PERFORCE

2024 State of Game Technology Report

In Partnership With

JETBRAINS

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Introduction

WELCOME TO THE STATE OF GAME TECHNOLOGY REPORT

Brad Hart
CTO and VP of Product Management — Digital Creation, Perforce

Game developers have often found themselves at the forefront of innovation, continually adapting to shifting consumer trends and a rapidly evolving industry. In my decades of working with customers across industries, I've observed the pioneers in gaming emerge as leaders in their space—through the development of new models, workflows, and processes that give their teams the ability to manage increasingly complex projects, and the license to push limits.

For the past three years, our State of Game Development & Design report has provided those leaders with valuable insights into the high-level direction of the gaming industry and the technology that shapes it, helping to inform strategic decisions for studios and teams.

But this year, we're doing something a little different. Over the past few years, practices previously limited to game developers, have gained traction with industries facing similar challenges. Recognizing these trends, we've expanded the scope of this year's report to gather data about game technology's increasing relevance in media & entertainment, education, engineering, automotive, and manufacturing.

We've compiled these findings into our State of Game Technology Report, where we explore the widespread adoption of game technology, the key challenges faced by organizations, and the essential tools teams rely on amidst today's shifting workforce dynamics.

Looking over the results of the report, these are a few of the key insights that resonated with me:

- **We've hit the inflection point on multi-industry game technology adoption.** While it's not new that gaming tools and workflows are being used in other industries, our data revealed a significant shift: 50% of responses noted game engine use outside of traditional game development. This trend highlights the demand for cutting-edge technology with increasing versatility.
- **Teams are struggling to move forward with increasingly complex projects and limited resources.** Respondents across diverse industries consistently reported challenges with collaboration, limited funding, and inadequate staffing.
- **The way forward lies in harnessing the right set of tools.** Our survey found that teams aren't looking to adopt more tools, but rather to find a core set of tools to increase productivity and efficiency for their developers, artists, and designers.

On behalf of our entire team at Perforce, I want to personally thank everyone who participated in this year's survey. The level of responses we got from each of you, allowed our team to go deep—even providing guidance for those looking to hire or be hired in the industries our survey respondents operate in.

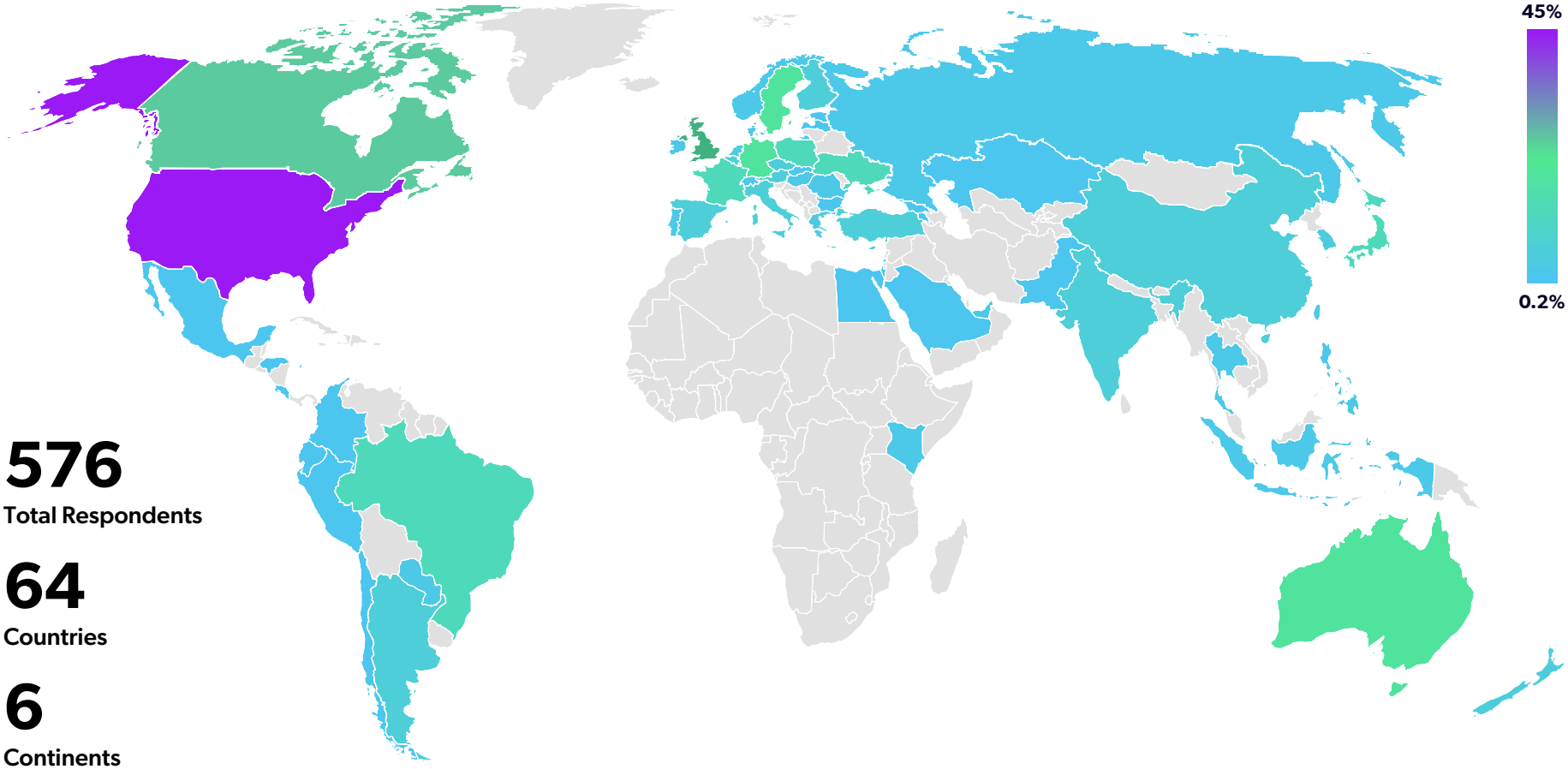
The data in this year's report has something for everyone, and we look forward to hearing how these insights shape your mindset along your path to new heights of innovation and success.

Brad Hart
CTO and VP of Product Management — Digital Creation, Perforce

Who We Surveyed

This year, we surveyed over 576 leaders and creators across a wide variety of technical industries. With one of our most diverse data sets captured to date, here are some interesting call outs about our respondents:

- 1/3 work in industries outside of gaming—including automotive, manufacturing, healthcare, military & defense, finance, and transportation.
- 20 + roles represented—including executives, product managers, researchers, and administrators.



576
Total Respondents

64
Countries

6
Continents

WHAT BEST DESCRIBES YOUR CURRENT ROLE?

40% Developer

15% Studio Owner/Lead

9% Other

8% Visual Artist, Animator or Designer

8% Producer/ Director

6% Project Manager

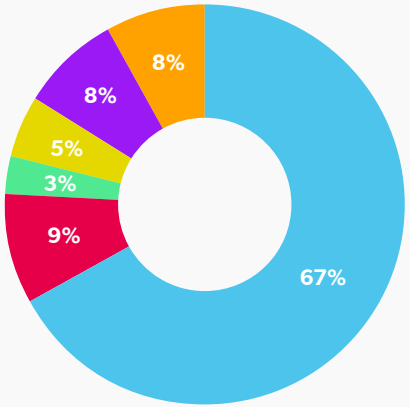
5% Engineer/ QA Tester

3% Educator

3% Technical Lead

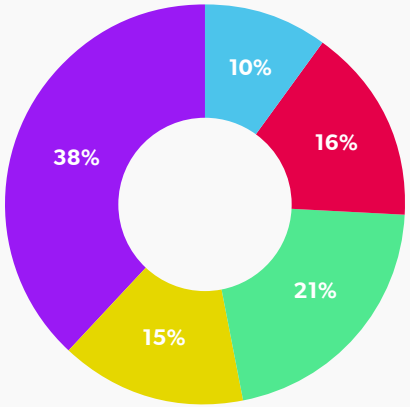
2% Student

WHAT BEST DESCRIBES THE INDUSTRY OR FIELD YOU WORK IN?



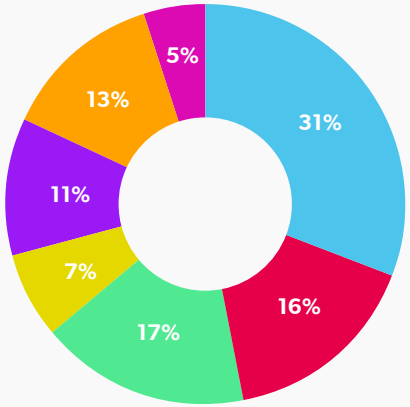
- Game Development
- Media & Entertainment
- Automotive & Manufacturing
- Engineering, Construction, or Architecture
- Education
- Other

HOW LONG HAVE YOU BEEN WORKING IN YOUR INDUSTRY OR FIELD?



- Less Than 1 Year
- 1-2 Years
- 3-5 Years
- 6-10 Years
- More than 10 years

WHAT IS THE SIZE OF YOUR COMPANY?



- 1-5
- 6-24
- 25-99
- 100-249
- 250-999
- 1000+
- I don't know

Methodology

TARGET POPULATION AND SAMPLING METHOD

This year's survey collected data from practitioners who work with or are part of their company's or institution's development, design, or management team. The survey was conducted online from March 17th to April 25th, 2024, and respondents were gathered through marketing channels affiliated with Perforce or JetBrains.

QUESTIONNAIRE

Promotion for the survey was done via email lists, social media, in-person at GDC 2024, and various partners. The sample was collected from countries across the globe including Europe, the Middle East, Africa, the Asia-Pacific region, and the Americas. Given the channels of promotion, 49% of the respondents were based in North America, with the remaining percentage of respondents scattered variously across the globe. Given the sample's nature, this data is likely limited to organizations and institutions familiar with game technologies such as Unreal Engine, Unity, Perforce Helix Core, and JetBrains TeamCity.

REPORTING AND CLASSIFICATION

In this report, indie game developers (or indies) refer to individuals, small teams, or midsize game studios who typically finance their projects through crowdfunding or direct investments. AAA game development studios (or AAAs) refer to major game publishers and the large teams they employ. Classification as an 'Indie' or 'AAA' was made by the survey respondent through a user-selected field.

The terms EMEA, APAC, and LATAM are also used in this report, and denote groups of respondents that designated their company headquarters as being located within Europe, the Middle East, and Africa (EMEA), Asia-Pacific regions (APAC), or Latin American (LATAM) countries respectively. North America or NA, refers to groups of respondents with company headquarters located in the United States or Canada.

All reported stats and their percentages have been rounded to the nearest whole number.

The Rapid and Global Adoption of Game Technology

As game engines have become more versatile, they are now also referred to as "real-time 3D engines," reflecting their broader applications and increasing popularity.

Notably, over 50% of survey responses reported use of real-time 3D engines for projects outside of traditional game development.

WHY INDUSTRIES ARE TURNING TO GAME TECHNOLOGY

From film and television to digital twins, automotive design, education, and healthcare — game technology is being adopted at a rapid rate. Below, we explore why these tools have become so widespread.

Projects Are Growing Increasingly Complex

According to a Q2 2024 US Economic Forecast from Deloitte, the economy has been characterized by:

- High fluctuations in consumer spending
- Rising demand for volume
- Persistent inflation and geopolitical risks

This economic uncertainty, along with the rise of remote and globally distributed teams, have made projects increasingly complex. In addition, consumers have come to expect high quality and realistic visuals—which take more time and require more data—across a variety of applications.

