



PLURALSIGHT

REPORT

Tech in 2021

The top three trends impacting
technology teams in 2021 and beyond

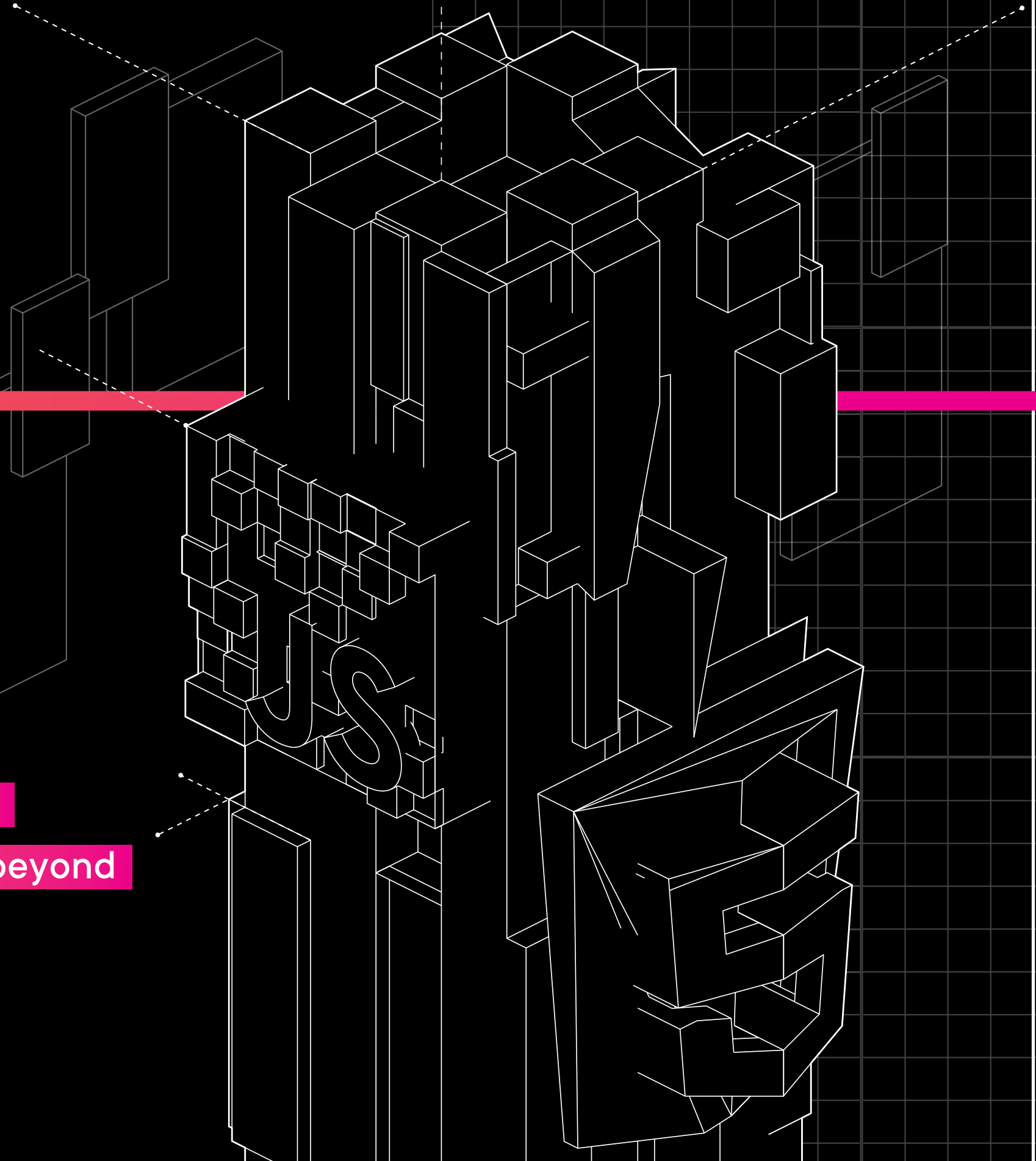
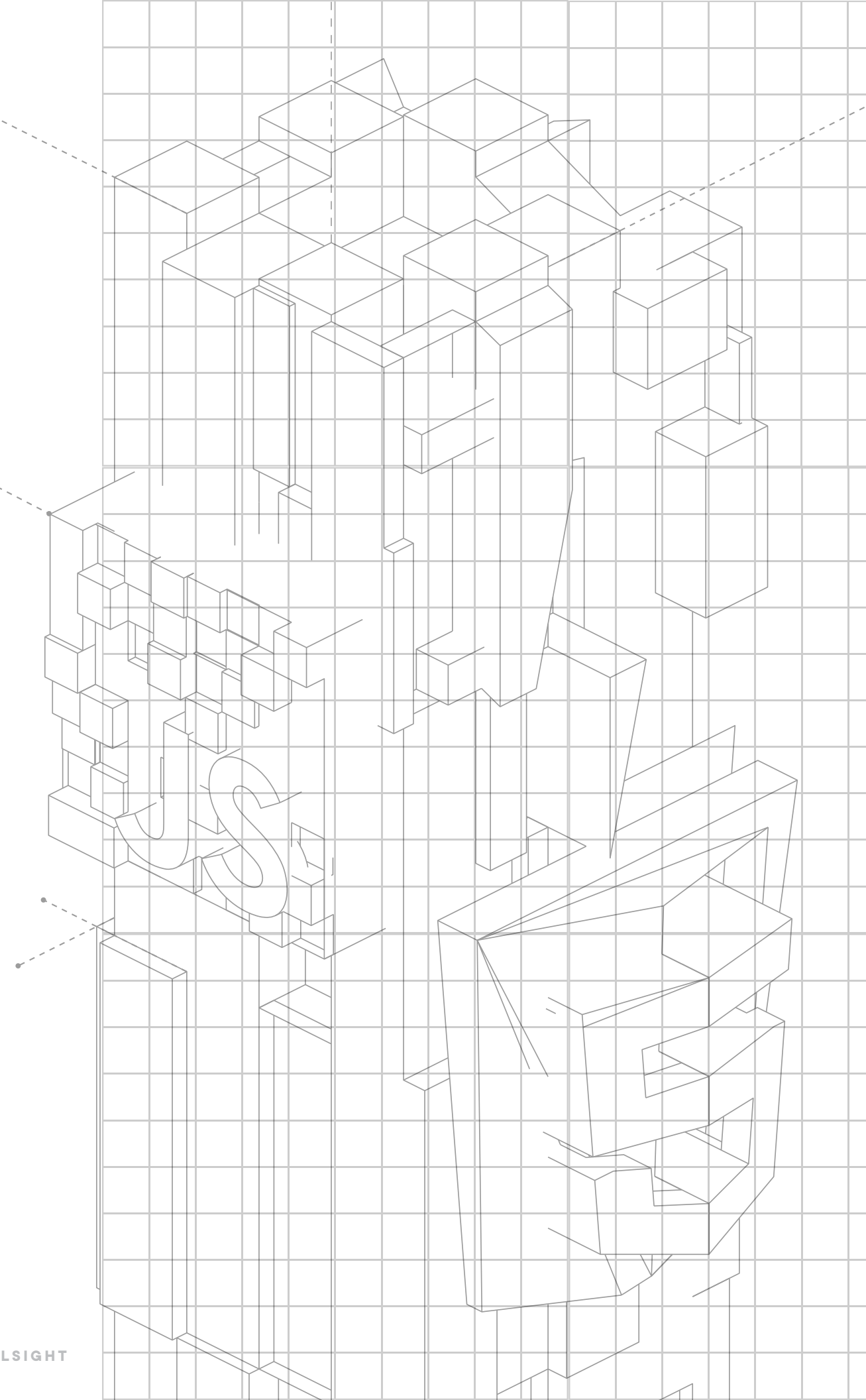


