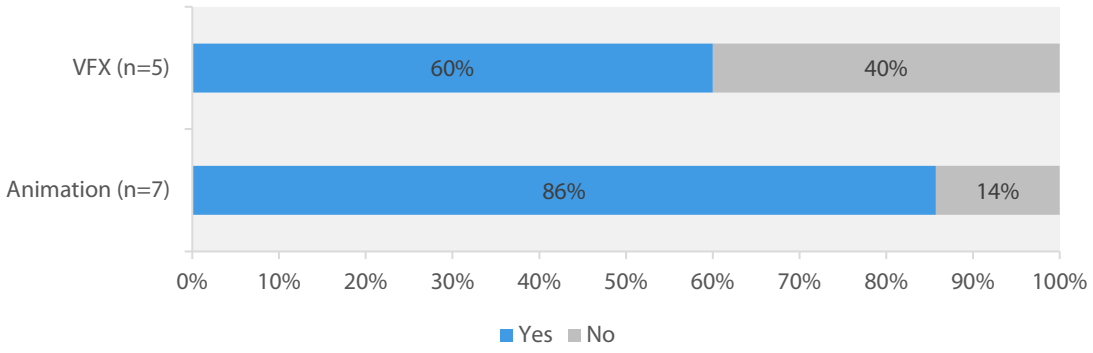
Figure 33: New precautions for remote working
Survey question: Did your company adopt any new precautions for data security during the COVID-19 for remote working?



n=12

Figure 34 illustrates whether responding companies adopted new precautions for remote working responses based on their company type (Animation or VFX). 86% of Animation company respondents reported adopting new precautions for data security for remote working, whereas 60% of VFX company respondents reported that they did so.

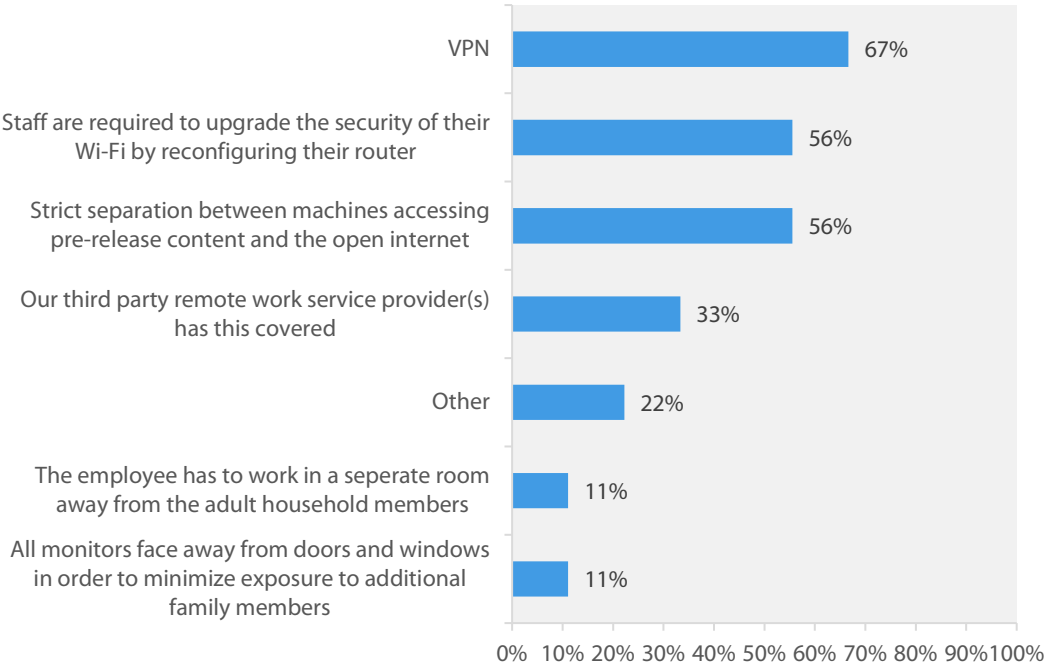
Figure 34: New precautions for remote working (by type of company)
Survey question: Did your company adopt any new precautions for data security during COVID-19 for remote working?



According to Figure 35, *VPN, upgraded security of their Wi-Fi*, and *strict separation between machines accessing pre-released content and open internet* are the top three most selected practices by the companies that adopted new precautions for data security during COVID. Other precautious include access restrictions, upload, and download restrictions, an upgraded Anti-Virus system, and endpoint protection and two factor authentication (2FA) logins across the board.

Figure 35: Type of data security precautions

Survey question: If yes, what practices you have adopted so far for security issues? Please select all that apply

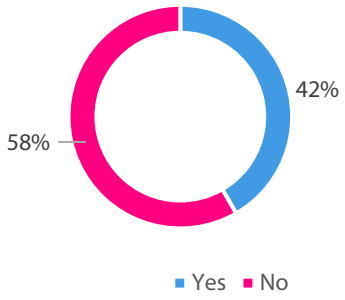


n=9

As shown in Figure 36, more than half (58%) of the respondents said the data precautions that they are using right now will not change post-pandemic. 42% of the respondents reported that the data security precautions would change post-pandemic, but the open-end responses showed that these respondents have **willingness to increase the level of data security to meet client demands and industry standards such as Trusted Partner Network (TPN) guidelines**.