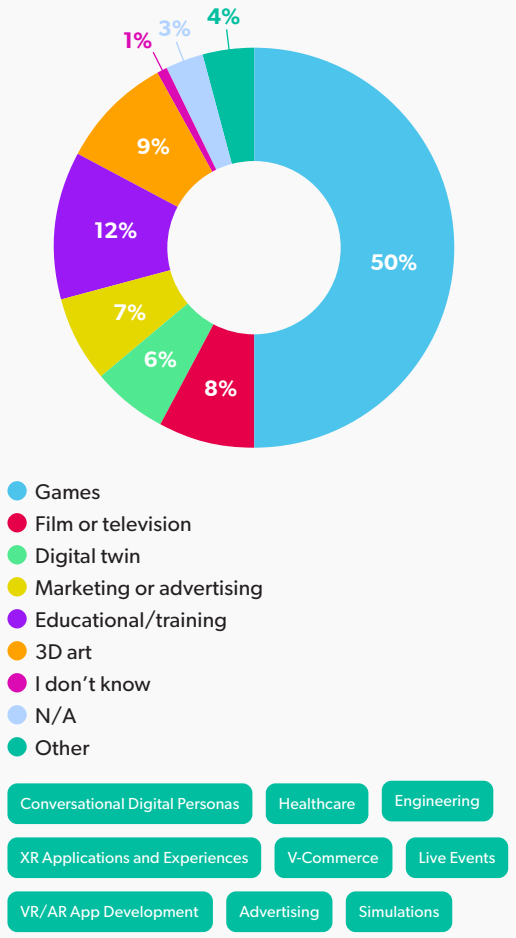
Businesses are Consolidating Their Toolsets

Organizations are also looking to consolidate technology toolsets across their business to save resources and reduce costs. Game technology is often seen as extremely versatile, with a deep set of integrations that enable teams to create across a variety of workflows and industries. This is evident by respondents using game engines for a wide range of projects including educational/training (12%), 3D art (9%), film or television (8%), and more.

Game Technology Is on the Cutting Edge

Game developers have always been on the cutting edge of scale and performance needs. From mobile devices to virtual reality headsets, game developers must develop their projects with a variety of new platforms, requirements, and use cases in mind. According to the 2024 Unity Gaming Report, there was an 34% increase in games launching on three or more platforms between 2022 and 2023.

WHAT BEST DESCRIBES THE TYPE(S) OF PROJECTS YOU OR YOUR COMPANY ARE USING GAME ENGINES/REAL-TIME 3D ENGINES TO DEVELOP?



The Challenges Impacting Teams Across Industries

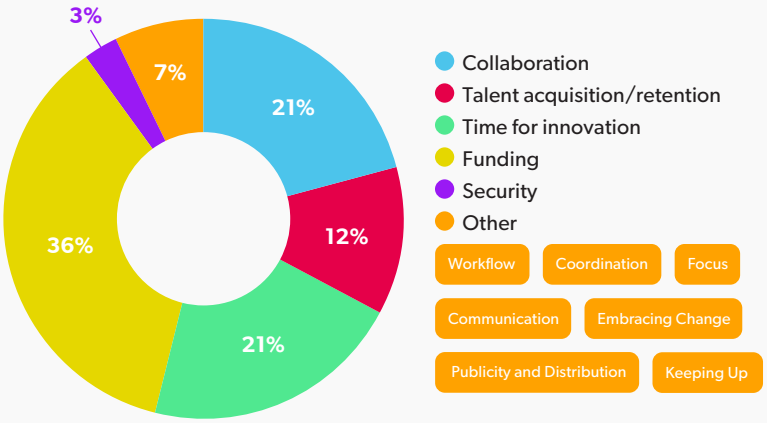
Although our survey respondents came from a wide range of industries, the challenges and frustrations reported were largely similar. This year's respondents listed funding (36%) as their top challenge, with collaboration and time for innovation (21%) tying as the next biggest challenge. Other shared challenges included organizational inefficiencies such as problems with workflow, communication and coordination, and adaptability.

FUNDING IS THE LEADING CHALLENGE

When broken down by industry, funding stands out as particularly challenging for respondents working in Media and Entertainment (42%), Education (42%), and Gaming (37%). News outlets have dubbed 2024 the year of cost cuts, with U.S. companies announcing 82,307 job cuts just this January.

This climate of economic uncertainty has lessened the appetite for risk, and added constraints for time and personnel.

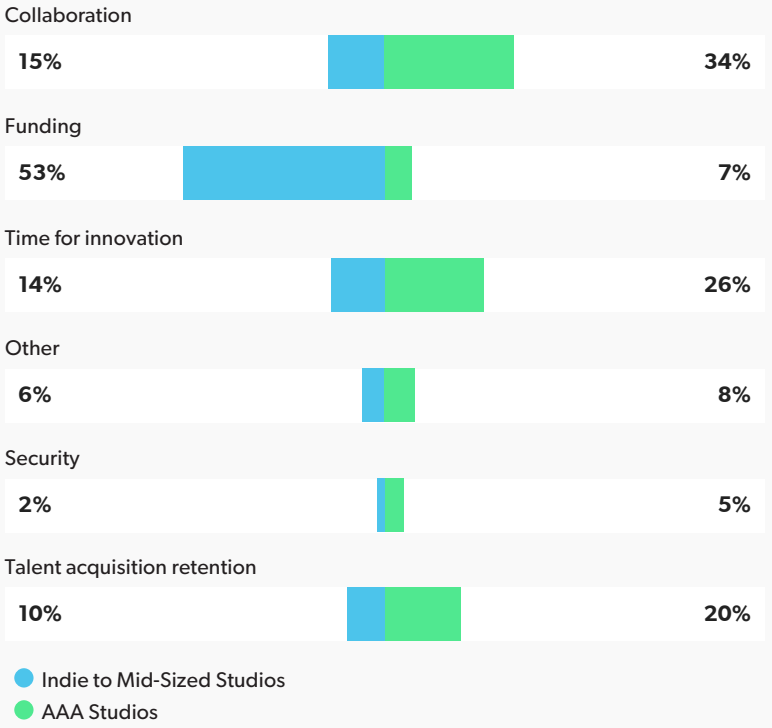
WHAT BEST DESCRIBES YOUR ORGANIZATION'S BIGGEST CHALLENGE?



INSIGHTS FROM JETBRAINS

Not surprisingly, the challenges faced by smaller studios and AAA studios are different. For large and AAA studios, collaboration and time to innovate are their primary obstacles. In contrast, small studios struggle with funding, far eclipsing other challenges.

WHAT BEST DESCRIBES YOUR ORGANIZATION'S BIGGEST CHALLENGE?

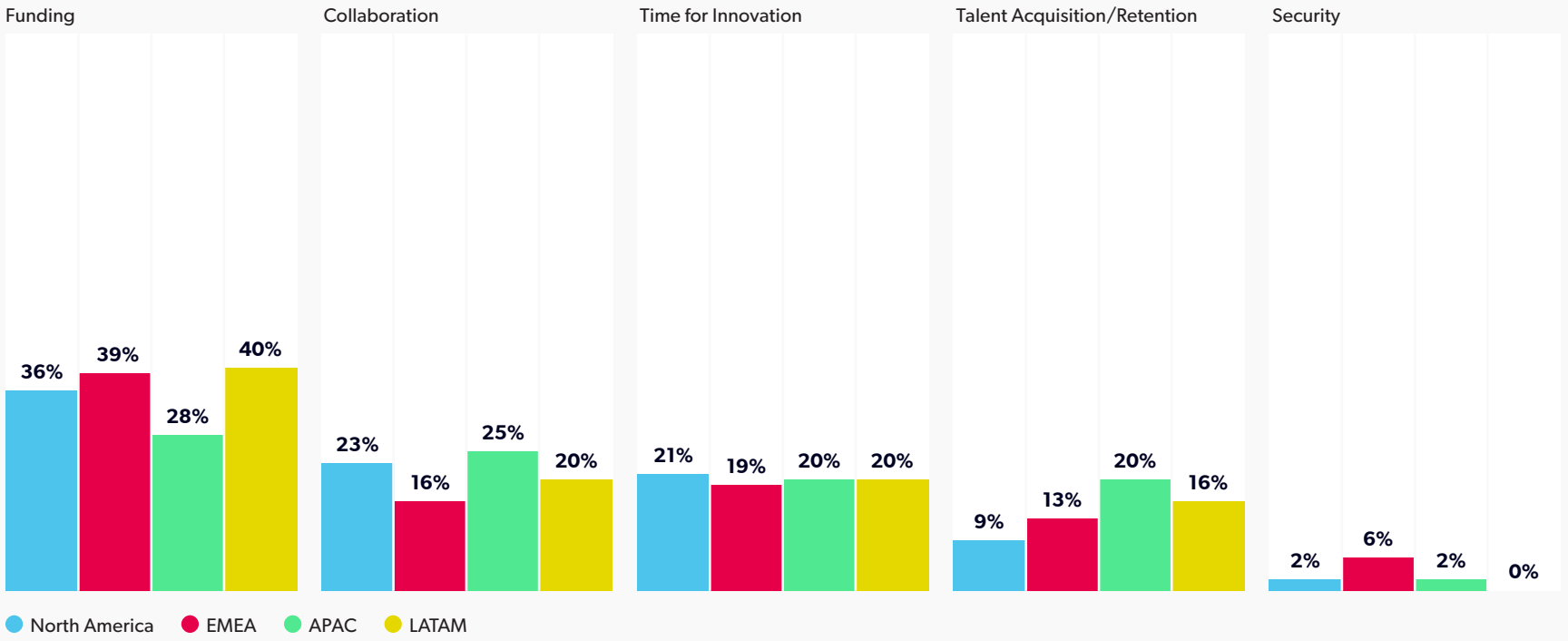


TRENDS IN CHALLENGES ACROSS REGIONS

Though funding was the leading challenge, our survey found these trends when breaking down our respondents by regions:

- Collaboration is the second most pressing issue for respondents in North America (23%), APAC (25%), and LATAM (20%).
- Talent Acquisition and Retention continues to pose a challenge for respondents in APAC (20%) and LATAM (16%), while it has reduced to a minor challenge in North America (9%).
- Overall, Security was the least pressing challenge faced by regions, with less than 6 percent of respondents citing it as a major concern.

WHAT BEST DESCRIBES YOUR ORGANIZATION'S BIGGEST CHALLENGE?

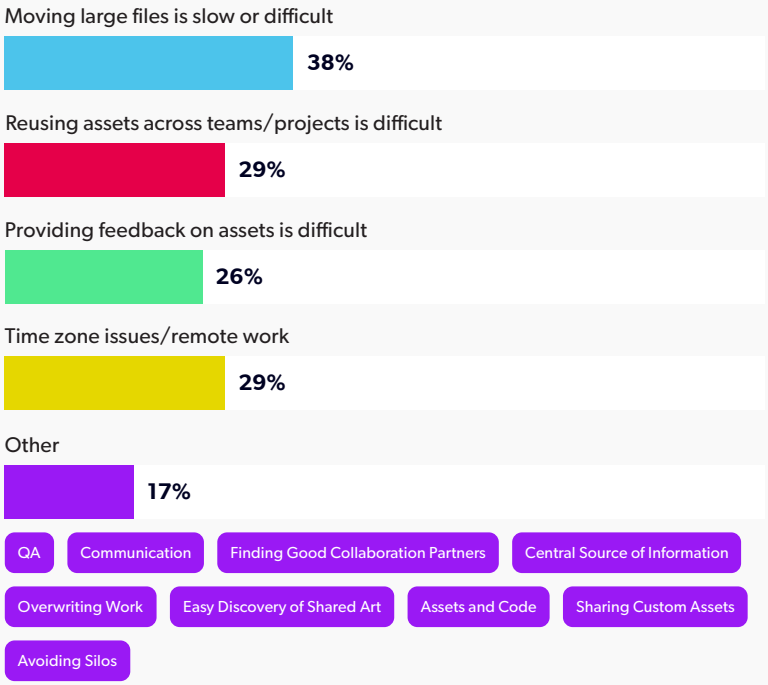


MOVING LARGE FILES IS HINDERING COLLABORATION MORE THAN REMOTE WORK

Respondents listed moving large files (38%) as the biggest barrier to collaboration. With the size of projects and the fidelity of individual assets continuing to grow, especially with the increased adoption of technologies like AI and VR, methods in collaboration and the tools involved have failed to keep up.

