

# Upskilling in Crisis — Elevate Your Skills With Continuous Learning: A Gartner Trend Insight Report

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Initiatives: [Data Center Infrastructure for Technical Professionals](#); [Application Architecture and Platforms for Technical Professionals](#); [Application Development and Platforms for Technical Professionals](#); [Business Analytics and Artificial Intelligence for Technical Professionals](#); [Data Management Solutions for Technical Professionals](#); [Identity and Access Management for Technical Professionals](#); [Security and Risk Management Programs for Technical Professionals](#); [Security Technology and Infrastructure for Technical Professionals](#)

Technical professionals must take advantage of the “pandemic pause” to elevate their skills to help their organizations adapt and evolve the business model to cope with the changing times. This special report gathers a range of research that will help the upskill process.

## Overview

### Opportunities and Challenges

- Making time for training was a long-standing struggle in the “old days” (aka prepandemic). It’s time to squash the mindset that the enterprise can’t afford to have productive people take time away from their work.
- Technical professionals will find new roles they may be interested in training for, especially within the machine learning and artificial intelligence landscape.
- Security and risk management technical professionals are in high demand, especially as more and more organizations move their operations to the cloud and have more employees working remotely.
- Application architects and developers must continue to reskill as they confront rapid changes in technologies and business needs that require more agility and innovation.

### What You Need to Know

- Reset learning goals. Be clear that reskilling helps future-proof careers and, on a larger level, enables the enterprise to exit a crisis stronger.
- Embrace learning opportunities. Look at any downtime or pause after a global event as a time to upskill and reskill for the enterprise’s return to growth. Downtime becomes learning time.

- There will be new business objectives across the enterprise after a crisis; be agile to accept that and equip yourself with new skills.

## Insight From the Experts

### Digital Heroes Need Training, Too



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The COVID-19 pandemic has truly turned our world upside down, throwing us into a constant state of volatility, uncertainty, complexity and ambiguity — a VUCA world. This new world resets our perception of heroes away from comic books to first responders (especially healthcare professionals) battling the disease on the front lines and saving lives. Those heroes are putting their lives on the line to save ours. However, there are others who are contributing to the fight and empowering those front-liners with the tools and technology that are making a huge difference. That's you.

As Microsoft CEO Satya Nadella said, "We are the digital first responders to all the first responders." <sup>1</sup> You are all the digital first responders. Your architecture and infrastructure are deployed to empower medical professionals, enable supply chains and logistics to continue to flow and allow many of us to work remotely from the safety of our homes (see Notes 1 and 2). Your technology and infrastructure in the form of AI and analytics are being leveraged to find a vaccine. Your technology is being used to develop applications to securely enable contact-tracing while respecting personal privacy.

Think of all the technology and infrastructure used every single day behind the scenes to enable all of us to preserve our way of life and emerge out of this pandemic. From cloud computing to artificial intelligence/machine learning (AI/ML), data and analytics, cybersecurity, and modern application development. The technology we have built over the years, leveraging all the best practices for scalability and availability, has ensured reliable networks and collaboration that keeps us close to each other while we are far from one another.

As we begin to emerge out of this pandemic pause, it is important to stay ahead, keep your skills sharp, learn new ones and realize the knowledge you had before is not going to be enough as the world “unpauses.”

**Respondents to the 2020 Gartner Technical Professionals Survey were asked to rate the quality of their organizations’ skills for implementing and delivering results with various technologies. They said eight of the nine technologies listed, on average, were “Poor/Weak” and “Average.” Poor/weak skills were reported in multiple disciplines, including artificial intelligence (53%), edge computing (50%), serverless computing (49%) and containers (34%).**

Therefore, now is a great time to elevate your skills and prepare for what is to come next. As you were digital first responders during this pandemic, let’s make sure you build the technology for whatever comes next.

We gathered Gartner for Technical Professionals (GTP) research featured in this special report with the goal of providing you the knowledge and actionable steps to take to elevate your skills while you stay safe.

Please note, we use the word “upskill” to include any training or professional development that would either raise skills for your current role or increase your skill set to take on another role within your organization.