Most companies reported that the data security precautions would not decrease post-pandemic, 42% of them indicated the willingness to increase the level of data security to meet client demands and industry standards such as TPN guidelines

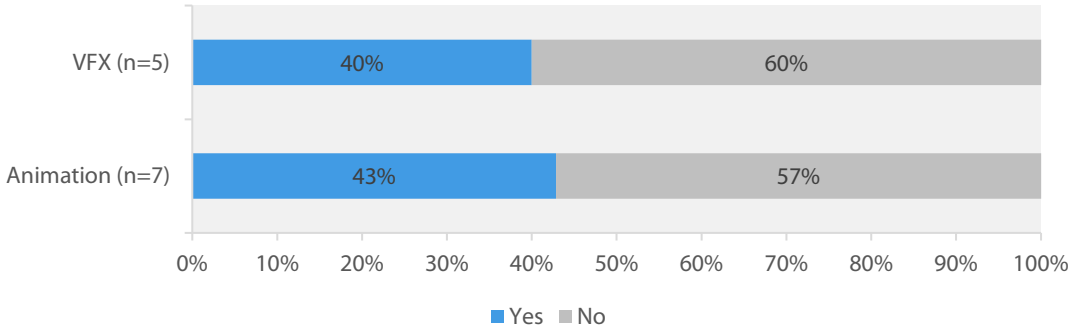
Figure 36: Data security precautions change post-pandemic
Survey question: Will the data security precautions you are using right now change post-pandemic?



n=12

In this section, the plan of changing the data security precautions is broken out based on the type of companies, as shown in figure 35.

Figure 37: Data security precautions change post-pandemic (by type of company)
Survey question: Will the data security precautions you are using right now change post-pandemic?



4.3 Employee Trends

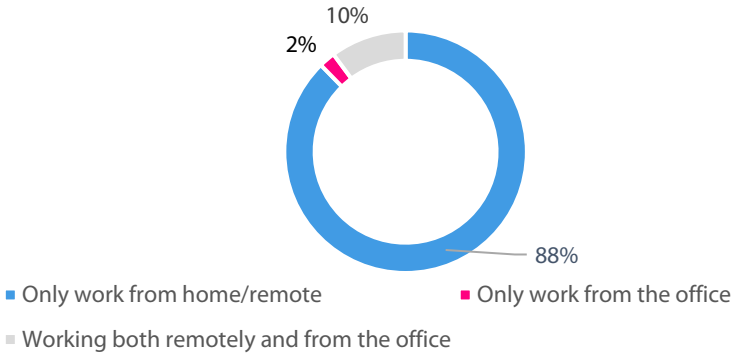
This section summarizes the trends of remote working and bandwidth demands from the employee survey.

4.3.1 Current Places of Work

When asked about the current working location, 88% of employee respondents said they only work from home/remote, and 10% of respondents said they work both remotely and from the office (figure 36).

88% of respondents said they only work from home/remote

Figure 38: Current working location
Survey question: Where are you currently working?

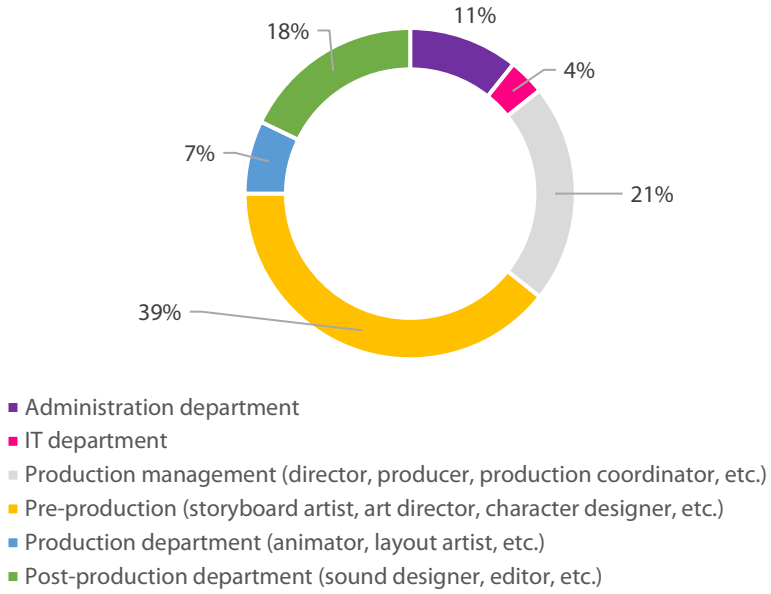


n=138

4.3.2 Bandwidth Requirements and Positions

Respondents were asked about the department that they work for in the company. Figure 39 shows the breakdown of the responses for animation companies. 7% of responses come from the production department (animator, layout artists, etc.), and 39% of responses come from pre-production (storyboard artist, art director, character designer, etc.).

