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GORILLA
GUIDE[®] to...



Navigating IT Evolution and Modernization

Remote Work: The New Normal?

S. MICHAEL BENSON

Navigating IT Evolution and Modernization

By S. Michael Benson

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EDITORIAL DIRECTOR

Keith Ward

DIRECTOR OF CONTENT DELIVERY

Wendy Hernandez

CREATIVE DIRECTOR

Olivia Thomson

SENIOR DIRECTOR OF CONTENT

Katie Mohr

PARTNER AND VP OF CONTENT

James Green

ABOUT THE AUTHOR

S. Michael (Mike) Benson is the owner and principal architect for EmpriZe IT Consulting. He spent 30 years at IBM as an Executive IT Architect in technical sales where he led client workshops and studies across a wide variety of technical topics before starting EmpriZe. Mike has been a frequent conference speaker and published many technical articles and whitepapers.

Introduction: Not a One-Size-Fits-All Roadmap

Welcome to The Gorilla Guide To...® Navigating IT Evolution and Modernization, Foundation Edition. IT modernization is high on the priority list for most companies, but where to start is often a challenge.

This book will review the major focus areas that dominated IT modernization in 2020, and what you can expect to take center stage in 2021 and beyond. In addition, you'll find a strategy you can adopt to better position yourself for IT modernization in your organization.

This guide provides a look how many organizations are modernizing their IT, to help you successfully address your own challenges. IT modernization is not a one-size-fits-all roadmap, but you have nothing to fear if you follow a proven path.

Robotic process automation (RPA) will become a normal part of DevOps processes as the next level of DevOps automation. RPA removes even more of the human element from the delivery and operations environments, enabling hundreds of software product updates daily.

Current State of IT Modernization



IT infrastructure is evolving at an ever-increasing pace as businesses and government agencies focus on modernization and optimization. The desire for infrastructure flexibility to help quickly meet new challenges while still reducing IT costs drives organizations to modernize in several key areas, including infrastructure, applications, and processes.

IT modernization involves replacing aging legacy systems with new technology that enables greater optimization through automation, flexibility, and process improvements. But legacy systems are often a challenge to replace and integrate with newer systems. Every company uses legacy systems to some extent, though not all companies consider them a liability.

For many executives, IT modernization means moving to a newer platform. Replatforming is definitely an option, but there are many steps businesses can take to modernize existing environments without incurring the cost and risk of a complete rehosting project. A recent IDC study revealed that customer satisfaction is higher for companies that modernize in place.

There are many good reasons to modernize your IT systems, but the path is fraught with land mines that could blow up and put your job, your company, or both, at risk. We're here to help you avoid those explosions.

The past several years have been filled with challenges that directly affect IT infrastructure. The global COVID-19 pandemic forced organizations to creatively deploy work-from-home solutions that required infrastructure agility. Many companies were unprepared for the challenge.

Several modern technologies, such as cloud computing and DevOps processes, have matured and been adopted by a large majority of enterprises. The focus on application modernization remains, as the pandemic continues to reveal vulnerabilities in legacy application systems that haven't been updated in years.

CLOUD COMPUTING

Studies show that more than 80% of organizations have some cloud computing presence in their infrastructure—a number that will continue to increase.

While public cloud is the most widely deployed cloud model for smaller companies, large companies with data security concerns have generally opted for a hybrid cloud model where sensitive applications and data remain on-premises.

Many of them have strict regulatory requirements that dictate how they handle data and prevent them from using pure public cloud implementations. This mix of public and private cloud provides both flexibility and security.

The pandemic has accelerated the growth in cloud computing as more companies transform from in-person to online services. Industries such as retail, health care, education, and government services have led in the shift to online services,

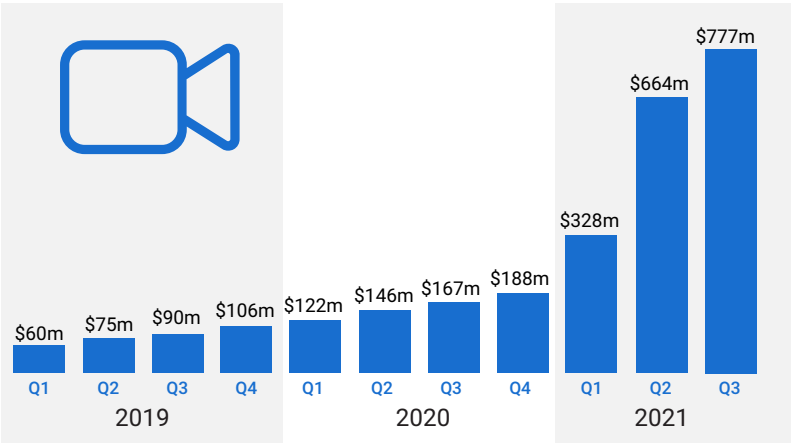
many of them using a cloud computing infrastructure to provide self-service portals.