*Kind Regards,*

*Elias Khnaser, Patrick Hevesi, Carlton Sapp, Brad Dayley*

## **Executive Overview**

### **Definition**

Whether it's the immediate impact of a viral pandemic, economic recession or new competition from external disruptors, organizations across the globe may face some level of uncertainty. During this COVID-19 pause, technical professionals should make time to assess their skills and identify any gaps. With this assessment in hand, they can train up for any new roles and responsibilities that may arise as this "reset" period ends with a recover and renew phase showing light at the end of the tunnel.

Figure 1 lists roles and associated skills that technical professionals can train up for.

**Figure 1: Technical Professionals May Consider Upskilling for These Roles**

### Technical Professionals May Consider Upskilling for These Roles



Source: Gartner  
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**Every technical professional should be asking "Do I have the essential skills to survive in a postpandemic economy?"**

This special report brings together four GTP research topics for technical professionals to better understand — and importantly to act now on — the new skills that will be required for the "new normal":

- Infrastructure, operations and cloud
- Data and analytics
- Cybersecurity

## ■ Application architecture and development

At some point, major external events like the COVID-19 pandemic give the world a pause before entering and exiting a recovery phase. Now's the time to elevate your skills to be better prepared for what the new normal might bring.

## Research Highlights

### Research Critical Skills for Infrastructure, Operations and Cloud

Upskilling in extraordinary times allows organizations to free themselves of being stuck in a pattern of role specialization. By neglecting interpersonal and other soft skills, technical professionals risk being lost in a sea of perceived mediocrity. They miss the opportunity to become leaders within their organizations and miss the opportunity to help guide technology decisions and strategies. Without strong technologists at the business table of the future, organizations risk ill-conceived projects and late discovery of technical missteps, which ultimately waste funding.

Gartner research shows an increased need for I&O technical professionals to enhance their skills in areas including cloud services and automation especially.

### Increase in Cloud Adoption Requires New Skills

The demand for technical professionals with cloud skill sets is increasing as organizations shift their strategies to increase cloud services. Although technical training that leads to certification remains a fundamental pillar of professional development, nothing builds skill sets as much as practical, hands-on experience.

Now may be the perfect time to take advantage of cloud offerings of challenging labs and services that are easy to set up and tear down. In fact, you can create a free account with one or more public cloud providers to experiment and gain hands-on experience. Deepen your newly learned skill set by networking with other professionals via virtual events and hackathons. And don't overlook your peers. Other cloud engineers and architects are an excellent source of knowledge and may offer new scenarios to test your skills.

### Wanted: Cloud Engineers

Cloud projects require complex integration between on-premises services, cloud platforms, cloud services and the edge. These projects require skilled technical professionals that are not only proficient in traditional on-premises technologies, but also proficient in modern cloud infrastructure and platforms. Therefore, it's time to elevate your skill sets, or your team's skill sets, to those of a cloud engineer.

### Automation Expertise Is Among the Most Desirable Skills for I&O Technical Professionals

Transformative automation requires a new generation of dedicated specialists capable of solving the technical challenges of automation. For the technical professional, it is among the most important skills to develop. But, for the IT organization, automation is a key strategic challenge. Solving it requires both technical expertise and business acumen, realized as part of a larger strategic program of organizational change.

Skills to consider during your training time include:

- Scripting
- Object-oriented programming
- Data serialization languages (e.g., YAML/JSON)
- REST
- Basic version control

## Related Research

[“Essential Skills for Automation Architects”](#) lists the essential skills needed by I&O technical professionals who want to become automation architects.

[“Essential Skills for Automation Engineers”](#) identifies essential skills needed by automation engineers and describes their new jobs, roles, responsibilities and teams.

[“The Cloud Engineer: Skills Guidance for Modern Technical Professionals”](#) focuses on the evolutionary role for modern technical professionals focused on cloud computing. Cloud engineers are the craftspeople of the digital business era. To remain valuable to their organization and competitive in the market, they must hone both technical and soft skills.

[“Jump-Start Your Cloud Skills With These Objective-Driven Assignments”](#) provides 10 objective-driven hands-on assignments that help technical professionals build and apply their cloud knowledge.

[“The Cloud Architect: Skills Guidance for Modern Technical Professionals”](#) looks at how technical professionals focused on cloud computing initiatives must understand the responsibilities and requirements of the role and develop the necessary skill sets for long-term success.

[“Solution Path for Transforming Your I&O Work and Career Strategies”](#) encourages infrastructure and operations technical professionals to take a proactive approach with their career trajectory to remain relevant well into the future.