Figure 39: Animation Department[44]
Survey question: Which of the following option best describes your department?

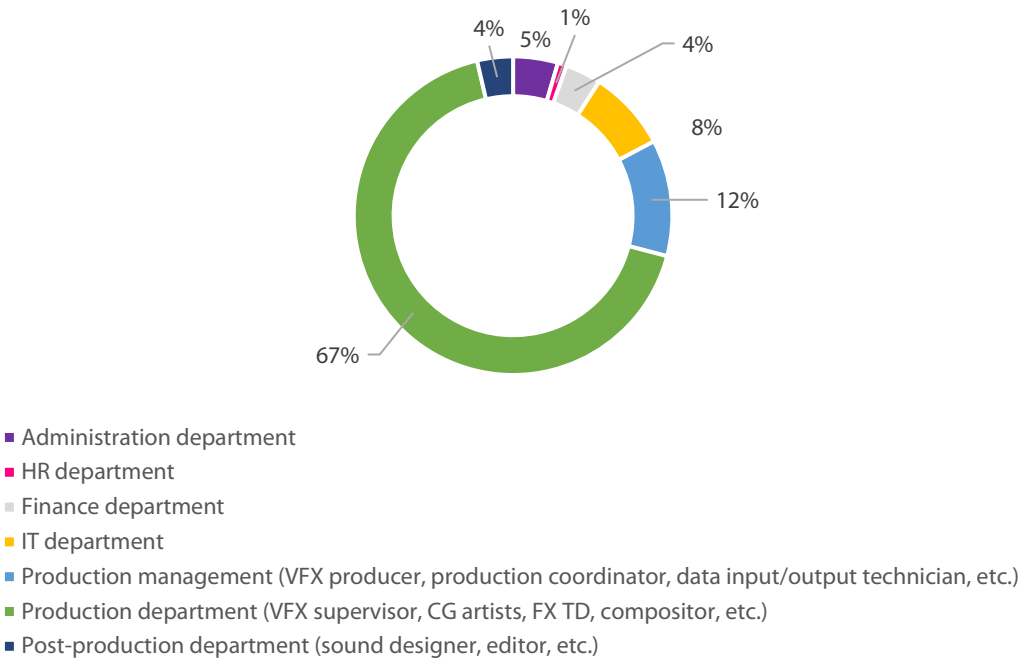


n=26

a[44] The data for animation production department is too thin to report separately.

As Figure 40 shows, 67% of the responses from employees of VFX companies come from people working in the production departments (VFX supervisor, CG artist, etc.).

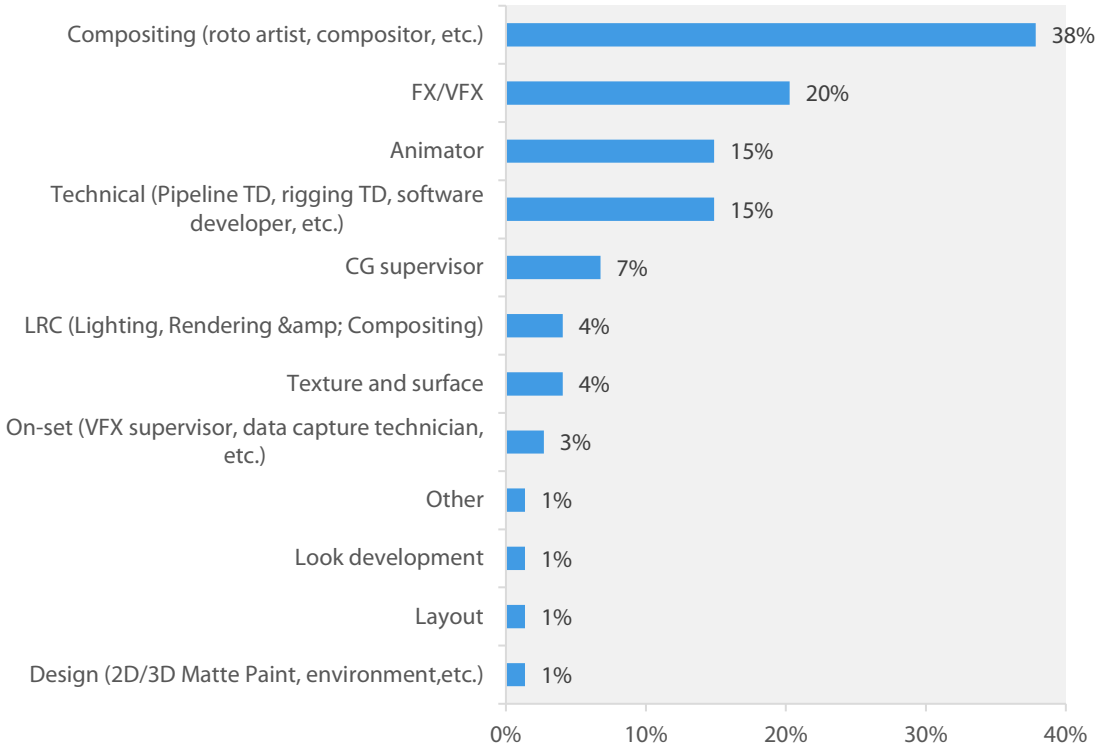
Figure 40: VFX Department
Survey question: Which of the following options best describes your department?