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Overview

If 2020 demanded we question the way we work, 2021 will demand answers. Last year caused us to reimagine how we see ourselves, our teams and our businesses. It forced us to evaluate our priorities and perceptions. It changed what we need to know and how we need to work together. And how technology teams respond will widen the gap between the leaders and the laggards to an insurmountable divide.

Forrester predicts as many as 20% of the Fortune 500 won't make it through 2021 intact.

[Forrester: Predictions 2021](#)

We looked at trends born from, or accelerated by, the global COVID-19 crisis to report on the state of technology and give leaders guidance on how to build better teams, processes, and products in the year ahead.

47%

of CIOs say the pandemic has permanently accelerated digital transformation and the adoption of emergent technologies.

[Harvey Nash/KPMG CIO Survey 2020](#)

Top trends for 2021

Shifting priorities and greater investment despite economic downturn



Three new priorities emerge from the pandemic

The shift to remote work and digital everything in 2020 forced change at a pace we've never seen before. Companies had to both abruptly shift their workforce and their product/service delivery models to accommodate health and safety measures imposed by the global pandemic. We see this evident in the challenges the C-suite is focusing on, where they're investing, and what technology teams are now responsible for.

The pandemic caused a necessary shift in priorities for the C-suite. Before COVID-19 more technology executives were focused on operational efficiency, customer engagement and developing new products and services. This has changed now to include a focus on workforce enablement.

Spending changed dramatically to adapt to new customer expectations and market conditions. Spending on digital transformation increased in 2020, with 83% of companies planning to accelerate their efforts, and 65% expecting to increase the amount they're investing in 2021—despite the economic downturn, [according to BCG](#).

And, the COVID-19 crisis exposed gaps in what teams need to know and how they need to work to succeed. Teams are being challenged to step out of their comfort zones. In fact, [AppDynamics reported](#) that 64% of technologists are now being asked to perform tasks and activities they have never done before.

We're seeing technology organizations shift spend and resources to tackle three main priorities in order to succeed in 2021 and beyond:

1 Workforce transformation

Improving the workforce's ability to adapt

2 Tech modernization

Increasing agility and flexibility, decreasing risk

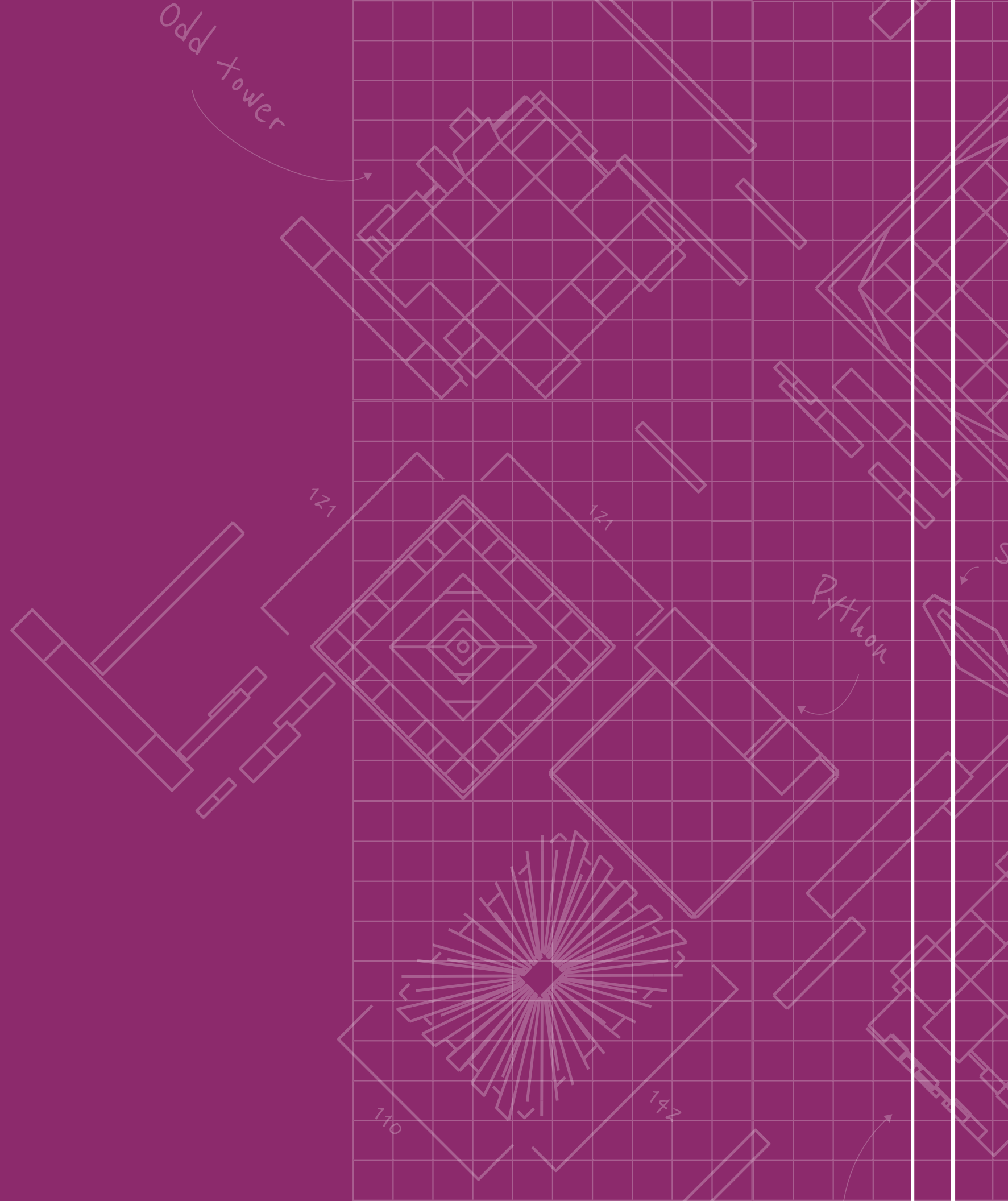
3 Digital acceleration

Delivering on a digital customer experience to accelerate revenue

1

Workforce transformation

Improving the
workforce's ability to
adapt



Empowering the workforce of the future

According to the [2020 Harvey Nash/KPMG CIO](#) survey, workforce enablement has jumped from the 8th priority for CIOs to a top priority. Other workforce challenges—including out/insourcing, off/onshoring, acquisitions and more—are still on the C-suite’s radar, but thriving in 2021 will require keeping teams engaged, productive and adaptable to ever-changing circumstances.

Remote work will remain at a minimum of 300% of pre-COVID levels in 2021.

[Forrester blogs Predictions 2021: Remote Work, Automation, And HR Tech Will Flourish By David Johnson 29 Oct 2020](#)

In 2021 organizations need new ways to continue to empower distributed teams to adapt to new practices and processes. There are four key practices for teams to unlock greater adaptability.

- 1 Enable remote work long term**
- 2 Create a tech skills strategy**
- 3 Improve team productivity**
- 4 Move to modern software development**

LEADER TIP:

Leaders need to make sure their teams know they are working on work that matters. Capitalize on the opportunities to drive engagement and retention—visibility is required to coach your teams to success.

1 Enable remote work long term

Technologists have been forced to rapidly adapt to new collaboration and delivery models. IT teams supported a mass surge toward remote work, with many organizations now operating in a 100% virtual environment. High-performing Agile teams also suddenly became remote. That abrupt transition disrupted the flow of Kanban and the regular cadence of Scrum for product teams.

In one form or another, work from home is here to stay—but it doesn't need to remain a disruption. In fact, developer activity in 2020 remained largely consistent and productive compared to 2019. Engineering teams using Pluralsight Flow were able to see a +5% increase in productive code throughput globally in 2020. This suggests that developers continue to contribute and show resilience in the face of uncertainty.

Employers would be well advised to embrace remote work for the long term and capitalize on the learnings from the sudden shift. It's more important than ever to have data on your team's workflow efficiency to empower them to continue to contribute remotely. Now is the time to provide tools that allow your team to collaborate effectively and offer visibility into the data behind their work. Know what [patterns to look for](#) so you can course-correct quickly, should output drop.

Fast Facts

21%

In 2021, at least 21% of US information workers will work primarily from home, compared with 7% in 2019.

[Forrester Predictions 2021, Forrester Research, Inc., October 2020](#)



One-third of Europe's white-collar workers are expected to remain remote full-time in 2021.

[Forrester European Predictions 2021, Forrester Research, Inc., October 2020](#)

48%

Over 48% of Asia-Pacific managers surveyed during the pandemic anticipate a permanently higher rate of full-time, remote employees.

[Predictions 2021, Accelerating Out Of The Crisis, Forrester Research, Inc., Oct 2020](#)



More than half of IT team time is being spent solving challenges linked to this new way of working.

[AIT Newsdesk, June 2020](#)

2 Create a tech skills strategy

Technologists are being asked to do more with fewer resources, with many taking on tasks they've never done before in a completely new way of working.

Tech leaders need a tech skills strategy that provides confidence and predictability in their ability to execute on company goals. Enable your workforce with the resources they need: upskilling methods and measurement tools directly related to these new demands.

In 2021 it will be more crucial to help your teams upskill so they can deliver on key initiatives. Delivering holistic resources to your teams will accelerate skill mastery; they should be able to learn at their own pace, on-demand, with opportunities to practice and apply skills in a risk-free environment with hands-on labs. They'll need clarity from leadership on what the business is trying to achieve, and skill development plans that are aligned to those initiatives and personalized to the learner.

Upskilling your team needs to happen quickly to keep up with business needs. Data from Pluralsight Skills suggests that users are able to progress from one skill level to the next, on average, in 70 days.

Fast Facts

35%

of tech leaders expect online learning spend to increase considerably in the next six months.

[Pluralsight Marketing Customer Survey, 2020](#)

2/3

Almost two-thirds of technologists are now being asked to perform tasks and activities they have never done before.

[AppDynamics, May 2020](#)

70

Days it takes on average to progress from one skill level to the next: 70 days

[Pluralsight Skills, 2020](#)

SKILLS

Novice to Proficient: **56 days**

Proficient to Expert: **90 days**

3 Improve team productivity

Technologists have figured out WFH. Productivity hasn't dipped, and in most cases, it's up, and delivery has been expedited. In most cases productivity eventually increased as a result of the transition to remote work, especially in the U.S.