## Research Critical Skills for Data and Analytics

Data and analytics continues to be a key area of focus and investment for organizations. This trend will likely continue as more advanced analytics, such as artificial intelligence and machine learning, become increasingly integrated into our applications, infrastructure, devices and systems.

In a data-driven enterprise, data and analytics are no longer afterthoughts — they are fundamental to digital business transformation. Data and analytics has become a primary driver for some enterprises' business strategies. It is a part of everything they do. Yet the ability to “think in data” is difficult for most enterprises.

**Although there are a number of data and analytics roles, this special report focuses on two: citizen data scientist and machine learning architect.**

## Citizen Data Scientists Require Myriad Skills

Technical professionals desiring to revamp their careers may have the opportunity to grow into a citizen data scientist role in a number of ways, including independent learning. But you should know that technical skills alone are not enough. Instead, citizen data scientists typically develop profound business subject matter expertise, collaboration skills and intellectual curiosity.

At its essence, a citizen data scientist is an experienced self-service analytics platform user with an added overlay of machine learning (ML) skills and knowledge. This is one common path to becoming a citizen data scientist. The typical pathway involves the most advanced users of an organization's self-service business intelligence platforms endeavoring to develop ML models to achieve more sophisticated data analysis. Other positions in the organization can also grow into the citizen data science role.

**Citizen data science is defined as an emerging set of capabilities and practices that allows users to extract predictive and prescriptive insights from data while not requiring them to be as skilled and technically sophisticated as expert data scientists.**

## Welcome the Machine Learning Architect

The growing popularity of artificial intelligence and machine learning is creating new roles that require new skills. Among those roles is the machine learning architect, a connective tissue between data scientists and application developers that fills the gap between science and engineering.

Consider the impact highly distributed citizen and noncitizen data science teams producing ML workflows will have on the IT organization's capability to deploy and maintain the resulting AI and/or ML systems. As a result, many organizations are implementing the role of the ML architect. Technical professionals in this role primarily architect, design, facilitate, lead and direct machine learning initiatives on multiple fronts as part of data science or AI initiatives. Table 1 lists some common permutations of the ML architect role. Use it to determine whether you are interested in gaining skills to qualify for any of the roles.

**Table 1: Key Permutations of the ML Architect Role**

<i><b>Role</b></i>	<i><b>Description</b></i>
Data scientist/citizen data scientist	Broad focus on extracting knowledge/insight from data in various forms
ML architect	Focuses on integrating the data science output; performs engineering functions to operationalize and optimize ML products and services
AI architect	Designs broader AI systems using various techniques (e.g., probabilistic reasoning, computational logic and optimization)
AI engineer	Integrates broader AI systems into new and/or existing business systems

Source: Gartner (July 2020)

In assessing whether any of these permutations appeal to you while considering upskilling during the pandemic pause, focus on the distinctions in each role's scope and goal. Data scientists have a broader focal point on data analysis, while AI architects and AI engineers have a broader focus on numerous techniques used in building AI systems — machine learning is one aspect of that.

### Related Research

[“Build a Data-Driven Enterprise”](#) is built on the premise that data and analytics leaders must lead the development of the appropriate competencies and align work to be consistent with their enterprises' ambitions for generating information value.

[“Essential Skills for Citizen Data Scientists”](#) discusses how citizen data scientists can catalyze advanced analytics initiatives in an organization. Data and analytics technical professionals can cultivate citizen data scientists by focusing on 19 essential skills.



[“Introduce the Machine Learning Architect – An Emerging Technical Professional Role in AI Initiatives”](#) defines the role and chronicles the skill sets needed for success in upskilling to a machine learning architect.

## Research Critical Skills for Cybersecurity

As organizations face global crises, the role of the security and risk management technical professional continues to be in high demand. In fact, the cybersecurity industry continues to have the lowest unemployment numbers in the world. <sup>2</sup>

A main focus now is on how teams can quickly extend security to the cloud and to the employee at home. Many companies that may have required employees to work in corporate offices with no remote access had to quickly set up work-from-home processes and strategies in terms of cybersecurity. And those just beginning their cloud journey had to accelerate plans to make the move earlier than expected. Others have had to scale existing work-from-home and cloud programs in a very short time. Whatever your organization’s situation, upskilling with a cybersecurity focus may take you places you have not thought of yet.