As organizations have adapted to a remote workforce, time zone issues and remote work have become less problematic. However, the remaining 72% of hindrances our respondents listed stem from how these teams and their work is organized. These include issues with a central source of information, difficulties in giving feedback, lack of shared resources, and inefficient communication.

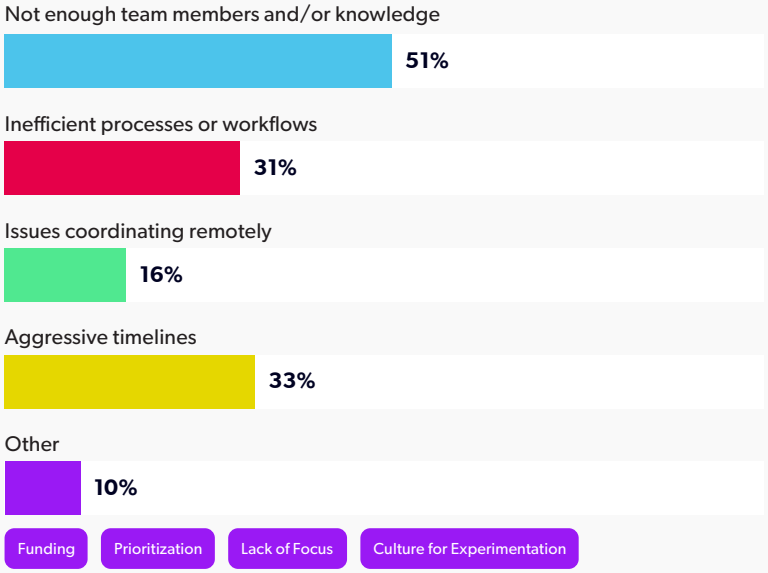
WHAT CHALLENGES DO YOU OR YOUR TEAM HAVE WITH COLLABORATION?



LACK OF TEAM MEMBERS IS THE LARGEST BLOCKER TO INNOVATION

Respondents identified not enough team members (51%) and aggressive timelines (33%) as the two biggest blockers to innovation. The combination of these two challenges is causing strain and reveals a significant organizational weakness across industries. To help address this, workers need solutions that help them reduce administrative work, allowing more time for creative and innovative work.

WHAT CHALLENGES DO YOU OR YOUR TEAM HAVE WITH TIME FOR INNOVATION?



Cross-Industry Game Technology Trends

The wide adoption of game engines has made it clear that game technology is on the cutting edge. Game technology also has a very mature set of tools that can work together through open and flexible APIs, allowing organizations and studios to build efficient workflows and pipelines that scale across all the roles involved in production.

In this section we'll look at the various tools used in projects from end to end, noting the insights and trends and how they vary across teams. First, we'll dive into game engines—a foundational tool for developers across industries.

UNREAL IS THE LEADING GAME ENGINE

Amongst our respondents across industries, Unreal Engine (UE) was the preferred game engine, with 63% of teams using it. Unity, used by 47% of respondents, comes in as a close second. Developers have gravitated towards Unreal for its ability to design 3D worlds that are simple, powerful, and flexible for a wide range of industries.

For instance, Unreal Engine 5's release of tools like the MetaHuman Animator has made it a critical asset in industries such as broadcast, live events, automotive and transportation, and film and television.

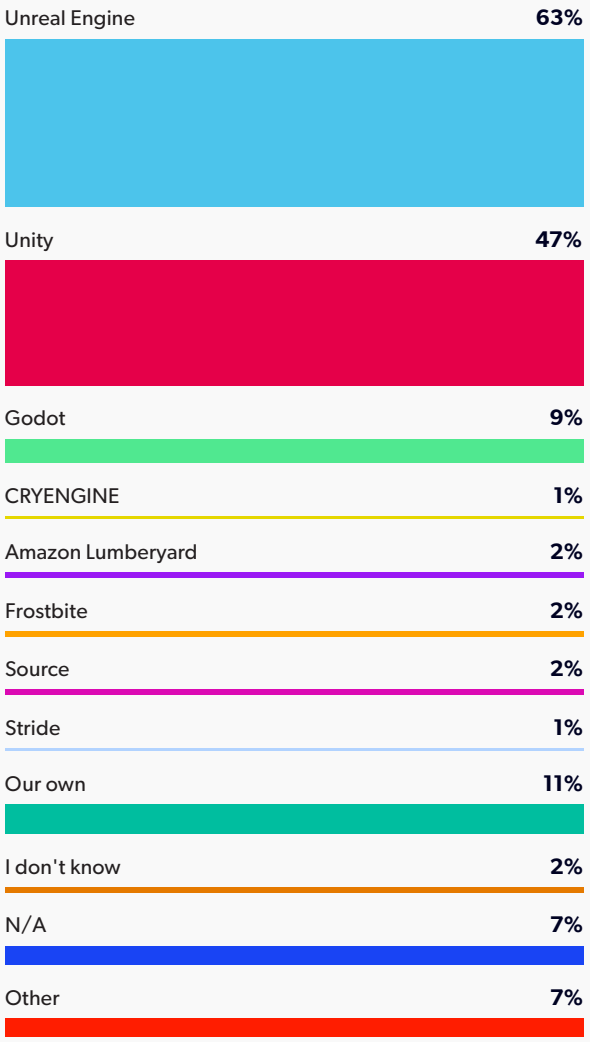
THE MEDIA AND ENTERTAINMENT INDUSTRY LARGELY PREFERS UNREAL

When we look specifically at the media and entertainment industry, the gap widens further, and these teams overwhelmingly prefer Unreal Engine (51%), compared to Unity (16%). According to Unreal Engine, since the release of UE5, it has been used for over 550 major motion pictures and TV episodes.

Only a few years ago, virtual production was limited to seasoned filmmakers and directors. UE5 has made virtual production accessible to the larger industry, providing creators with an extensive virtual production toolset, a cinematic editing and animation tool called Sequencer, and the ability to create final-pixel output for their content.

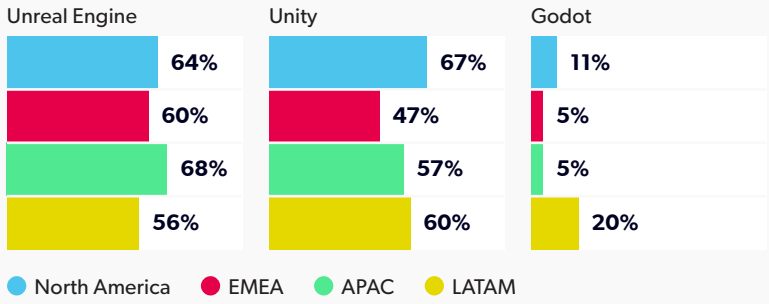
As mentioned earlier, Unreal Engine's advances in AI tools also help creators produce photo-realistic visuals, (i.e., the MetaHuman Animator), in a matter of minutes — a manual process that used to take months. All these benefits and tools have made it a valuable asset for the industry.

WHICH GAME ENGINE/REAL-TIME 3D ENGINE(S) DO YOU OR YOUR TEAM USE?



GODOT IS BEING ADOPTED AT A RAPID PACE

First developed by an Argentinian game studio back in 2001, Godot was released as open source in 2014. Though Godot was only made available 9 years after Unity and 16 years after Unreal Engine, 9% of respondents note its use for their projects. When looking specifically in North America and Latin America, respondents that used Godot were 11% and 20% respectively.



What Has Contributed to Godot's Rising Popularity?

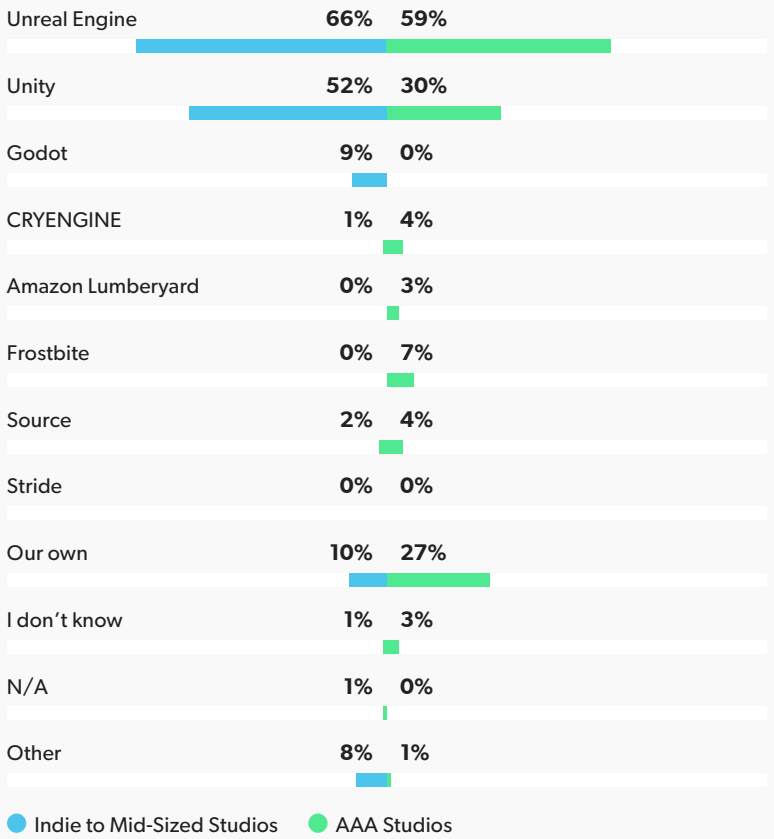
Godot stands out from other game engines for its straightforward and intuitive design. In particular, indie developers are increasingly turning to Godot as an alternative to game engines like Unity and Unreal Engine. Here are some of the reasons why:

- **Godot is free and open source.** Under the MIT license, there are no fees or licenses required to use and build games within Godot. Additionally, since Godot is open-source, users have complete freedom to modify all of the source code for their own use or to contribute back to the community.
- **It's easy to get started with Godot.** Popular engines like Unreal or Unity can require over 40 gigabytes of storage to get started. In comparison, Godot's native editor is only 8 gigabytes, making it easy and fast to get started building games.
- **Over 600 contributors work on improving Godot.** Due to active community forums, Godot developers are constantly releasing user requested enhancements and debugging the engine.

INSIGHTS FROM JETBRAINS

Our analysis found a stark contrast in game engine preferences between AAAs and indie studios. While AAA developers are more likely to use their own game engine, they predominantly use Unreal Engine, which is nearly two times as popular as Unity. A small percentage of AAAs also use Frostbite and CRYENGINE. In contrast, indie studios use Unreal Engine and Unity at much closer rates, with Godot emerging as a popular alternative.

WHICH GAME ENGINE/REAL-TIME 3D ENGINE(S) DO YOU OR YOUR TEAM USE?