Data from Pluralsight Flow backs this up—we saw additional positive impacts through the immediate 6 months after April 1st, including: Uplift in commits per week +12%, productive throughput +5%, and a largely intact regular work day (indicated by commits by hour).

But in some instances these productivity gains have begun to wane, perhaps driven by technologists who report an increase in work while in quarantine. To address these concerns and tackle challenges with employee well-being, many employers report that they plan to take steps toward creating a greater sense of community and developing stronger connections between employees.



Insights from aggregated Flow data

	PRE-Covid	POST-Covid	Change
Weekly code commits per dev	6.05	6.77	+12%
Weekly Lines of Code per dev	549	589	+7%

Fast Facts

45%

of software developers say they are working more while in quarantine.

[Coderbyte, April 2020](#)

59%

A majority of respondents, 59%, said their software teams are significantly or somewhat more productive than pre-pandemic.

[Accelerated Strategies, The Future of Remote Work and Software Development, 2020](#)

40%

By 2022, 40% of the Fortune 500 will reengineer culture and collaborative practices—shifting from authorized to empowered teams, which are then measured by metrics aligned to team success.

[IDC FutureScape: Worldwide Developer and DevOps 2021 Predictions, October 2020](#)



One third of all employers expect to take steps to create a sense of community, connection and belonging through digital tools.

[World Economic Forum, The Future of Jobs Report, October 2020](#)

4 Move to modern software development

Forward-thinking and bold companies will take full advantage of the current climate around change that was ushered in by the pandemic. Change agility—the willingness and ability to alter and improve processes—is at an all-time high. People understand, now more than ever, that change happens whether they like it or not, and whether they’re ready or not, and it’s best to start adapting and adopting new ways of working sooner rather than later.

Software development leaders who have previously thought about switching to Agile should finally pull the trigger in 2021. To be clear, they have to be prepared for this change; leaders still need to build awareness and sell the idea to their development teams, then invest the right amount of [resources](#) to ensure everyone is properly trained. Resistance to the change, however, should be a lot easier to overcome, thanks to 2020 chipping away at perceived notions about what changes cannot succeed. If a team can survive—and even thrive in—a global pandemic, where nothing went as planned, they have the ability to adopt Agile successfully.

Fast Facts



Agile adoption is up with 46% of respondents stating they are using cross-functional teams, 55% practicing daily stand-up meetings and 43% automating tasks.

[Accelerated Strategies, 2020](#)

2

Tech modernization

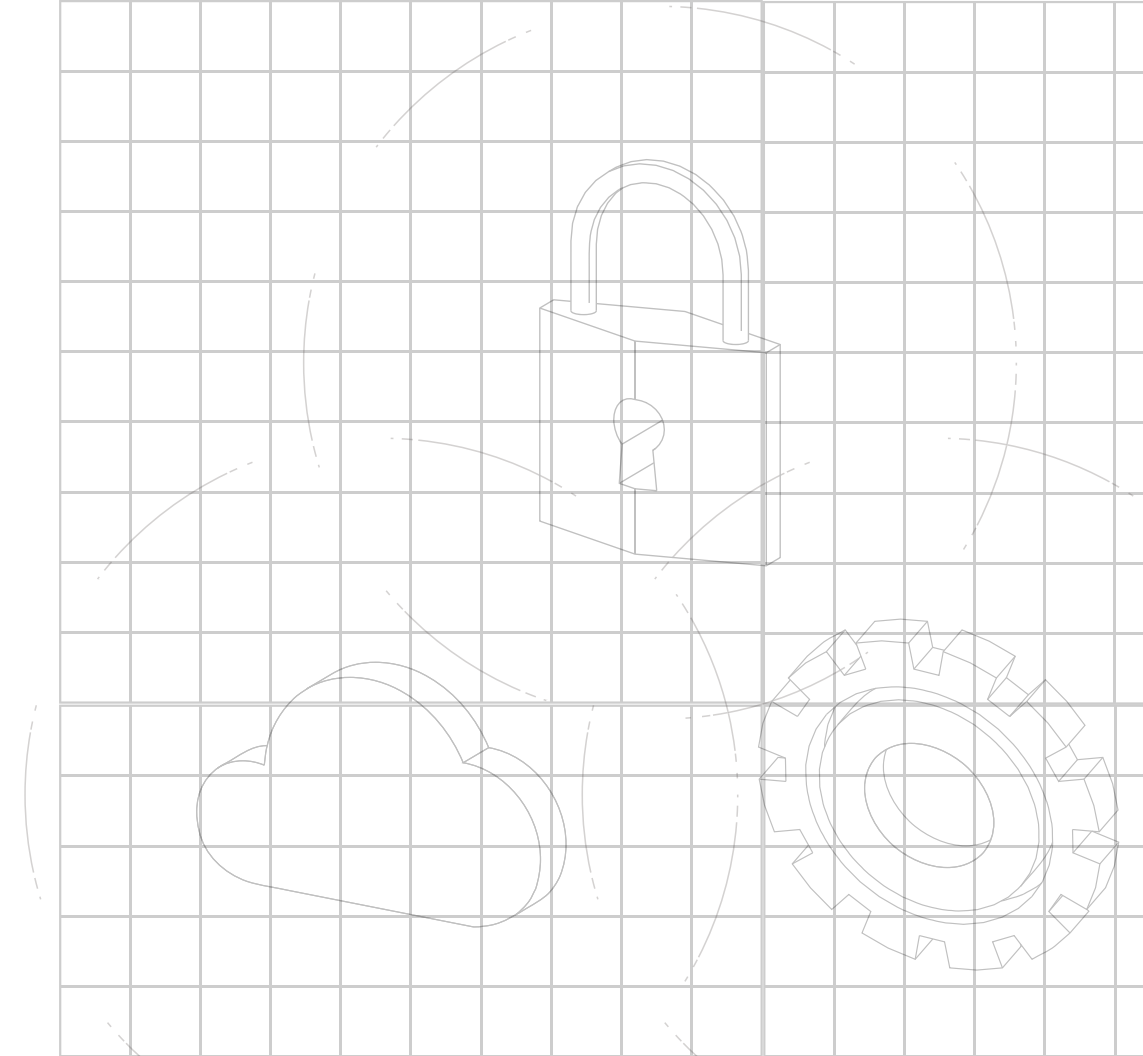
Increasing agility
and flexibility,
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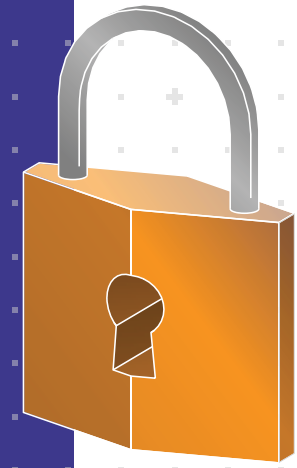
The time to modernize is now

2020 expedited the need for organizations to modernize their infrastructures. Updating legacy processes and systems became even bigger hurdles to scale, but necessary to laying the groundwork for future innovation.