n=110

For Figure 41, respondents who work in production departments in VFX companies were asked to identify what option best described their position in the department. 38% of the respondents do compositing (roto artist, compositor, etc.), 20% of the respondents work as FX/VFX, 15% of the respondents work as animator and another 15% of the respondents work as technical (pipeline TD, rigging TD, etc.).

Figure 41: VFX production positions
Survey question: If production department, which of the following options best describes your position?

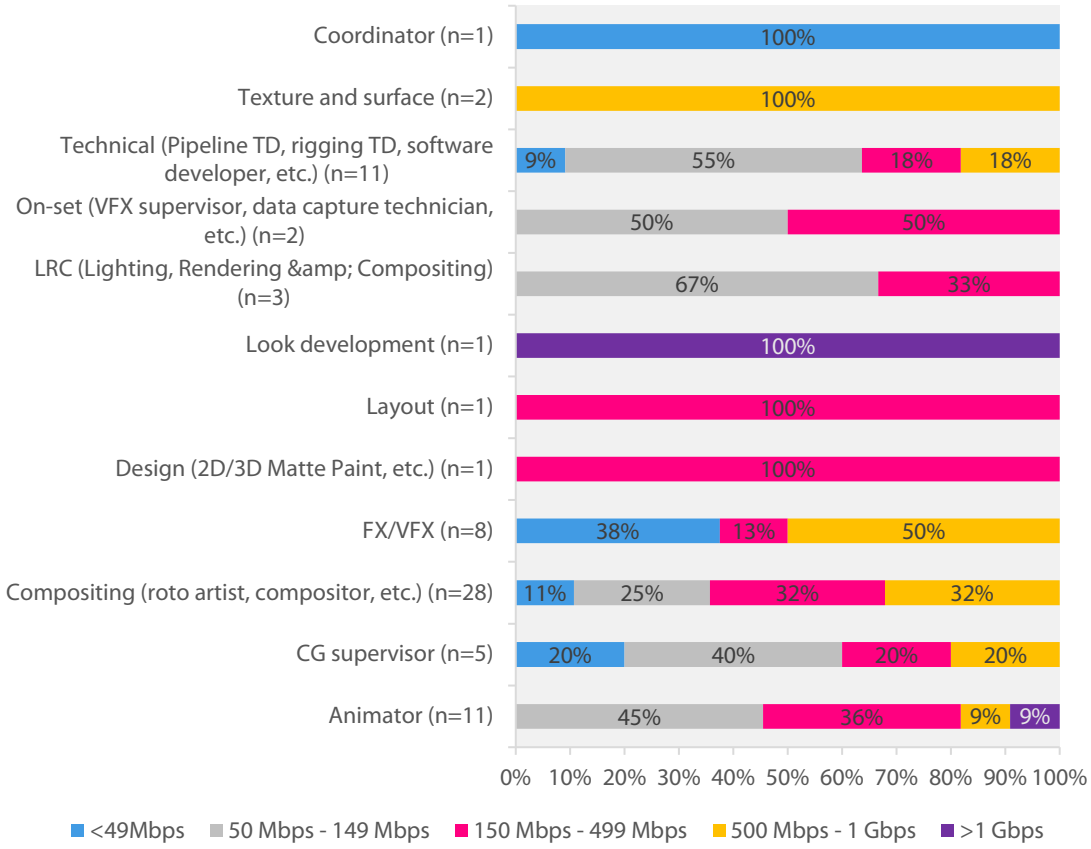


n=74

Figure 42 presents the breakdown of the minimum download speed required to adequately complete the task remotely by VFX production positions. 100% of respondents from *Look development* and *Texture and surface* positions selected more than 1 Gbps and 500 Mbps -1 Gbps options respectively, showing high bandwidth requirement. The second highest bandwidth demands come from *Layout* and *Design (2D/3D Matte Pain, etc.)* positions, in which all respondents selected 150 Mbps – 499 Mbps option. 50% of respondents from FX/VFX positions indicated needing internet with no less than 500 Mbps download speed. 67% of respondents from LRC positions selected 50 Mbps – 149 Mbps option, while 33% of them selected 150 Mbps- 499 Mbps option.