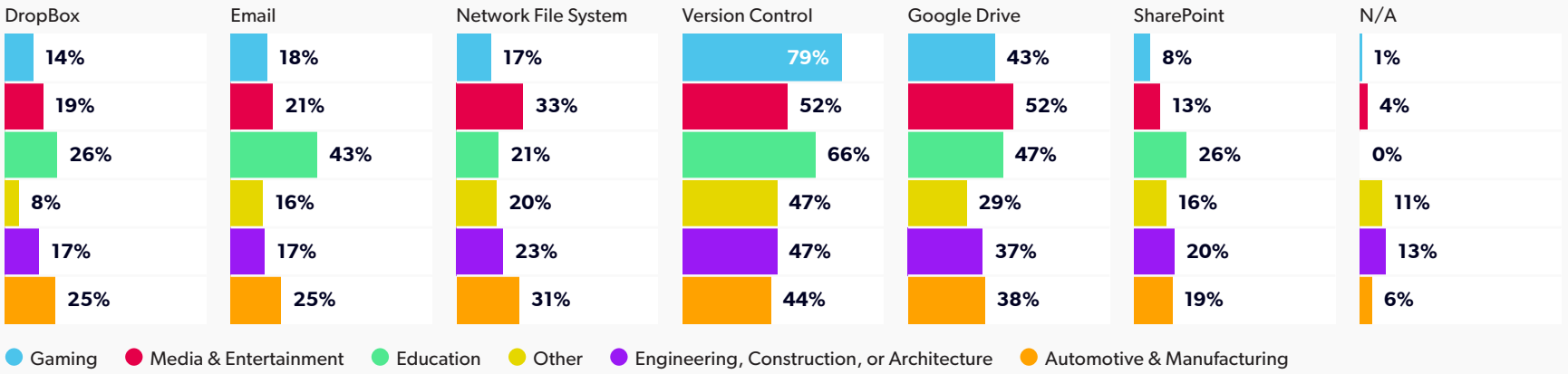


VERSION CONTROL SOFTWARE IS A FOUNDATIONAL TOOL FOR DEVELOPMENT TEAMS

The rising complexity of projects has created the need for version control systems (VCS) to serve as a foundational component to an organization's development. These systems not only enable developers to manage changes to code and files over time, but also allow them to work on the same project simultaneously.

Version control systems have become crucial to the structure of organizations, with 69% of respondents using version control to store and share source files and art assets. In fact, version control was noted as the top tool used for storing and sharing purposes across industries:

WHICH TOOL(S) DO YOU OR YOUR TEAM USE FOR STORING AND SHARING SOURCE FILES AND ART ASSETS?

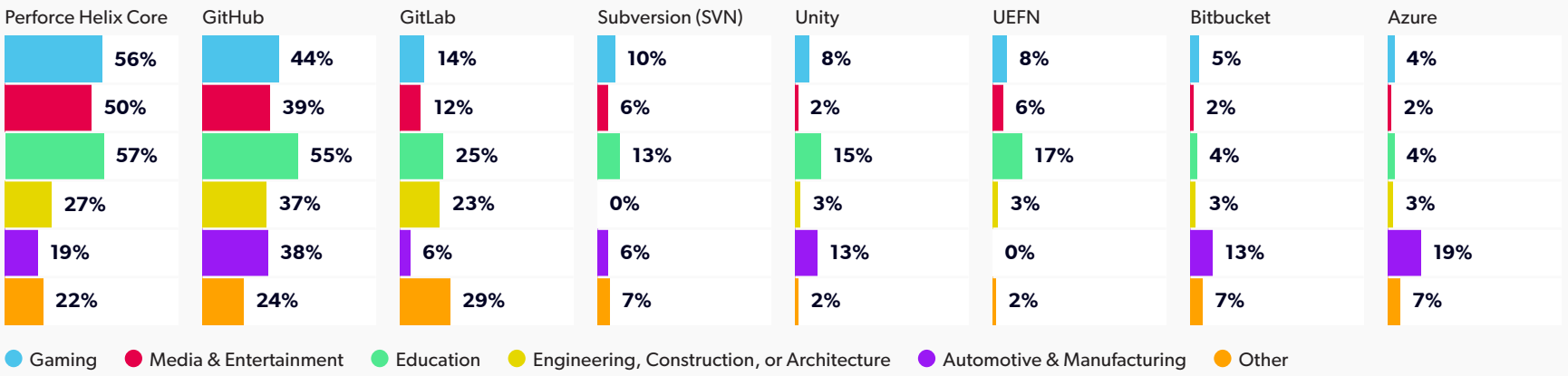


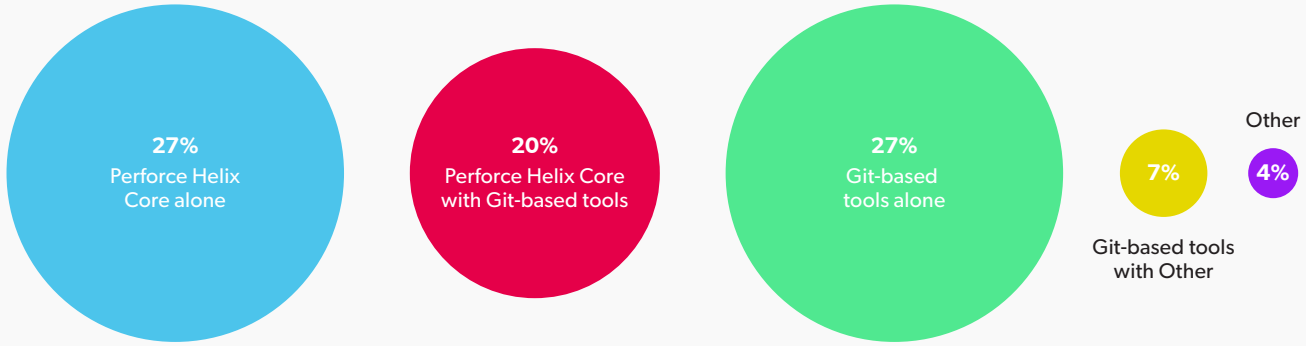
Today's most successful and widely adopted version control offerings provide modern and flexible frameworks that quickly adapt to the advanced needs of users. Below, we'll further explore the trends around version control and how teams are adapting to today's rapidly changing landscape.

WHICH TOOLS DO YOU OR YOUR TEAM USE FOR VERSION CONTROL?

Perforce Helix Core is Used Extensively Across Industries

Our survey data indicated that a majority of respondents (54%) include Git-based (GitHub, GitLab, BitBucket, or Azure DevOps) version control tools as part of their workflows. Similarly, over 50% of respondents note use of Perforce Helix Core in their workflows—the most of any one product. Notably, Helix Core was the leading version control platform in gaming (56%), education (57%) and media and entertainment (50%) sectors.

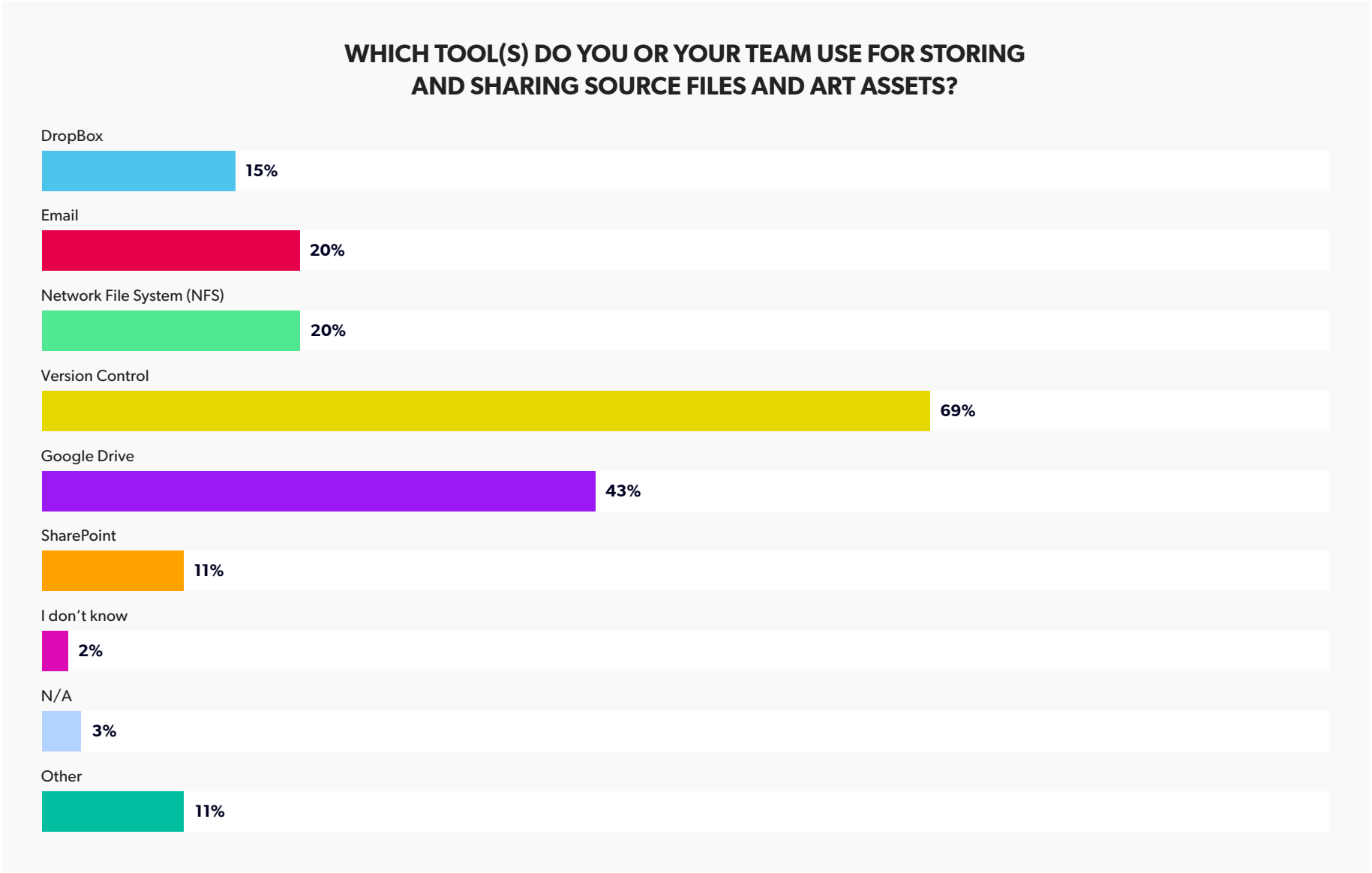




GitHub, GitLab, BitBucket, and Azure DevOps are Git-based tools. Other tools consist of Unreal Revision Control, Unity Version Control and Other

The Continued Use of Google Drive

While version control systems are the preferred option for storing and sharing assets, Google Drive use is still high across industries, with 43% of respondents relying on Google Drive. This is likely due to its ease of use, and the number of total active users — which Google estimates to be over 3 billion per month.



THE ESSENTIAL TOOLS OF EVERY DEVELOPMENT TEAM

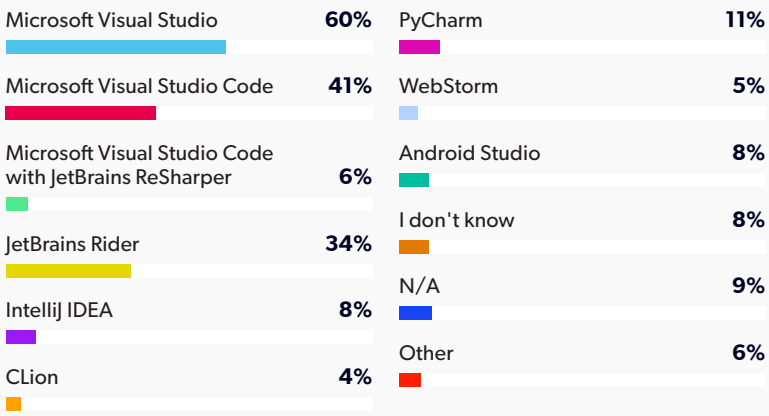
In addition to version control systems, development teams across industries rely on the following types of game technology to facilitate more efficient collaboration and create higher-quality products.

Integrated Development Environments (IDEs)

The majority of respondents (91%) incorporate Integrated Development Environments into their workflows. These tools streamline development for programmers — offering a suite of capabilities that enhance code writing, improve code quality, and better facilitate integrations across game engines and the cloud.

One insight our survey found was that over a third of respondents (34%) rely on JetBrains Rider. Though released in 2017, two decades after Microsoft Visual Studio, the tool's growing popularity demonstrates its effectiveness in meeting developer needs and its unique features which differentiate it from the competition.