As companies invest more heavily in areas that will allow them to take full advantage and realize the value of new technologies and processes in 2021 and beyond, expect to see even more prioritization toward security, cloud and automation, three of the top five most-important CIO priorities for 2021, according to the most recent [Harvey Nash/KPMG CIO Survey](#). Tech debt and microservices will also play a role in separating the leaders from the laggards in 2021.



Security	Cloud migration	Automation	Tech debt	Microservices
<p>Security needs change drastically when people work from home, stressing VPNs not only for capacity but for additional safeguarding as well.</p>	<p>Engineers aren't in person pushing software to on-prem environments, or if they are, it's over a slower VPN connection. The cloud offers the benefit of being accessed from anywhere.</p>	<p>Engineers are being asked to do so much more now that automating processes will allow them to focus on the additional tasks required of their roles.</p>	<p>While quickly adapting to customer needs during the pandemic, some companies incurred even greater technical debt. Reducing tech debt will be critical to unlock speed and scale in the long term.</p>	<p>Customer expectations are shifting to demanding new features be released more frequently. Companies increasingly use microservices and containers as foundations for stronger and higher-performing automation.</p>



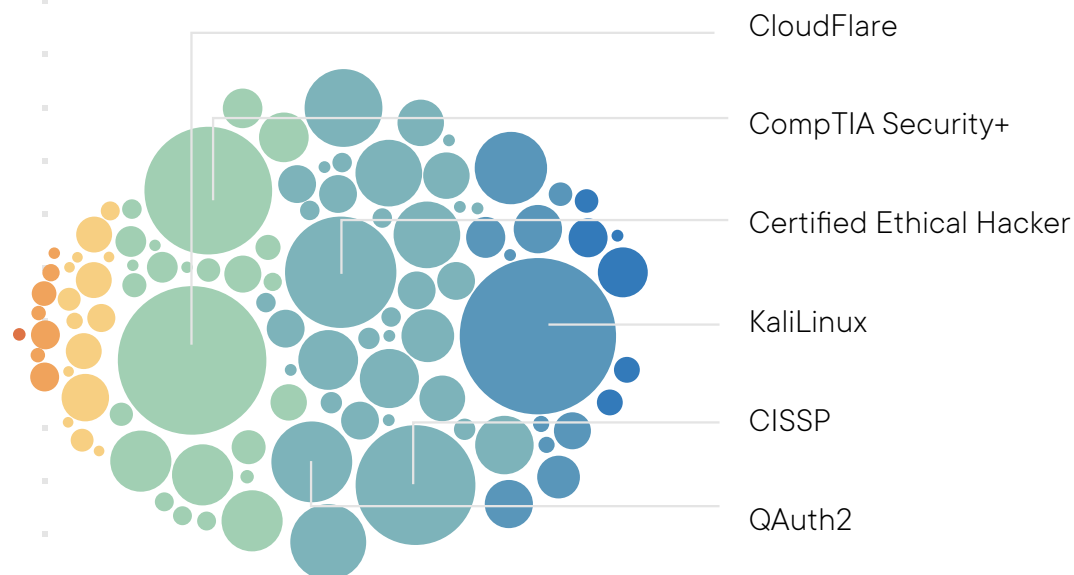
Security

Already a top concern because of increased incidents and threats, data privacy laws and customer awareness, cybersecurity remains a target investment for companies in 2021.

The shift to distributed work and an increased investment in cloud technologies created additional cybersecurity needs around identity, access management and network security.

There were several high-profile security breaches in 2020, and none loom quite so large as the supply-chain attack on Solarwinds. Based on the breadth and depth of the breach’s impact, 2021 is the year to take a hard look internally and start to tighten up security practices. Concepts like DevSecOps need to be brought into the fold, while also looking to apply fundamental security constructs to your cloud real estate.

Top security technologies according to the [Pluralsight Technology Index](#)



Fast Facts

41%

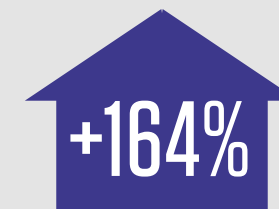
of organizations experienced an increase in cybersecurity incidents due to remote working in 2020.

[Harvey Nash/KPMG CIO Survey 2020](#)



Cybersecurity expertise became the most in-demand skill set of 2020.

[Harvey Nash/KPMG CIO Survey 2020](#)



The fastest-growing cybersecurity skill is Application Development Security, predicted to see a 164% increase in available positions over five years.

[Forbes, November 2020](#)



Cloud migration

Organizations are adopting the cloud at an impressive rate. So much so, that according to Gartner, worldwide public cloud service revenue will grow to \$331 billion by 2022.

The two most important things companies need to consider regarding their cloud strategies in 2021 are multicloud and, once again, security.

The vast majority of companies either are or will be running a multicloud infrastructure. It might happen through acquisition, a desire to use best of breed technology, or a shadow IT project that is now critical production. Regardless of how it occurs, multicloud is the reality and companies need to plan for it. The first step is acceptance, and the second step is governance. Companies need to figure out how to manage consumption of each cloud. Leaders need to start looking for multicloud toolsets than enable continuous delivery of infrastructure and applications, governance over cloud services and cost, and monitoring for performance and security.

Which leads to the second point: security.