Figure 42: Internet speed for VFX production positions

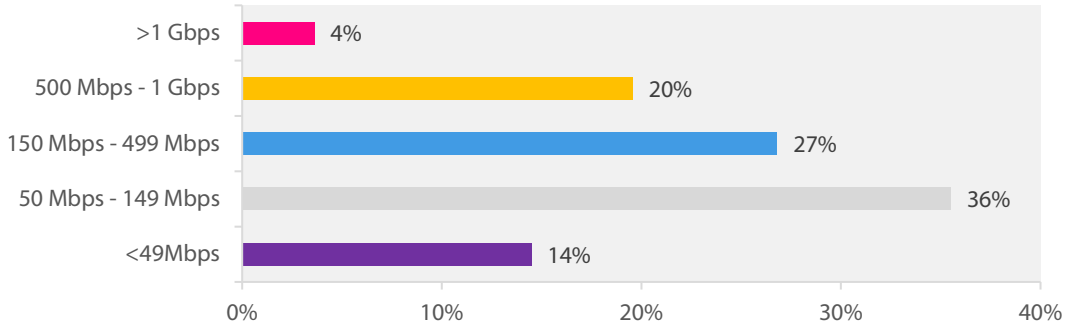
Survey question: What is the minimum download speed required to adequately complete your task remotely?



Overall, across all departments, the most selected (36%) option for minimum download speed required to adequately complete their tasks remotely is 50 Mbps – 149 Mbps, followed by the 150 Mbps – 499 Mbps option (27%). About one in five respondents said 500 Mbps – 1 Gbps is the minimum download speed required to adequately complete their tasks remotely.

Figure 43: Internet speed for all respondents

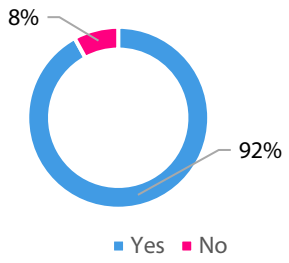
Survey question: What is the minimum download speed required to adequately complete your task remotely?



n=138

Respondents were asked if the internet where they work is sufficient for completing their tasks. Most of the respondents (92%) said yes, while only 8% said no.

Figure 44: Internet sufficiency
Survey question: Is the internet where you work sufficient for completing your tasks?



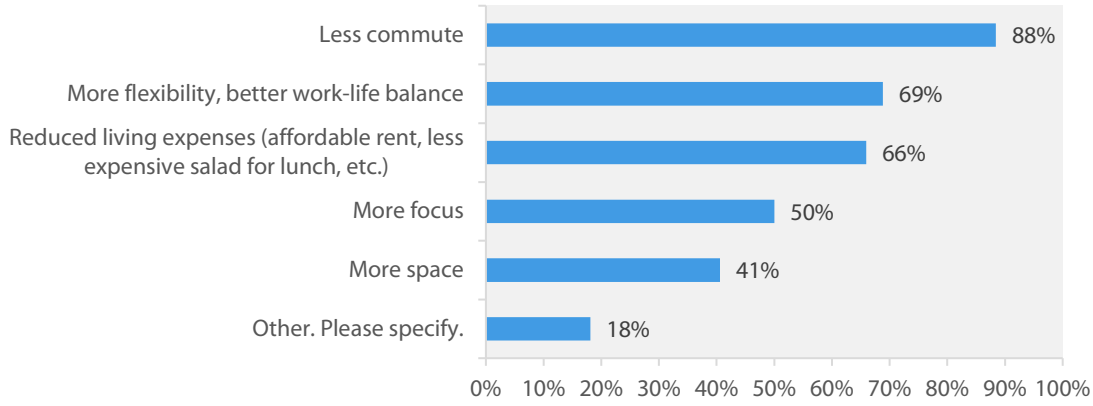
n=138

4.3.3 Remote Working

Respondents were asked what aspects of remote working they enjoy. As shown in figure 43, a majority (88%) of the respondents enjoy working remotely due to *less commute*; 69% of all respondents enjoy *the flexibility and better work-life balance*; 66% of all respondents agreed that remote working *reduced living expenses* and half of the respondents think remote working gives them *more focus*. Other benefits revealed in open text responses include improved mental health, reduced stress and social anxiety, more productivity and comfort.

Less commute, reduced living expenses, more work-life balance and focus are the top three benefits that employees enjoy working remotely

Figure 45: Remote working benefits
Survey question: What aspects do you enjoy working remotely? Please select all that apply (if any)