## How Can You Become the New Cloud Security Architect?

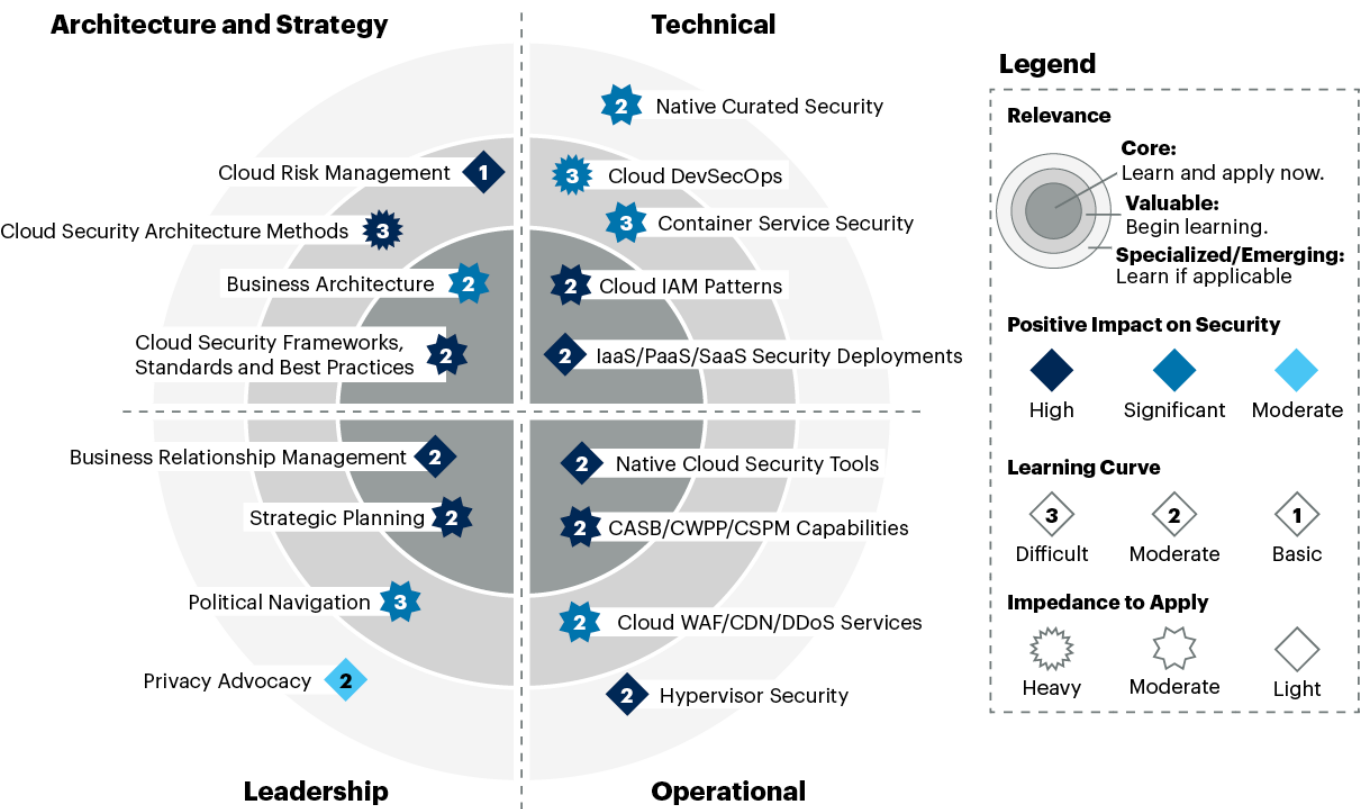
Your company continues to move more infrastructure to the cloud at a rapid pace, some with cloud-first or cloud-only policies. It is critical for you to keep pace with the organizational change and help implement a sound cloud security architecture to protect the enterprise from new intrusions and threats.

Cloud security spans multiple disciplines, each needing particular attention to successfully address risks. For this reason, the role of cloud security architect has become mission-critical for many organizations to ensure that the correct, balanced set of controls is applied to an organization’s cloud journey. Cloud security architects must advance skills and understanding so as to make correct selection and implementation for security technologies, processes and overall architecture.