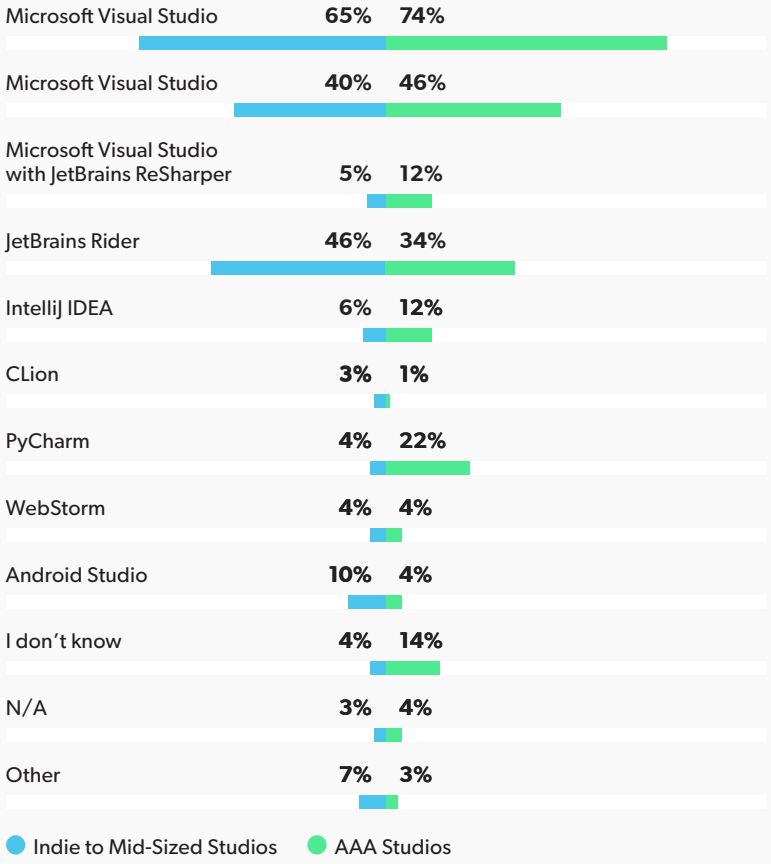
WHICH IDES (INTEGRATED DEVELOPMENT ENVIRONMENT) DO YOU OR YOUR TEAM USE?



INSIGHTS FROM JETBRAINS

The survey revealed that Microsoft Visual Studio remains the most widely used IDE within AAA studios, with 74% of teams surveyed utilizing it. However, the data also highlights the increased traction JetBrains Rider has gained, perhaps due to its integrations with game engines like Unreal Engine, Unity, and Godot.

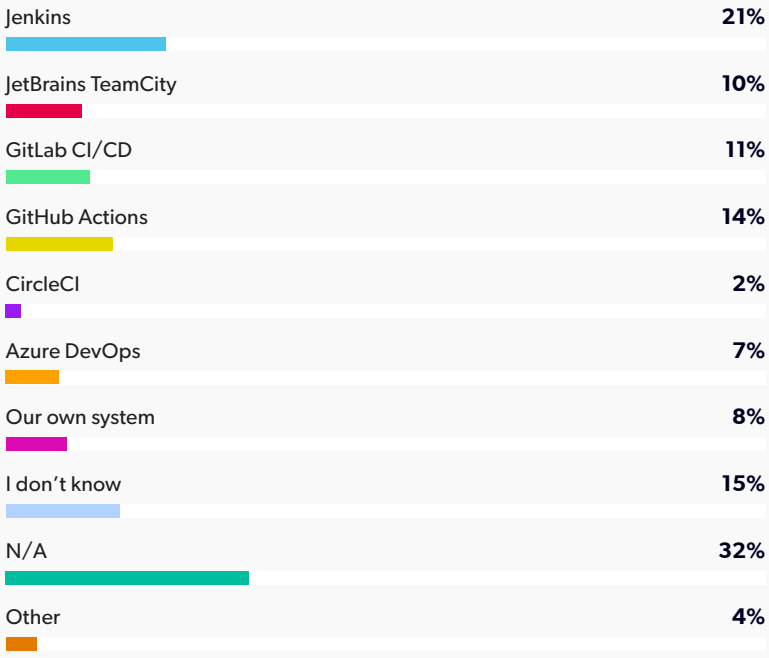
WHICH IDES (INTEGRATED DEVELOPMENT ENVIRONMENT) DO YOU OR YOUR TEAM USE?



CI/CD (Continuous Integration/Continuous Delivery or Deployment)

Together, CI/CD forms the backbone of efficient software development and DevOps automation. Our survey found that teams are widely divided regarding the tools they use for CI/CD, with over 8 tools listed. The three most-used CI/CD tools were Jenkins (21%), GitHub Actions (14%), and GitLab CI/CD (11%).

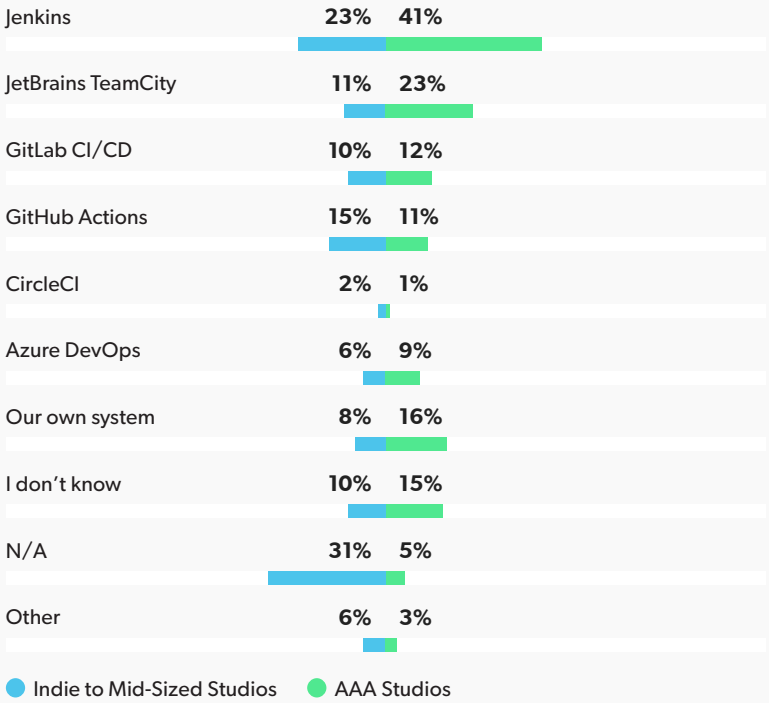
WHICH TOOL(S) DO YOU OR YOUR TEAM USE FOR CI/CD (CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY)?



INSIGHTS FROM JETBRAINS

Among AAA studios, Jenkins (41%) and TeamCity (23%) emerge as the most common CI/CD tools. In contrast, a significant portion of indie studios reported they weren't using CI/CD tools (31%). Among those that do, Jenkins (23%) and GitHub Actions (15%) were the two most used tools.

WHICH TOOL(S) DO YOU OR YOUR TEAM USE FOR CI/CD (CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY)?



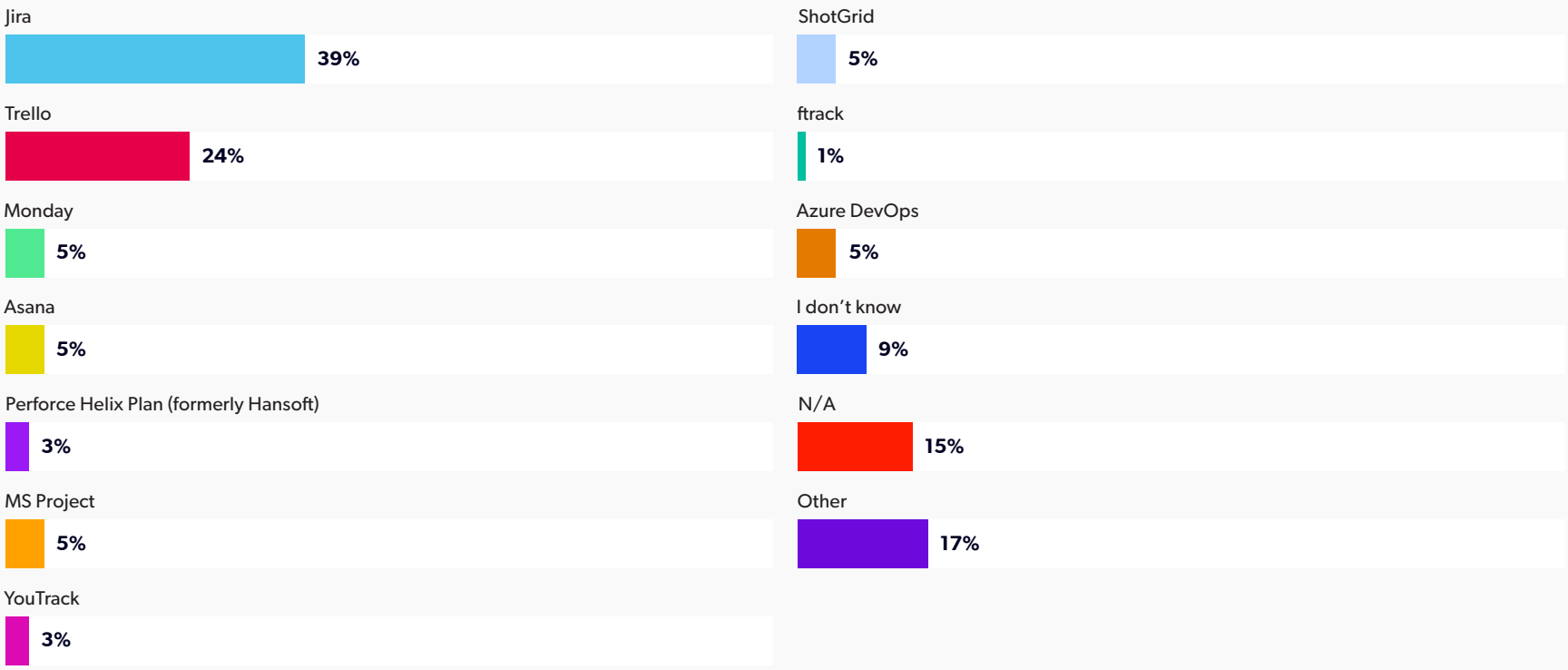
Project Management Tools

Project management tools are invaluable assets for development teams, with 85% of respondents using them to manage their projects, support various teams, and enable decision-making at the project, program, and portfolio levels. These tools vary widely, reflecting the diversity of the project manager role itself—ranging from highly managerial to highly technical.

A recent trend is that project managers are increasingly working across organizations, teams, contractors, and partners (or 3rd parties). This context places an even greater importance in selecting the right project management tool—one that fits your industry's specific needs and can best support your team.

Our survey found that many project managers employ a mix of tools to address specific needs and industries, with respondents distributed over the use of 11 types of tools.

WHICH TOOLS WERE USED TO MANAGE THE PROJECT BACKLOG OF YOUR MOST RECENT PROJECT?



ESSENTIAL TOOLS FOR ARTISTS AND DESIGNERS

In our analysis of artist and designer roles across industries, we identified a core set of tools crucial to their work. Digital Content Creation tools, or DCCs, are where artists and designers make magic.

Notably, most respondents use a combination of three tools—at a rate of over 3:1. Our survey also revealed that Photoshop (62%) and Blender (59%) were the most widely used tools among respondents, followed by Maya (42%).