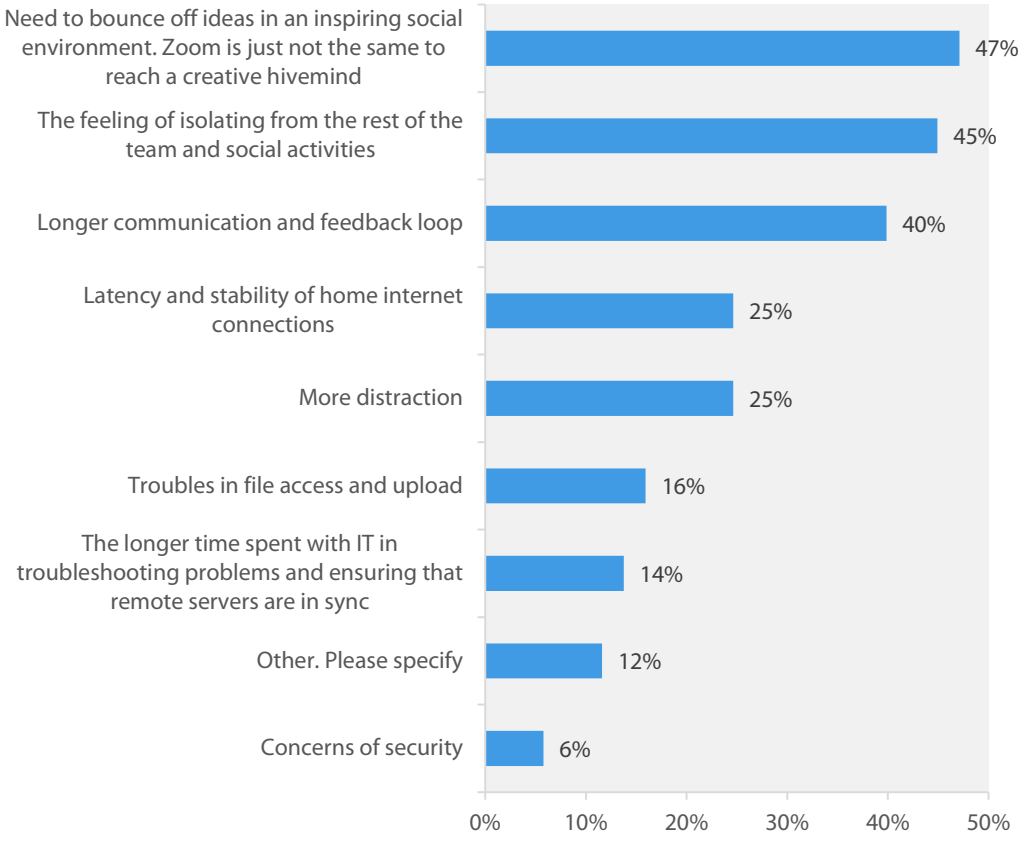


n=138

Respondents were also asked about the challenges they find working remotely. *Needs to bounce off ideas in an inspiring social environment* was the most selected option (47%) by the respondents, followed by *the feeling of isolating from the rest of the team and social activities* (45%) and *longer communication and feedback loop* (40%). About one quarter of respondents reported *latency and stability of home internet connections* and *more distraction* being a challenge.

Need for creative environment, the feeling of isolation, longer communication and feedback loop are the top three selected challenges from working remotely

Figure 46: Remote working challenges
Survey question: Which aspects do you find challenging working remotely? Please select all that apply (if any)

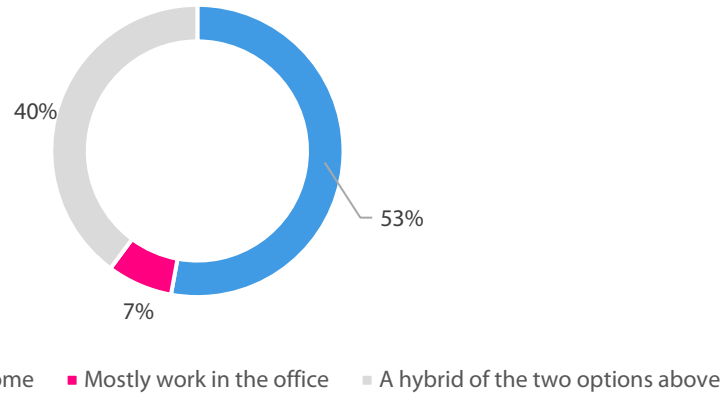


n=138

Figure 47 illustrates the desired future work mode. More than half (53%) of respondents prefer to mostly work from home in the future; 40% of respondents would like a hybrid of remote working and office working.

Despite remote working challenges, more than half (53%) of respondents prefer to mostly work from home in the future, while 40% of respondents would like a hybrid of remote working and office working

Figure 47: Future desired working location
Survey question: Where would you like to work in the future?

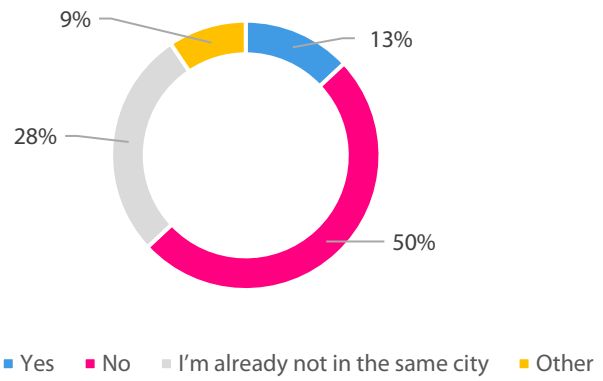


n=138

When asked about their plan to leave the city in which their company is located, half (50%) of the respondents said they did not have any such plan, while 28% of the respondents said that they were already not in the same city (see Figure 48).[45] 13% of the respondents said they did have a plan to leave the city in which the company is located. About 9% of the respondents said *Other*, indicating desires or plans to leave the city pending on certain constrains and/or personal circumstances. In sum, 28% of the employees already do not live in the same city where their companies are located, 22% of the employees are or might be leaving the same city if circumstances permit. As such, **up to 50% of the workforce could end up outside of the same city (as their employer).**

[45] Note that responding companies report that 38% of their employees already reside outside of the city in which the studio is located. As such, the employee survey is slightly more weighted towards employees that have not (yet) left the same city as their studio.