Figure 2 illustrates the required cloud security architecture skills for the role.

Figure 2: Cloud Security Architect Skills

Cloud Security Architecture Skills Scope



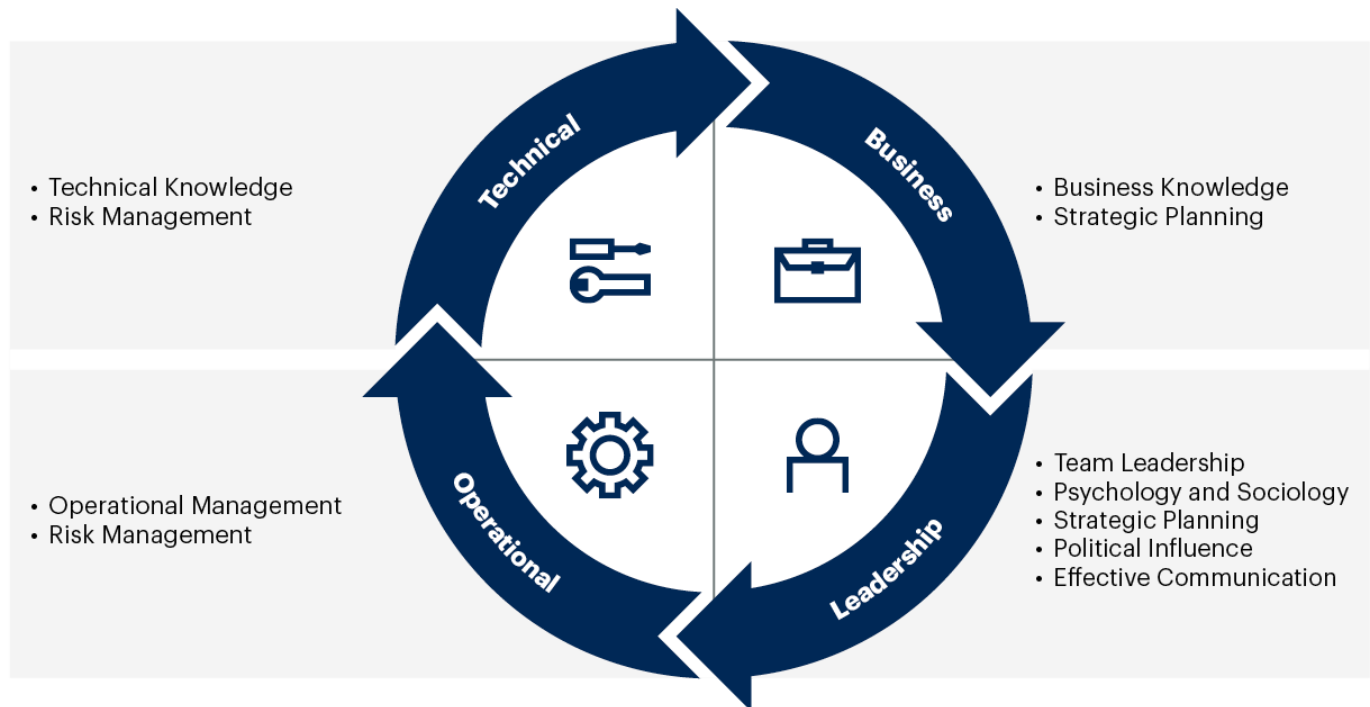
Source: Gartner (2020)  
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So You (Think You) Want to Be a Chief Information Security Officer (CISO)?

If so, this might be the right time to reflect on your career path as it relates to this position of increased responsibilities. Review where you are now with your skill sets, training, certifications and time in different roles that may be needed to be ready for the CISO title.

Figure 3 lists the skills needed to become an effective CISO. But know that many technical people climbing the career ladder have found it challenging to leave their hands-on jobs to become a leader.

Figure 3: CISO Skill Sets and Knowledge Requirements

**CISO Skill Sets and Knowledge Requirements**

Source: Gartner  
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The path will vary for each individual, organization and industry. There is no one clear progression to become CISO. You may have to leave the security organization, the company or even change industries. The key is to build your four key skill sets and knowledge areas. Training, certification and real-world experience will all factor into proving that you are ready to become a CISO.