In some ways, the marketing from public cloud vendors worked too well—allaying concerns about public cloud security. Despite providing infrastructure and platforms as a service, cloud providers cannot and will not do all of an your security hygiene. It's time for organizations to get the security team involved in a constructive way that improves their security posture without sacrificing developer productivity.

To that end, organizations need to continue to [mature their cloud strategies](#), ensuring that they have the right organizational design, skill development and processes in place to realize value.

Fast Facts

80%

of enterprises will put a mechanism in place to shift to cloud-centric infrastructure and applications twice as fast as before the pandemic.

[Gartner, July 2019](#)

75%

By 2022, 75% of all databases will be deployed or migrated to a cloud platform, with only 5% ever considered to repatriation to on-premises.

[Gartner, The Future of the DBMS Market Is Cloud, June 2019](#)

60%

By the end of next year, 60% of companies will leverage containers on public cloud platforms, and 25% of developers will leverage serverless.

[Forrester, October 2020](#)

52%

increased their progress on migration to cloud service providers (AWS, Azure, Google Cloud Platform).

[Accelerated Strategies, 2020](#)



Automation

According to [IDC](#), “In 2021, organizations will be simplifying the development experience by empowering developers to spend more time on writing code, and less time working on tasks that can be automated.”

[IDC Market Analysis Perspective: Worldwide Developer Demographics and Development Trends, 2020, Doc # US45929820, Sep 2020](#)

In addition to helping identify and fix security problems faster, improvement in tooling and process will make software development faster. Continuous integration and deployment systems will increase the velocity of software releases. Automated creation of environments in the cloud and automated testing systems will free up time for developers to create instead of diagnose. The combination of these tools means better products released sooner.

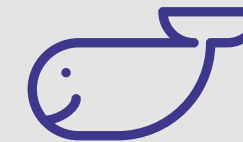
Fast Facts

2019 17/72

2020 45/55

In 2020, 45% of all IT automation technologies were in deployment with the remaining 55% in pilot. This is a drastic change from 2019 when 17% of IT automation technologies on the roadmap were in deployment and 72% were in pilot.

[Gartner, 2020](#)



By 2024, nearly 60% of new applications will be built and managed using microservices and containers as foundations for stronger and higher-performing automation.

[IDC FutureScape: Worldwide Developer and DevOps 2021 Predictions, Doc #US46417220, Oct 2020](#)

1/3

More than a third of developers will use machine learning in 2021 to automate development activities.

[Forrester blogs Predictions 2021: Software Developers Face Mounting Pressure By Jeffrey Hammond 30 Oct 2020](#)



Tech Debt

For all organizations, tech modernization will also mean paying down technical debt. The cycle of doing things “quick and dirty” and subsequent tech debt has always been a reality, and poor management of it only further hampered the ability for many companies to compete in the tumultuous 2020 landscape.

IDC reports seeing IT and business stakeholders regrouping as they move into 2021–2022 to address problematic design, quality and security issues that were not thoughtfully or judiciously addressed during 2020. “We expect organizations to continue with remediation efforts through 2021 into 2022 to address technical debt incurred during the pandemic and its aftermath, including design and architectural reviews, continuous quality reviews, and code and security analytics,” [IDC predicts](#).

Fast Facts

70%

of CIOs say coping with technical debt that accumulated during the pandemic will shadow them through 2023 causing financial stress, inertial drag on IT agility and “forced march” migrations to the Cloud

[IDC FutureScape Highlights What Will Happen Next as Enterprises and the IT Industry Respond to the Disruptions Caused by COVID-19, Doc #prUS46963620, 27 Oct 2020](#)

Organizations will need to reduce their tech debt so they can accelerate and scale offerings for the long term. **We recommend improvements or adjustments in four areas:**

Automation

Time saved doing repetitive tasks can be used to work on tech debt.

Coding

Increasing skill level of developers helps with reducing tech debt.

Visibility

Cloud services provide increased visibility to help identify bottlenecks and problems.

Testing

Automated testing finds problems faster and exposes tech debt.



Monolith to microservices

Increasing use of microservices architecture will continue in 2021. Due to the loosely coupled and independent design of microservices, they're easy to maintain and test. This fits well with emerging DevOps practices and today's fast-paced product development, so organizations are adopting microservices to maintain a competitive advantage.

This shift to microservices is driven by a need to iterate quickly and empowered by cloud services. Major cloud providers are making resilient, easy-to-implement cloud offerings that make migrations and new development more attractive than ever.

Microservices are not a “silver bullet” and are not the best fit for every application. Crucial skills are needed to analyze and determine which if any microservice solution is right for the problem.

Fast Facts

60%

of organizations' new custom-developed applications will be built and managed using microservices and containers as foundations for stronger and higher-performing automation by 2024.

[IDC FutureScape: Worldwide Developer and DevOps 2021 Predictions, Doc #US46417220, Oct 2020](#)