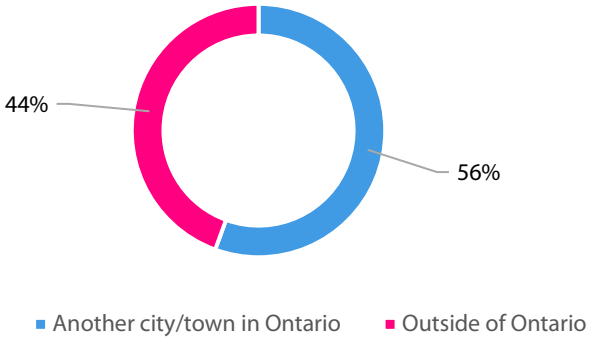
Figure 48: Employee plans on leaving
Survey question: Do you plan on leaving the city in which your company is located?



n=138

Among the respondents who plan to leave the city in which the company is located, about half (56%) reported they would move outside of Ontario while the other half (46%) reported they would move to another city/town in Ontario.

Figure 49: Future moving location
Survey question: Where will you move to?



n=18

4.3.4 Work-life Balance

The employee survey also collected text-based responses that provided additional insights into remote working and work-life balance. For example, when asked about the benefits and challenges of working remotely, several respondents indicated *increased efficiency* and *saved costs*.

> **Saving for car insurance, parking, gas ($800); at least 2 hours' time saving on commute; More flexibility to check renders on the farm after work; OT hours could be better managed due to no needs of commute.**
>
> Employee A
>
> Commute • Efficiency

> **More efficient, productive and creativity. I used to spend 2-3 hours every day on my commute. Now I save my energy and put it into my work. Currently I'm working very smoothly and efficiently.**
>
> Employee B
>
> Commute • Efficiency

Another benefit of remote work is a *comfortable* working environment, including physical comfort (e.g., not having to share and wait for the washroom, being able to use individualized office setup, access to necessities), as well as mental comfort without feeling self-conscious (e.g., ability to take breaks/stretch whenever they want, reduced social anxiety, and more privacy).

> **Little-to-no noise (Misophonia), ability to comfortably stretch and take breaks every hour without feeling guilty or self-conscious.**
>
> Employee C
>
> Comfort • Mental Health

> **Privacy, mental health improvement, improved multitasking with access to multiple monitors that I can expand and downsize.**
>
> Employee D
>
> Comfort • Mental Health

> **Massive social anxiety reduction**
>
> Employee E
>
> Comfort • Mental Health

> **Better access to necessities**
>
> Employee F
>
> Comfort • Health

Respondents also indicated some specific benefits from having more time such as having more time to work out, to balance commitments like children or pets. Other respondents pointed out challenges of working remotely such as it being harder to find the boundary between home and office. Additionally, many respondents mentioned longer working hours resulted from more meetings and difficulty stepping away from the computer. These findings align with the Animation and VFX industry trends mentioned in Section 2 Market context, showing a strong need for a new studio managing model that facilitates more collaboration, technology, and communication.

"

More time left in the day to decompress and do more personal things, like work out, time with family, sleep, and personal hobbies

Employee G

Work Life Balance

"

Significantly longer work hours, instead of 10hr/days 5 days/week, it's now minimum 12hr days plus at least 1 full day on the weekend

Employee H

Work Life Balance

Other challenges include longer communication loops, difficulties managing staff, and feeling out of touch with the artistic and social aspects.

"

Team members isolating themselves from the team (camera always turned off, no contributions in meetings, not making any effort to respond to questions posted to the whole team)

Employee I

Managing Team • Communication

"

Managing people remotely is extremely difficult. I manage a team of individuals and it is extremely challenging at times to mentor, teach and show them things that would otherwise be very quick in person.

Employee J

Managing Team • Communication

5. Recommendations

The COVID-19 pandemic has invited the world to rethink work models: forced remote (or hybrid) work, more flexible hours to accommodate children's care or personal realignment. By necessity, the world has become more digital, structured around messaging and video call apps. Some of these changes will likely continue in a post-pandemic world and VFX and animation studios are no exceptions.

This section summarizes the trends to watch for the coming years and options to address the needs.