### Is an Identity and Access Management (IAM) Role Right for Me?

With digital technology's acceleration — and associated risks — IAM has become a key component and discipline that must be architected correctly to support organizational success. While considering upskilling, aspiring IAM architects should know the role has transformed from primarily a tactical solution-oriented one to a more strategic and multidisciplinary role. Great IAM can both improve internal operations and enable increased revenue.

Gartner research shows enterprises have experienced a shortage of technical skills, and an increase in the scope of an IAM architect's areas of coverage. Technical professionals may want to consider developing additional competencies in this area to keep pace with the demand for this unique skill set.

### Related Research

["7 Critical Elements of a Security Risk Management Framework"](#) gives guidance on developing a systematic and proven business-oriented decision framework based on international standards and

methodologies.

[“Essential Skills for Cloud Security Architects”](#) focuses on the need for security architects to adapt, enhance and learn new skills to envisage and implement cloud security architecture.

[“A Step-by-Step Guide to Becoming a CISO”](#) shows the technical, business, operational and leadership skills needed to become a chief information security officer (CISO).

[“Guide to Cloud Security Concepts”](#) provides you a great starting point to understand the latest technologies associated with cloud security strategy and solutions.

[“Essential Skills for IAM Architects”](#) discusses how security and risk management technical professionals focused on IAM architecture can be most effective by acquiring certain technical, business and interpersonal skills.

## Research Critical Skills for Application Architecture

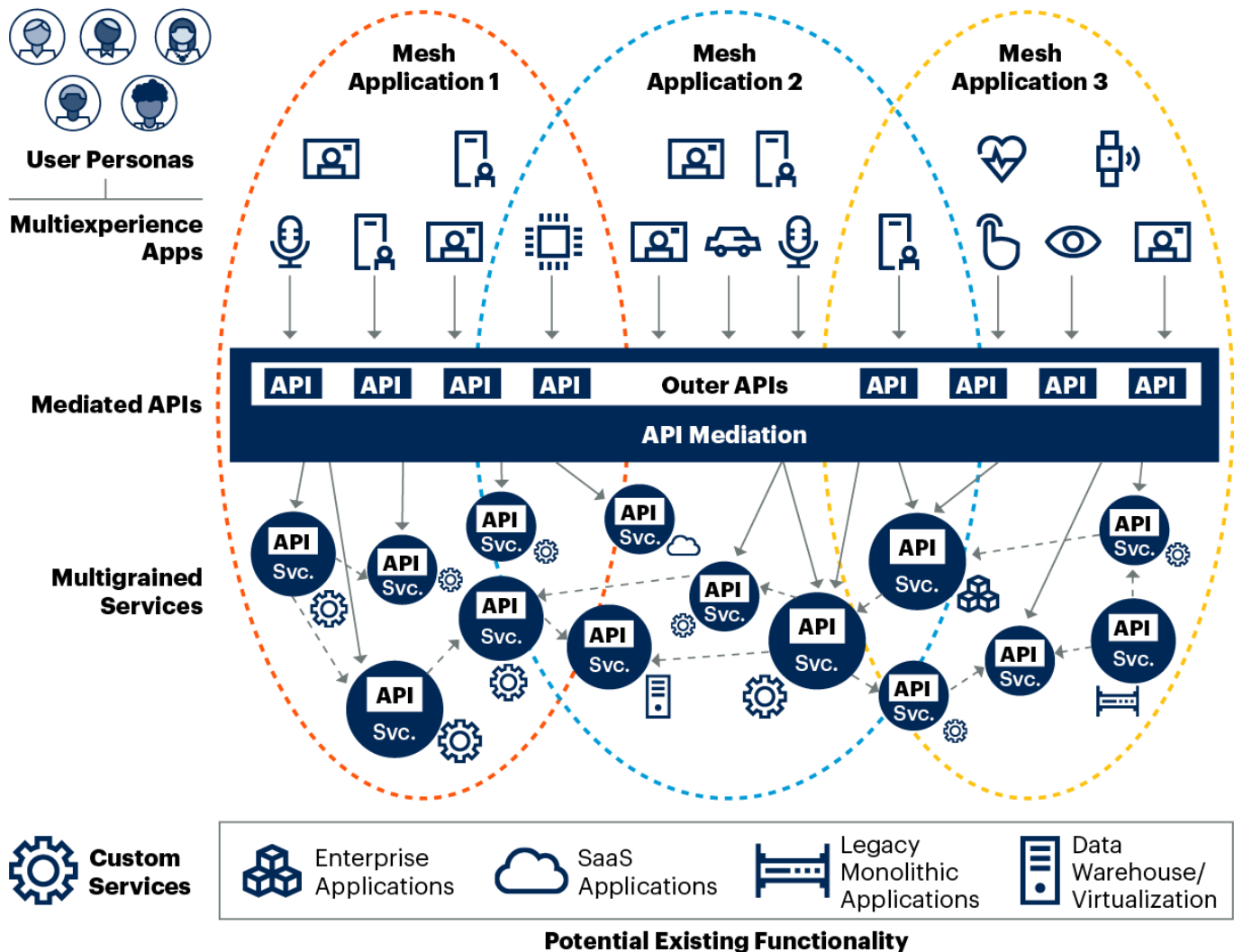
Technical professionals in application architecture and development roles face a dizzying pace of changes in technologies. Changes continue to accelerate cloud computing, multiexperience apps, Internet of Things (IoT), big data, AI, ML automation, augmented reality and digital business, to name just a few. And there is no end in sight, making it critically important for application architects and application developers to make time to advance their skill sets.