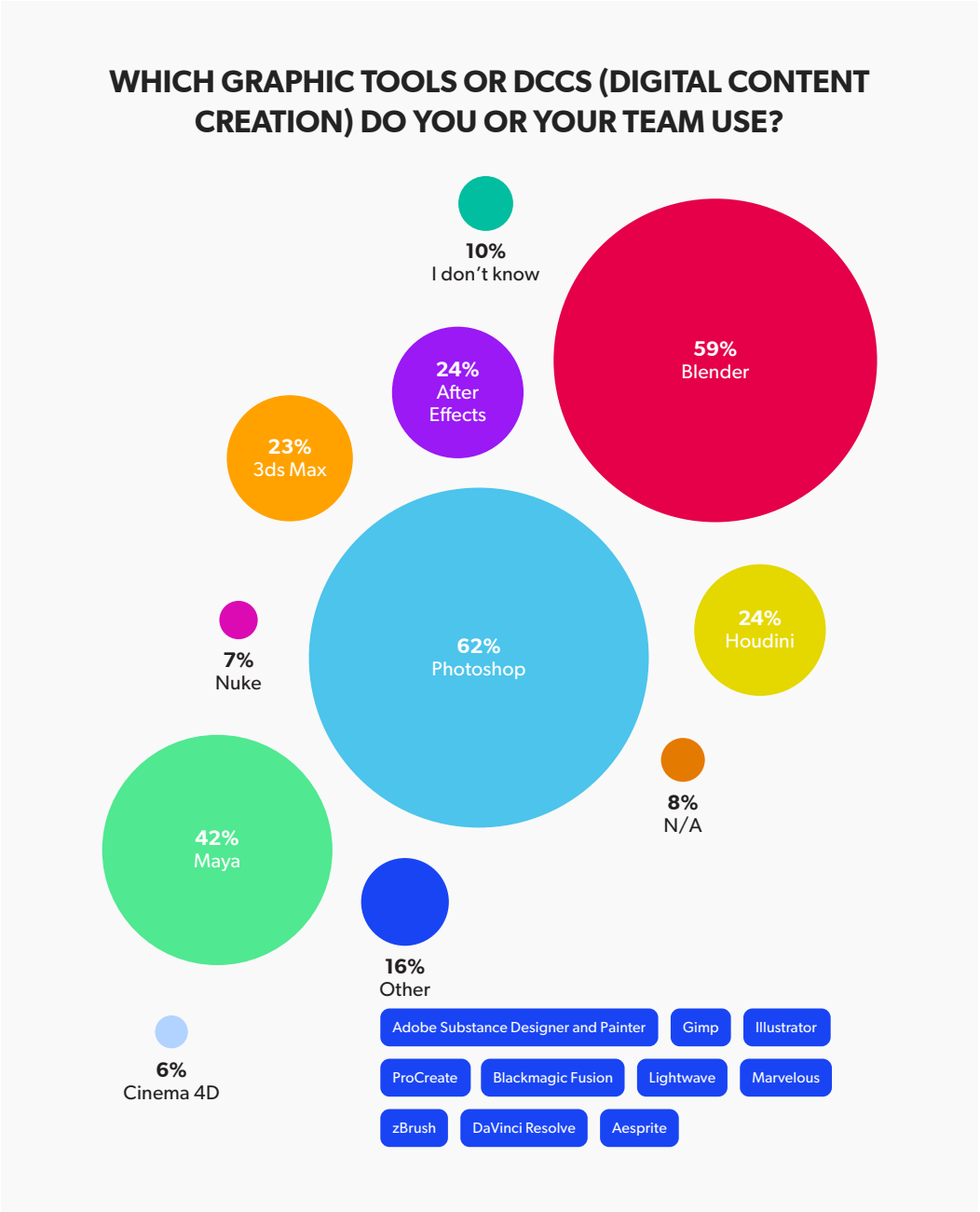
The New Landscape for Creatives

The rapid adoption of streaming content for games, films, and episodic series has significantly impacted consumer expectations. Audiences now demand high-quality content—at a rapid rate—from studios and producers in the gaming and media industries. This trend has also permeated other industries, compelling them to meet similar demands.

What Will Help Artists and Designer's Embrace Today's Challenges?

To address these evolving needs, organizations need a workflow comprising a robust set of tools. Our survey found that half of the respondents (51%) identified Perforce Helix Core as a component of that workflow, when it comes to managing and reviewing assets.

However, version control is just one piece of the puzzle. To thrive in today's fast-paced creative environment, teams will need to embrace a comprehensive toolkit that addresses all aspects of digital content creation.



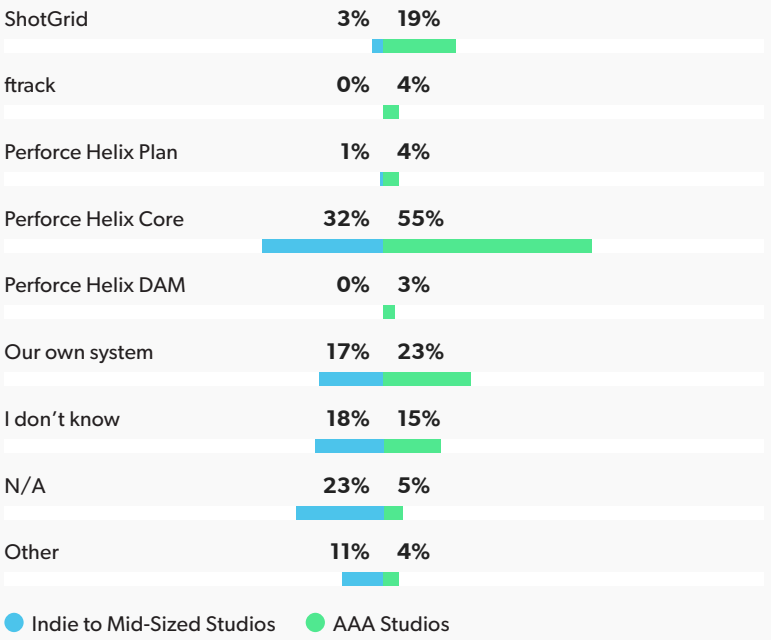
INSIGHTS FROM JETBRAINS

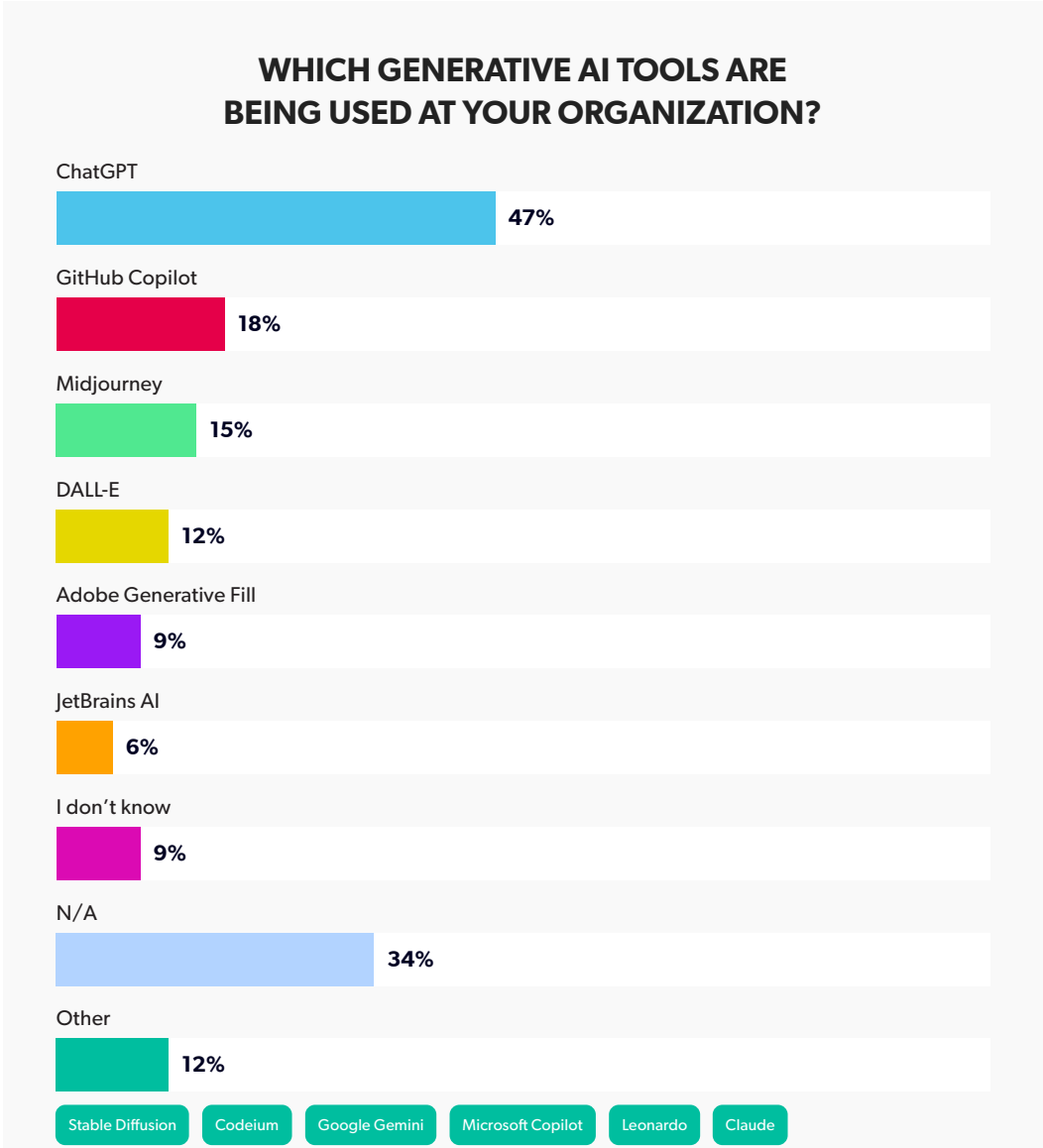
Our analysis of AAAs and indie studios revealed an interesting trend in digital asset management. Studios of all sizes are using homegrown tools to review and track their 3D assets and art.

AAA teams often have the challenge of working with a large bed of IP and have needed to create their own tools to manage it all. However, the resources to maintain and manage custom-built solutions divert the focus of studios and leave less time for game creation.

On the other hand, indie studios tend to wait for the market to develop mature solutions for them. Only 17% of them use their own solution, while almost a third (32%) rely on Perforce Helix Core.

WHAT TOOL(S) DO YOU OR YOUR TEAM USE FOR REVIEWING, TRACKING, AND/OR FINDING YOUR ORGANIZATION'S 3D ASSETS OR ART?





GEN AI IS BEING WIDELY ADOPTED AT AN ORGANIZATIONAL LEVEL

We all know that generative AI has been on the rise at an experimentation level, but in this year's survey we asked respondents which tools are being used by their organizations. Today, over 65% of respondents are using an AI tool within their organizations, with ChatGPT being the most widely used (47%) among those surveyed.