workfront

Transitioning to microservices without sacrificing engineering team culture

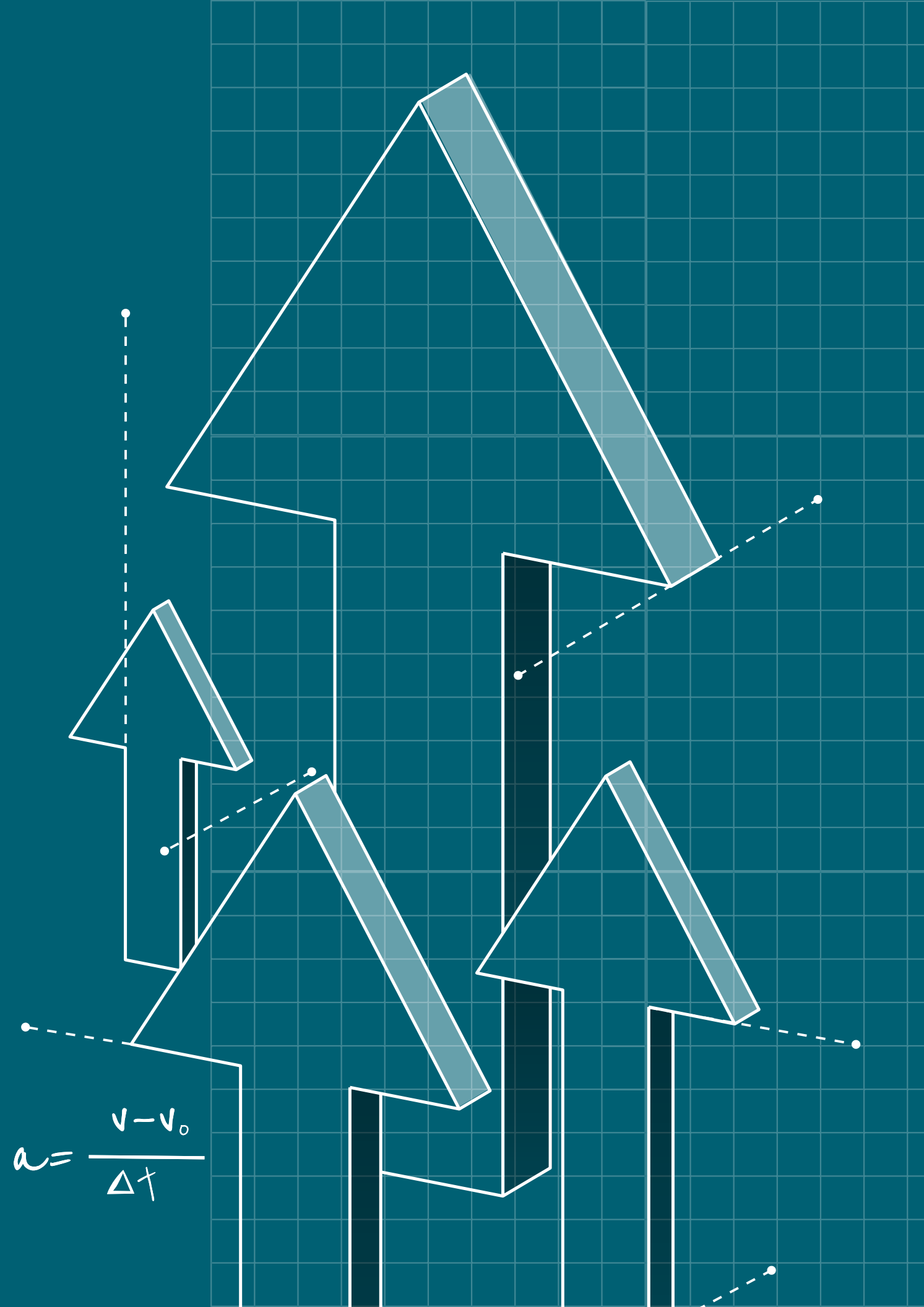
Learn how Workfront was able to break their current monolith software structure into a microservice model while improving the teamwork and coordination across their engineering team.

[Watch the video »](#)

3

Digital acceleration

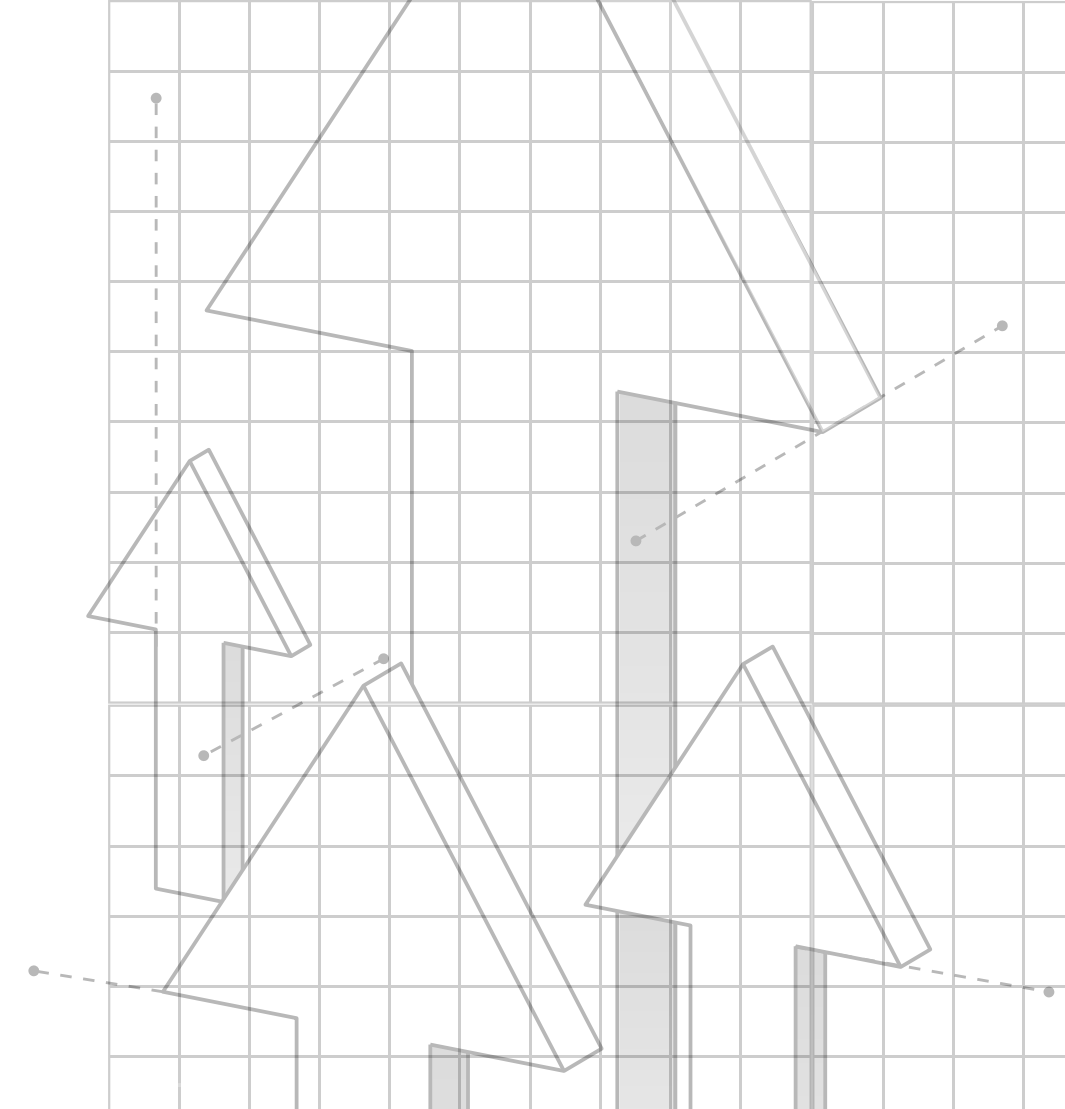
Delivering on a digital
customer experience to
accelerate revenue

$$a = \frac{v - v_0}{\Delta t}$$
An abstract graphic on a dark teal background with a light teal grid. It features several white-outlined geometric shapes, including triangles and rectangles, some of which are filled with a light teal color. Dotted white lines connect various points across the shapes, creating a sense of movement or a path. The overall style is clean and modern.