Evolving technologies, increasingly demanding customer expectations and shifting business needs require more agile, productive and innovative application development. Any time spent in the upskill process now will pay off for individual technical professionals as well as the business.

Architects and developers must think much more broadly. It's not just about individual applications — modern applications comprise an ecosystem of user experience apps, APIs and a variety of back-end services and integrations as shown in Figure 4. Application architects and developers must focus on learning skills that increase architectural agility, enable UX innovation, increase productivity and improve application performance.

Figure 4: Mesh App and Service Architecture

## Mesh App and Service Architecture



Source: Gartner  
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## Application Architects: Boost Your Skills

Factors such as cloud-native architecture, scalability, multiexperience expectations and event-driven architecture drive more unique and sophisticated applications. Designing the structure of these solutions resides with application architects. Having the right skills and knowledge will significantly improve application architecture, delivery speed, quality and user experience. It will also create new career opportunities for application architects.

Gartner has identified a number of skills that an aspiring architect would need:

- Excellent verbal and written communication skills
- Willingness to learn new technologies and methodologies

- Ability to participate across multiple projects
- Ability to work both independently and on a team that includes business-side stakeholders
- Strong analytical skills, attention to detail, troubleshooting, problem-solving and collaboration skills

## Application Developers: Strengthen Core Skills and Add New Ones

First, focus on strengthening core skills that are widely adopted, heavily used and proven to provide significant benefits. Prioritize these over others because they are valuable in staying relevant as application development evolves. Examples of core application development skills include:

- **Agile practices:** Agile development practices consist of practices and methods that enable self-organizing and cross-functional teams to evolve application requirements and solutions incrementally in short cycles of one month or less.
- **Decoupled apps, APIs and services:** An agile architecture composed of decoupled apps, APIs and services enables you to implement modern architecture constructs that provide the agility and flexibility needed to evolve applications to meet digital business requirements.
- **Modernizing legacy components:** Modernizing legacy components is a valuable skill for application developers dealing with legacy systems that are difficult to maintain or that use obsolete (no longer supported) technologies or who need to integrate modern applications with legacy systems.
- **Cloud-native application development:** Cloud-native application development involves designing and developing an application to support deployment to the cloud — free from constraints on specific hardware, tight coupling with other components and shared state.

A number of emerging skills will be required for the next evolution of core application development. Developers should begin learning these at least at a basic level:

- **Multiexperience development:** This involves designing, building and delivering apps to new channels, beyond the traditional desktop, web or mobile device.
- **Event-driven/reactive programming:** These models minimize dependencies between components in an application architecture.
- **Polyglot programming:** This programming implies the ability to create application components using multiple development languages.
- **Progressive web apps (PWAs):** PWAs provide a path to build web apps that satisfy mobile endpoint diversity, evolving user expectations and modern application demands.

## Related Research

[“Essential Skills for Modern Application Development”](#) focuses on technical professionals increasing their skills to deliver quality applications with increased agility.

[“Essential Application Architecture Skills”](#) explores how application architecture skills enable elegant and agile architecture that has a direct impact on the suitability and sustainability of the application.