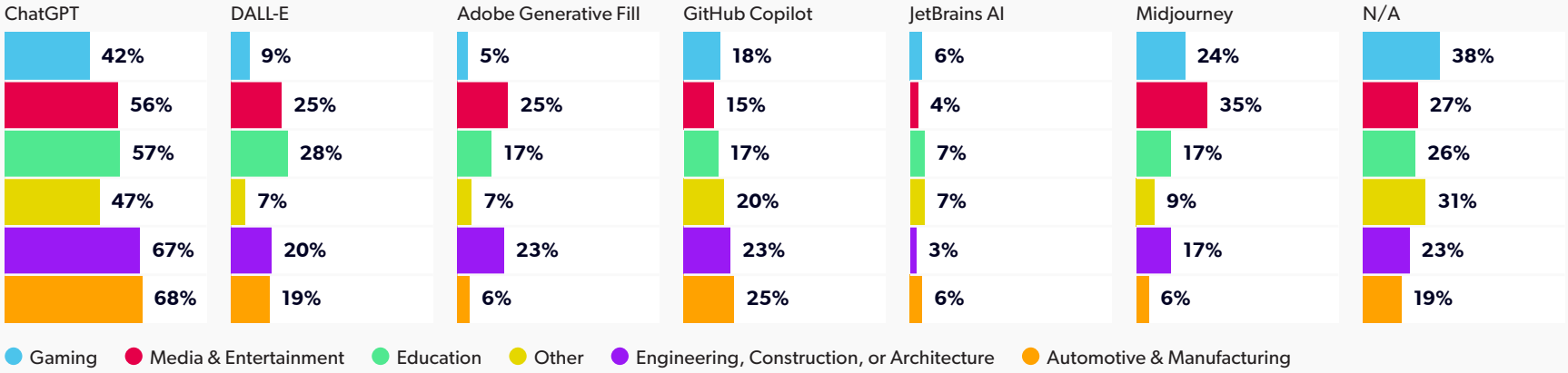
The Use of Gen AI Across Industries

Broken down by industry, the use of ChatGPT—a large language model (LLM)-based tool—was most popular among our respondents in Engineering, Construction, or Architecture (67%) and Auto and Manufacturing (68%). Interestingly, respondents who work in Education use a wide range of AI image generators such as DALL-E (28%), Adobe Generative Fill (17%), and Midjourney (17%).

While respondents working in Media and Entertainment had the most diverse AI toolkit, with a significant portion using ChatGPT (56%), Midjourney (35%), DALL-E (25%), and Adobe Generative Fill (25%). The wide variety of tool usage demonstrates that the industry is extensively experimenting and that there are several applications for this technology. Given the often manual and tedious processes associated with virtual production, the incorporation of generative AI holds significant potential.

As these tools continue to advance, it will be interesting to see how organizations develop workflows and processes to drive efficiency and innovation.

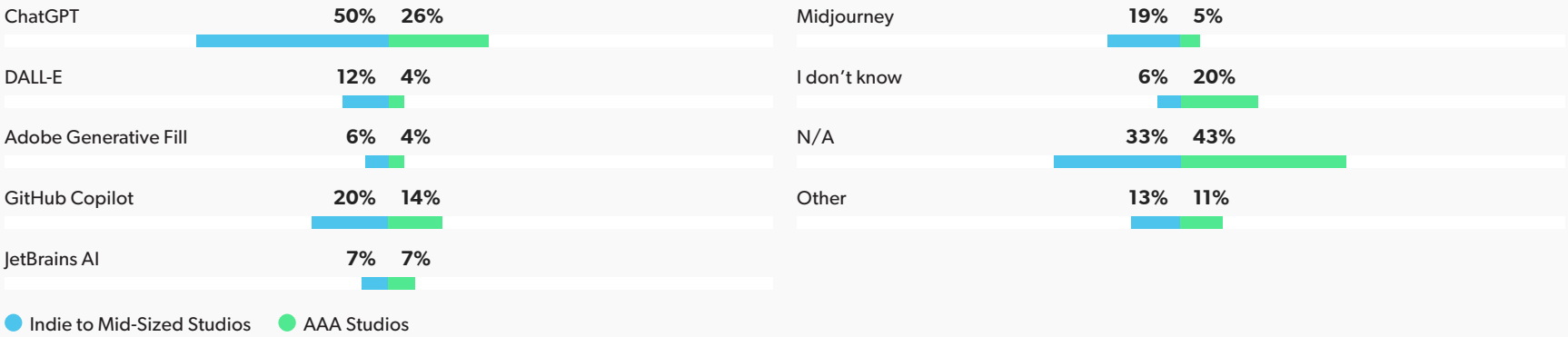
BREAKDOWN OF GENERATIVE AI TOOL USAGE BY INDUSTRY



INSIGHTS FROM JETBRAINS

As expected, indie studios are more likely to use generative AI than AAA studios. Small studios tend to have fewer restrictions and limited bandwidth and resources.

WHICH GENERATIVE AI TOOLS ARE BEING USED AT YOUR ORGANIZATION?



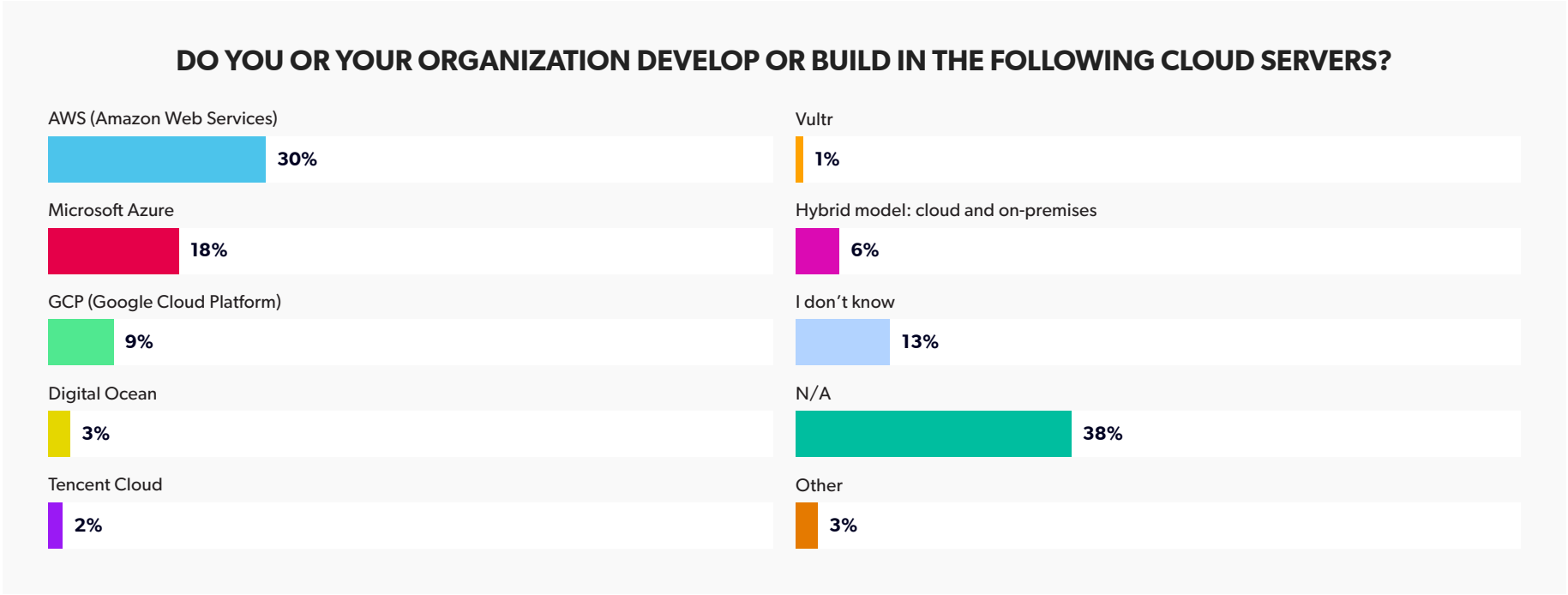
CLOUD DEVELOPMENT ACROSS INDUSTRIES

It's no surprise that organizations are increasingly developing and building in cloud environments. Nearly half of our survey respondents (49%) utilize cloud servers, demonstrating the critical role they play in organizations. This is especially true as teams become more widely distributed and current assets and projects push the limits of traditional solutions.

AWS Leads Among Cloud Providers

Our survey revealed Amazon Web Services is the preferred cloud provider across industries, with nearly a third of all respondents (30%) using it. Microsoft Azure emerged as the second most used platform (18%) and is used at an almost 2:1 ratio compared to Google Cloud (9%).

Interestingly, only 6% of respondents are using a hybrid approach, combining both cloud and on-premises solutions. As companies continue to seek ways to be agile and adapt to the evolving digital landscape, we anticipate more organizations will continue to migrate to cloud servers.



In Your Words

For this year's report, we also asked a few open-ended questions to explore predictions and sentiments across the industry. The responses revealed three key insights:

1. Concern over generative AI's growing influence
2. Shared excitement about game technology's unprecedented visual capabilities
3. Frustration among workers due to increased workloads and limited resources

These insights provide a valuable window into current sentiments and the transformation that lies ahead.

WHAT WILL BE THE BIGGEST CHANGE(S) IN YOUR INDUSTRY OVER THE NEXT FEW YEARS?

When asked to look ahead, a resounding majority of respondents predict AI to play an even larger role in how teams work. Given the constant release and iteration of generative AI tools, users anticipate the following changes:

"Code and art development will be handled by freelancers and AI. Being able to describe and refine the art or code will be a top skill with hardcore coding and art by an individual will become less important."

"Realistic textures will mainly be done by GenAI. There might be a market for stylized textures but given the nature of them there might still be a job for people making those."

Market Shifting Towards Indie Titles

Another predicted trend is the growth of indie game development. Across the gaming industry, indie games have gained attention for their innovative approaches, including:

- **No Man's Sky:** Renowned for its use of procedural content generation to create 18 quintillion worlds within one game.
- **Cocoon:** Winner of Best Debut Indie Game award at The Game Awards in 2023 and known for its unique storylines.

These successes highlight the indie sector's ability to capture the attention of the larger gaming audience. As AAA studios recover from a year of significant layoffs, there are now even more opportunities for indies to make their mark on the industry.

Here are some additional thoughts from respondents in the gaming industry:

"AAA games will nearly stop being made. The market will be indie games and GaaS (Gaming as a Service). I think there will be a lot more indie studios launching and having success due to all of the layoffs at AAA studios…a lot of big launches seem to be flopping from the disconnect between players and corporate ideas and ideals that seem to be heavily clashing."

"AAA Games and studios will suffer, Indies will rise. Double A becomes the new Triple A. I expect to see a surge of A and AA scale studios emerge, and some will make breakout hits, while AAA studios and publishers will continue to struggle for at least 2 more years."

WHAT IS ONE THING YOU WOULD LIKE TO CHANGE ABOUT YOUR INDUSTRY?

Our survey revealed consistent themes throughout every industry regarding where respondents would like improvements. Three changes that crossed each industry are:

- Better pay
- More stability
- Less aggressive timelines

These sentiments correlate with all of the challenges discussed earlier, including lack of funding, not having enough time for innovation, and insufficient team members. A full summary of the responses we gathered is categorized below.

Gaming

- More junior friendly
- New ideas for games
- Lower barriers to entry
- New publishing models that allow indie and game developers to express their ideas
- Change the way games are funded
- More independent funded and independent IPs
- Move away from subscription models
- Removing GaaS (Game as a Service)
- Cheaper games with less time commitment
- More fair wages for developers
- Realistic timelines
- More leadership that values the player
- Better job security

Media and Entertainment

- Job security
- Openness to change
- Simpler workflows
- Faster adoption of new technologies

Education

- Less uncertainty about how to navigate future technology trends
- More focus on good training instead of impressive looking training
- Better and faster documentation

Engineering, Construction, or Architecture

- Dedicating more time for visualization
- Innovation
- Improved UI/UX across all toolsets
- More 3D Artists
- Increased stability

Auto and Manufacturing

- More attention to environmental impact
- An increase in lower-level developers
- Embrace change

Other

- Access to capital
- Job security
- Compensation
- Work culture
- Lack of innovation

WHAT ARE YOU MOST EXCITED ABOUT WHEN IT COMES TO USING GAME TECHNOLOGY IN YOUR INDUSTRY?

When posed this question, our respondents expressed optimism about the ongoing advancements and endless possibilities of game technology. Many respondents are also looking forward to the increased efficiency and optimization that incorporating game technology into their workflows promises. Below we summarize the key responses and sentiments from each industry.