Recommendation #1: Enable effective hybrid working models

Based on our research and consultations, the hybrid working model presents an opportunity for Ontario-based animation and VFX companies to lead an effective work model that attracts talent. Companies need to be nimble and flexible in terms of workflow, physical space planning and operation logistics. The growing size of companies coupled with hybrid working demand will likely shift the operations of physical offices as well as digital infrastructure. Animation and VFX companies have been facing stiff competition in terms of finding, hiring, and retaining talent. A VFX company that offers production service for film and TV content, for example, faces the challenge of competing for talent not only against VFX companies or gaming companies but also against global/US tech companies beyond the film and TV industry. The new standard of remote working only increases the competition of finding local talent who have more options in terms of where they could work. As such, a long-term remote work strategy would give the company a competitive advantage to draw talent as remote work is becoming more widely entrenched now than ever before. According to Alice Default, CEO, and cofounder of the remote assistant platform Double, businesses that deny their workforce a perk that has been in practice for this long will suffer in talent retention and acquisition.[46] Moving forward, **a proactive implementation of remote work may require updating studio policies and protocols to fit the needs of a dispersed workforce as well as help management plan the capital expenditures/investments**.

Furthermore, companies need to find ways to increase collaboration whether they work from home or in the office. The interviews indicated that creative production requires creative people to get along to move the project forward. Hybrid collaboration is likely to be a future where people can get together at the beginning of a project to collaborate before setting off to do their own work. As such, **leveraging communication tools and technologies that equip workers to work effectively and facilitate asynchronous communication would help a company succeed in a hybrid environment.**

Finally, **company culture, employee satisfaction and communication practices need to be reinforced with the transition to a long-term hybrid working model**. Companies will need to also focus internally on maintaining an organizational climate that is positive and accommodating for employees that have remote working preferences. Survey results showed that creating a sense of psychological safety is key to the employee wellness, which could include management asking questions about employees' preferences, creating protocols to allow flexibility to balance work and life and having a leader-supported policy/expectation related to remote work.

As the upgrading and equipping of hardware and software to succeed in remote working is becoming an industry-wide movement, demands for data security continue to rise in addition to the industry standards upgrade. Below, Nordicity looks at options for addressing data security demands.

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[46] Robin Madell, *Remote Transformation: Give Your Company a Competitive Advantage,* June 21, 2021

Recommendation #2: Manage the increasing demands and expectations for data security

Cybersecurity is increasingly becoming a concern with animation and VFX studios, accelerated by remote working and usage of the cloud. Companies have been adopting new technologies and developing new protocols for greater security. For example, **the virtual private cloud (VPC) was mentioned by interviewees for improving data security**, which allows the user to create a secure connection to transfer from home to the work cloud. A VPS is a public cloud service that allows businesses to create their own private cloud-like computing environment on shared public cloud infrastructure, resulting in a private and secure environment in the cloud.[47]

To stay on par with the industry demands, companies first must **remain in open dialogue with regards to clients' demands for data security**. Secondly, **partnering with Trusted Partner Network (TPN)** — a third-party entertainment industry assessment owned and managed by the Motion Picture Association (MPA) — gives companies access to more clients, including those who require a TPN certified vendor and those who don't necessarily require a TPN certified vendor but have similar security models. Not only does TPN provide the portal to partner with more clients, but it also provides security guidelines and best practices for the companies to implement. In 2019, the Ontario VFX company Monsters Aliens Robots Zombies (MARZ) announced that the studio has been certified by TPN, allowing the company to begin partnering with high-end studios and clients that require TPN certification.

Recommendation #3 Advocate for Ontario's broadband infrastructure availability and stability

Given the objectives and mandate of CASO, "CASO represents a strong voice representing Ontario studio owners and operators in VFX &/or animation's interests to the municipal, provincial and federal government." CASO should advocate for ensuring access to stable and adequate home internet service maintained by broadband operators. The residential broadband infrastructure tends to have "lower grade" internet broadband service and the usage of the internet and electricity at home is generally accustomed to certain peaks of activity at fixed times, and the transition of working from home will bring new heights of internet and electricity usage.

As shown in the broadband availability map, continuous rolling out of high-speed broadband in Eastern and Northern Ontario would present more affordable locations for workers to migrate. As well, the actual broadband performance in the GTA has room to improve to meet the demands of working remotely. Lastly, the purchasing cost of high-speed broadband at residential locations may raise another challenge for companies and employees, especially for those who use cloud computing technologies and remote desktop solutions.

Recommendation #4 Build on a successful industry-government partnership

Based on our consultations, costs are increasingly becoming a concern for studio owners. On the one hand, the Ontario tax credit only applies to the labour of Ontario residents performed in Ontario. As such, studios may face a financial loss if their workers move outside of Ontario. On the other hand, studio costs continue to rise due to setting up employees for remote work as well as upgrading technologies. For example, long-term investment and initial set up for using cloud technologies are the top concerns for financial considerations. CASO should continue to work with the government to share knowledge about changing business environment to help government understand how their tools and incentives could be updated to better meet policy objectives.

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[47] IBM Cloud Education, IBM Cloud Learn Hub, *Virtual Private Cloud (VPC),* November 6, 2019

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