[“Become an Agile Superhero: 8 Attributes for Success”](#) focuses on how application technical professionals can excel at delivering quality software with increased agility.

[“10 Essential Skills of the Modern Software Architect”](#) discusses creating software that meets today’s needs while adapting to future needs in a cost-effective way.

[“Essential Skills for Modern Integration Architecture”](#) reveals the new skills that application technical professionals must learn to deliver a modern integration architecture.

[“Apps 2025: A Guidance Framework for Architecting Your Application Career”](#) tells application professionals how to plan a rewarding path in applications and provides a framework for executing your plan.

[“Assessing Online Learning Platforms for Technical Skills Development”](#) evaluates how modern online learning platforms can help improve technical proficiency in development technologies, processes and practices.

[“How to Build Successful Communities of Practice for Knowledge Management”](#) addresses the question of how to create and grow communities of practice within organizations.

[“Accelerating Agile and DevOps Adoption Post-COVID-19”](#) discusses how application technical professionals must support accelerated modernization to meet dynamic business demands and changing customer needs.

## Gartner Associates Supporting This Trend



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## Related Resources

### Webinars:

- [“The Field Guide to Infrastructure Automation”](#)
- [“Design Scalable ML Architectures to Deliver AI-based Systems”](#)
- [“Secure Your Enterprise IT From IoT Onslaught”](#)

### Articles:

- [“Reset Your Business Strategy in COVID-19 Recovery”](#)
- [“With Coronavirus in Mind, Is Your Organization Ready for Remote Work?”](#)
- [“Get a Grip on Critical Skills”](#)

## Evidence

**2020 Gartner Technical Professionals Survey.** This study was conducted to understand how organizations approach their architecture decisions. The research was conducted online from 2 March through 28 March 2020 among 878 respondents in North America, EMEA, APAC and Latin America. A subset of Gartner for Technical Professionals seatholders were invited to participate. In addition, Gartner IT Leaders seatholders with the job level of “associate” were invited to participate. Respondents were required to be a member of their organization’s IT staff or department (or serve in an IT function). Furthermore, they could not serve as a member of the board, president or in an executive-level or IT leadership position. The study was developed collaboratively by Gartner analysts and the Primary Research Team who follow technical professionals. Results of this study do not represent global findings or the market as a whole, but reflect sentiment of the respondents and companies surveyed.

<sup>1</sup> [“Microsoft Welcomes Tom McGuinness as Corporate Vice President of Healthcare,”](#) LinkedIn.



<sup>2</sup> [“Cybersecurity Talent Crunch to Create 3.5 Million Unfilled Jobs Globally by 2021,”](#) Cybercrime Magazine.

## Note 1: “Work From Anywhere” Must Be an Option

As the world economy begins to reopen and enterprises prepare to go back to business and adapt to new realities, it has become abundantly clear that enterprises must offer employees choices as to where they can work. This pandemic has proven beyond a doubt that many business associates can work remotely and still be productive. However, it has also proven that some workers are now fatigued and want to get out of the house and back to the office. This hybrid model will be with us for a while, making it critically important for enterprises to be ready to ensure employees feel safe to work from wherever they choose.

Enterprises should view this new flexibility as a perk. While in the past, many enterprises offered their employees snacks, free meals or even exercise facilities, today, the new perk is the flexibility to work from anywhere.

**Now is the time to reimagine the employee experience. Empower associates to choose the ideal workplace that will make them feel safe and, as a result, become more productive.**

## Note 2: Upskill While You Work From Home

Working from home? You may find it a good opportunity and environment to work in some training time. This is about owning your career direction. Don't just settle into the comfort of what you know how to do best.

Learning opportunities are out there, but you need a roadmap:

- Prioritize learning skills based on their usage and demand in your organization. Maximize the selection of skills that have the highest impact but lowest impedance to apply. These skills are essentially the low-hanging fruit to get the greatest effect in your organization.
- Learn with others within your organization, or even in external groups and meetups. Look for online certifications that a group of you could take, lending support to each other.
- Select skills that are relevant to your experience, have a reasonable learning curve and are likely to improve value to the business. However, keep an open mind about learning skills that are not so obvious.

## Recommended by the Authors

## Best Practices for Suddenly Remote Agile Teams

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