Gaming

- The improvement of free and open technologies
- New narrative tech
- Approaching actual realism
- AI for concepting
- The future of VR
- Creating joy
- The feeling of using state of the art tools that allow limitless creativity
- The advancement of visual design

Media and Entertainment

- Real-time iterations
- Speed and creativity
- Endless possibilities
- Placing talent in a virtual scene
- How fast we are approaching realism
- Experience
- Creative process

Education

- Collaboration
- Productivity tools
- Accessibility
- Excitement to learn
- Innovation

Engineering, Construction, or Architecture

- Visualization capabilities
- New technology
- Efficiency
- Graphic quality
- Innovation

Auto and Manufacturing

- Improved visuals
- Simulation
- Gen AI
- New tools
- Lower load times
- Graphic realism

Other

- Technology
- New use cases
- Changing behavior
- Learning
- VR
- AI

The New Work Culture

This year has brought a massive consolidation in the workforce—with the game development and media and entertainment industries being largely affected. In addition, capturing an audience's time and dollars is harder than ever, despite the rapid growth in budgets for AAA games and Hollywood films over the years. Companies are seen as making corrections in a post-COVID market, which has led to shrinking budgets and a desire to reduce resources.

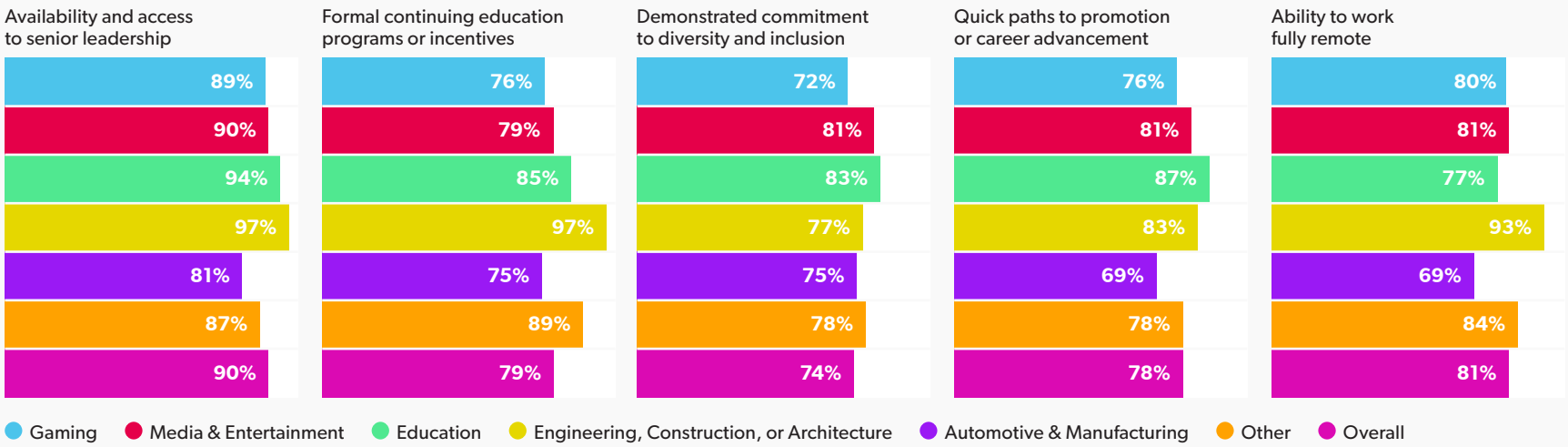
We've entered an era of doing more with less, and given this competitive job landscape, we also directed questions to managers and employees in different industries to help guide job seekers and employers. The following sections cover what potential employees value in a company, as well as the values and skillsets that managers look for in candidates.

WHAT THE WORKFORCE VALUES TODAY

The gaming industry had a tumultuous year in 2023, and the beginning of 2024 has continued with a wave of layoffs affecting creators at studios large and small. With many developers, artists, and designers looking for roles across industries, we wanted to know what those looking for work value in today's climate.

One interesting insight was respondents in every industry said availability and access to senior leadership mattered more than the ability to work remotely. This trend was especially relevant in our engineering, construction, or architecture segment (97%) as well as our gaming segment (89%), where access to senior leadership was noted as the most important factor.

PERCENTAGE OF RESPONDENTS WHO RATED THE FOLLOWING COMPANY OR MANAGEMENT TRAITS AS IMPORTANT



IN THEIR OWN WORDS

- "Any non-competing clauses. It is my opinion that an employer should only control the work that happens inside the company, and not after hours."
- "A company culture of working together, where mistakes are accepted and fixed instead of punished."
- "Work culture that values knowledge sharing and support."
- "Concern for the well-being and mental health of employees."
- "Openness to ideas…creativity, etc."

WHAT MANAGERS VALUE TODAY

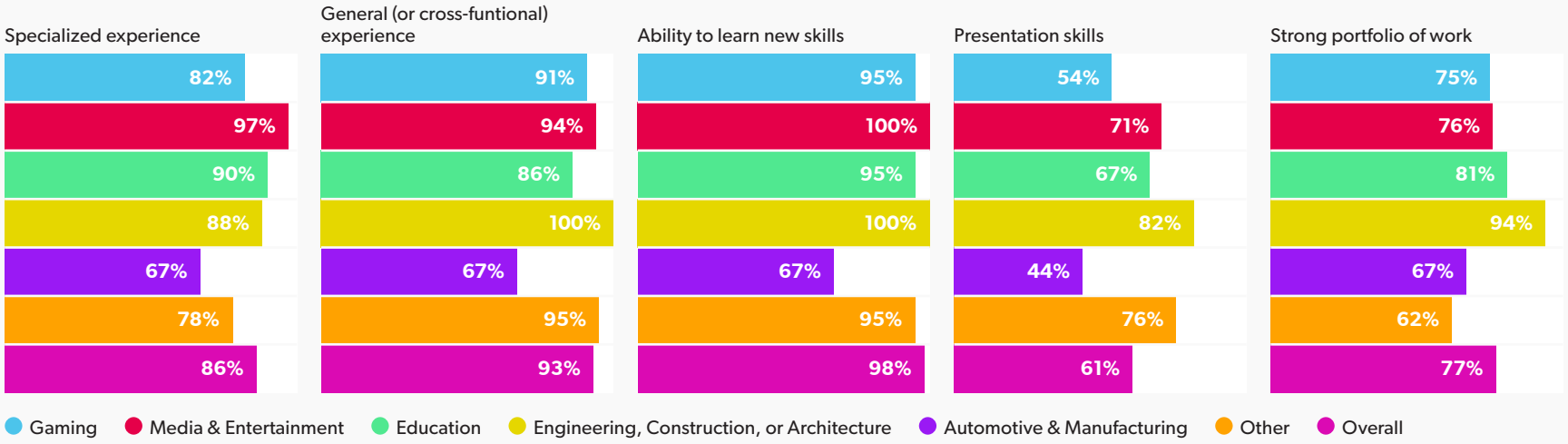
Finding the right role and right company fit is always a tough challenge. To help connect the workforce to the needs of organizations today, we asked respondents in a management position what they value from candidates they are aiming to hire.

Across the board, managers all rated the ability to learn new skills as the most important trait for new team members to possess, with 100% of M&E managers listing it as important. In the gaming industry specifically, managers strongly favored general (or cross-functional) experience over specialized experience.

IN THEIR OWN WORDS

- "Personality and adaptability"
- "Heart for what he/she does"
- "Communication skills and some evidence of commitment to craft."
- "The ability to offer strong and objective, yet respectful, opposition."
- "Attitude/flexibility - ties into the ability to learn, but it's more than that."
- "Grit. If you have this, you go to the top of the pile."

PERCENTAGE OF HIRING MANAGERS WHO RATED THE FOLLOWING SKILLS AND TRAITS AS IMPORTANT



Final Thoughts

The challenges organizations are facing are diverse and dynamic—ranging from increasingly complex projects and shifting consumer demands to economic uncertainty and an evolving work culture. Game technology offers a promising set of solutions, as game developers have consistently been trendsetters when it comes to exceeding consumer expectations.

Our report has highlighted the widespread impact of game technology across industries and the excitement around its innovation in fields like AI and digital creation. We believe that the companies who embrace this technology, and successfully build a strong set of foundational workflows, will be better positioned to navigate future industry shifts and drive innovation. We look forward to seeing how game technology continues to evolve and shape the way teams work across industries.

ABOUT PERFORCE

PERFORCE

The best run DevOps teams in the world choose Perforce. Companies can finally embrace complexity, achieve speed without compromise, and run their DevOps toolchains with full integrity. Perforce's suite of products is purpose-built to develop, build and maintain high-stakes applications. With a global footprint spanning more than 80 countries and including over 75% of the Fortune 100, Perforce is trusted by the world's leading brands to deliver solutions to even the toughest challenges.

HelixCore

Perforce Helix Core is at the center of development across industries, from gaming and VFX to semiconductor and automotive. Your team might know Helix Core as the enterprise-grade version control system trusted by Fortune 500 companies and award-winning studios, but it goes beyond versioning.

Helix Core is a platform that offers an integrated suite of tools for studios and teams who need it all: a way to plan their workflows, manage and review their assets, and bring their visions to life at any scale.

EXPLORE THE HELIX CORE PLATFORM

CLOUD
HelixCore

Designed for teams under 50, Helix Core Cloud is entirely managed and hosted by Perforce. It's the same version control trusted by top game studios, semiconductor firms, VFX houses, and other industries that push the limits of scale — available for the first time as a monthly subscription through the Azure Marketplace.

GET HELIX CORE CLOUD

ABOUT JETBRAINS

JetBrains game development solutions empower studios around the world to build games faster and with fewer bugs. Boosting code quality and streamlining development pipelines, JetBrains tools ensure fast delivery to market. Companies like Tencent, Ubisoft, Epic Games, Unity, and others rely on JetBrains game development solutions to optimize their workflows, maintain robust codebases, and bring innovative games to players more efficiently.

JetBrains Rider is one of the most loved IDEs among game developers. It's popular both among indies and in AAA studios, bringing value and speeding up the game creation process. Rider covers top game engines, helps you drive gameplay and shader development, and integrates with JetBrains' CI/CD solution, TeamCity. Other JetBrains IDEs, like IntelliJ IDEA, PyCharm, CLion, and WebStorm, are also widely used by game developers.

DOWNLOAD RIDER

TeamCity is one of the most popular CI/CD tools for game development. It integrates seamlessly with major game development tools like Unity, Unreal Engine, and Perforce, ensuring your projects run smoothly and efficiently. With TeamCity, you can establish a complete pipeline for building, testing, and releasing your games, no matter which tools you rely on in your production workflow.

GET STARTED WITH TEAMCITY

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As Director of Product Marketing - Media & Gaming, Chris sits at the intersection of communications and product experience for the Perforce Digital Creation and Collaboration Suite. A leader in the rapidly evolving gaming and media space, Chris works with game developers, VFX artists, producers, and technical directors to understand their unique challenges and perspectives. Chris started his career as an electrical engineer at IBM and enjoys using the power of human-centered design to solve complex business initiatives.

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Brad is responsible for the product strategy of the Helix Core platform – an integrated suite of tools that includes Helix ALM, Helix DAM, Helix IPLM, Helix Plan, Helix Swarm, and all related Helix Core clients and plug-ins. He also leads the Sales and Solutions Engineering team for Digital Creation.

With over two decades of experience in leadership roles at high tech companies, Brad has become an expert in optimizing development pipelines. His specializations include software engineering process, design, and implementation.

Editor Biographies

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Brent oversees the version control portfolio at Perforce. He loves being at the intersection of customers and software development teams, especially when there are hard problems to solve. In his spare time, he enjoys spending time with his family, staying active, and anything that has to do with the sport of hockey.

JASE LINDGREN

Visual Effects Specialist and Senior Solutions Engineer for Helix Core, Perforce Software

Jase is passionate about all things VFX. Being involved in the film and television industry for over a decade, he has worked on projects that have been viewed by people around the world. With Perforce, Jase is helping transform workflows, providing VFX, animation, virtual production, and game developers with the tools to improve productivity and quality-of-life in future projects.

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