Dramatic shift in customer needs creates opportunity for innovation

According to the [Harvey Nash / KPMG CIO Survey](#), the demand for digital customer experiences is greater than ever, rounding out the top three most important technology investments for the C-suite in 2021. Partly due to the COVID-19 crisis and the momentum that digital transformation efforts already had going into 2020, companies need more ‘hands off’ ways to facilitate seamless interactions between their products/services and their customers. This will require that tech teams speed up development and embrace new languages, frameworks, tools and processes. Perhaps more importantly, it will require organizations to be willing to try new technologies and capabilities, and throw them away if they don’t work. Is a mobile app right for you? Are bots right for you?

Once again, the answers will vary according to where your organization is in the maturity of your digital transformation. Less mature organizations are held back by legacy systems, limiting the ability to accelerate customer offerings. More mature organizations are able to focus on technological investments that improve the digital experience and create revenue—including AI/ML, big data and analytics and other emerging technologies such as 5G.



LEADER TIP:

In 2021, organizations have to be willing to step out of their comfort zones to push the boundaries on the new digital customer experience—a difficult thing to do given the shakeup that occurred in 2020, but more important than ever.

Tools to consider for digital acceleration



Artificial intelligence and machine learning

AI and ML add value to customer experiences and are now almost a necessity to remain competitive. Maturation of AI/ML algorithms open the door for more uses (look at GTP-3 for some mind opening examples). Also expect a big focus on automation for everything from productivity tools, applications and manufacturing due to AI and RPA, where a combination of the two accelerates value.

2021 will likely see increases in the popularity and prevalence of drag-and-drop ML modeling tools as well as no-code and low-code visualization software. More technologists will have the opportunity to build their own ML models or visualization dashboards, as data is now less likely to be siloed and more likely to be available in curated, easy-to-use repositories inside organizations. They also have more motivation to do so now, as remote working arrangements became commonplace and they're experiencing more independence in terms of working with data.



Big Data and analytics

How organizations think about scaling their data infrastructure remains key in 2021, with even more organizations choosing to modernize their data and analytics stack: shifting from custom code data integrations to help manage ETL processes to managed ingestion services like Fivetran and Stitch to enable ELT; making data for analytics more available and cost effective by shifting to a cloud-based data warehouse like Snowflake or BigQuery; and lastly, increasing focus on the governance of analytics and models in order to ensure data-driven processes and systems are consistently monitored for optimal outcomes.



Emerging tech (i.e. 5G)

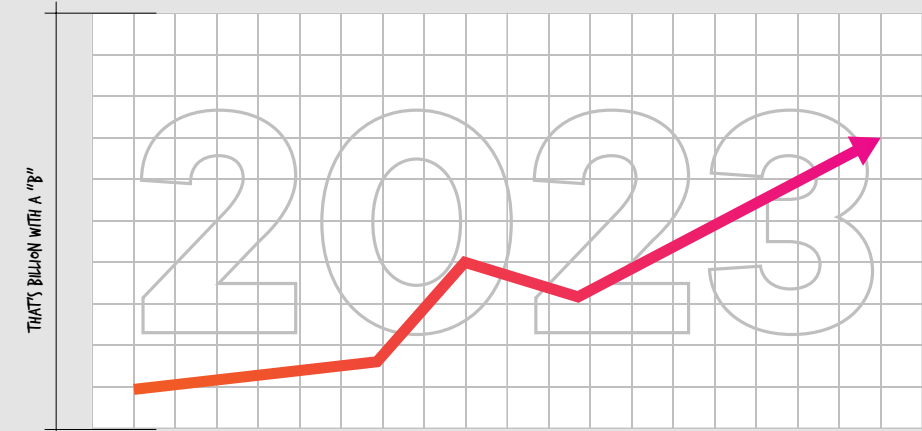
Expect to see the continued growth of edge computing powered by the roll out of 5G networks and all the opportunities created with lower latency and higher speed/bandwidth. We'll also continue to see open conversations around the ethics and value of technologies as tech and society are woven together at a global scale. 2021 is shaping up to be another big year of tech growth.

Conclusion

In total, technology trends for 2021 point to a clear opportunity. Delivery speed and volume were expedited in 2020, bringing a sharp focus to workforce transformation, tech modernization and digital acceleration as top priorities for the year ahead. Leaders and teams that focus on technology skill development, maximizing remote work, fostering community and ensuring productivity will be able to more quickly deliver better products and solutions to their customers. Because at the end of the day, stronger technology teams mean happier customers.

Start preparing your teams now to ride the next wave of transformation.

Fast Facts



In 2023, \$30 billion in revenue will be generated by products and services that did not exist pre-COVID-19.

[Gartner, Nine Predictions for Technology and Service Providers in a World of Turmoil, August 2020](#)

verizon^v

The foundation of Verizon's network of the future: Skills

See how Verizon doubled down on digital acceleration for better customer experience and workforce engagement.

[Watch the video »](#)



Pluralsight is the tech workforce development company that helps teams build better products by knowing more and working better together. Using our Skills product, teams can consistently deliver and quickly adopt new tools by building critical tech skills. Our Flow product gives engineering teams actionable data to improve workflow efficiency. And our professional services help you develop a strategy for the future, overcome roadblocks and customize your team's experience.

Build Better