A good example of the unprecedented growth in cloud services is Zoom, perhaps the largest provider of video-conferencing services. Zoom grew from 10 million calls per day in December 2019 to more than 300 million the following year. Zoom ramped up its public cloud infrastructure using Amazon Web Services (AWS) as the preferred provider, and continues to grow into new areas (see **Figure 1**).

REMOTE WORK INFRASTRUCTURE

The need to enable remote workers quickly, securely, and efficiently drove IT infrastructure decisions across almost every industry vertical. Companies that already had remote

Zoom Revenue*



*Zoom's fiscal year 2021 ends Jan. 31, 2021
Source: Zoom

Figure 1: Zoom usage, and revenue, got a huge lift in 2020, and figures to continue this year

worker infrastructures were forced to scale them up far beyond projected usage. Challenges included insufficient network bandwidth, lack of security controls, and use of unapproved IT equipment.

Successful companies already had flexible and secure infrastructures in place and could support the unanticipated growth. Companies that built their infrastructure on public cloud services were less impacted because of the elastic nature of the cloud. But those with less-flexible infrastructures were left scrambling.

Many companies and agencies without enterprise-grade video conferencing services turned to products such as Zoom to enable both internal communication among teams and external communication with customers. But Zoom suffered from security and privacy issues early on and had to scramble to tighten up its service.

APPLICATION MODERNIZATION

During the early months of the pandemic, many employees were furloughed when brick and mortar businesses were forced to shut down. This put a significant strain on legacy application systems to quickly process much higher volumes of unemployment benefits applications than had been seen before. Risks that had been hidden for many years became real when the legacy systems failed to keep up, as demonstrated by the [New Jersey unemployment benefits system](#).

APIs can be considered the front door for applications and data that reside in IT systems. Application modernization

includes both APIs and the applications and data behind them. To modernize one without the other is only half the job. Gartner Inc. states that the easiest way to start application modernization is by choosing robust modern APIs to encapsulate the application. The most common APIs are REST-style web services using JSON data formats.

Containers and microservices have become the de facto standard for modern application architectures and deployments that support DevOps processes. Microservices allow developers to work independently on services that make up the business application, reducing complexity and increasing agility.

As shown in **Figure 2**, containers are the efficient, light-weight packaging of everything necessary to run an application, including code, binaries, libraries, and dependencies.

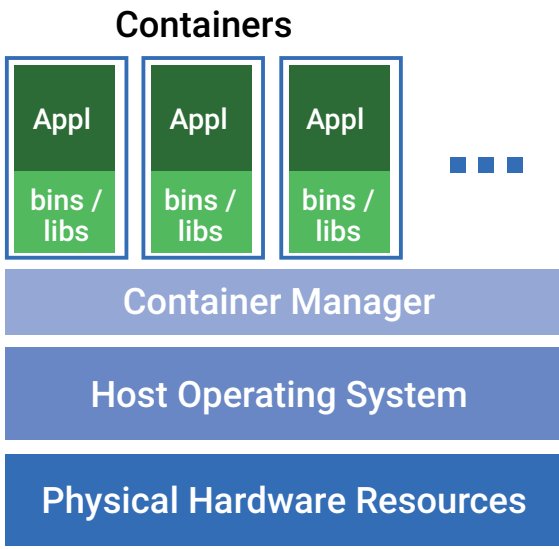


Figure 2: A sample container architecture

DEVELOPMENT PROCESS MODERNIZATION

DevOps processes continue to take center stage for companies that have to meet market demands more quickly. A Global enterprises are racing to develop DevOps projects, with many having multiple endeavors. This growth is leading to a challenge in finding skilled DevOps employees.

As the level of DevOps automation increases, we're seeing more integration of artificial intelligence (AI) into DevOps tools. One of the basic tenets of DevOps is to produce high-quality code more quickly. Test automation tools play a crucial role in helping to speed up software delivery, and they can be enhanced with machine learning (ML). Popular tools like Selenium take advantage of ML to obtain better test coverage.

While public cloud is the most widely deployed cloud model for smaller companies, large companies with data security concerns have generally opted for a hybrid cloud model where sensitive applications and data remain on-premises.

The Future Landscape



Recent events have served as a wake-up call for many organizations on just how inflexible many of their IT systems have become. With the pandemic continuing to inflict pain across individuals and organizations, the evolution of IT systems will accelerate to handle the shifting landscape. IT modernization will be a major focus of organizations as they respond to new requirements driven by the pandemic.

Automation will continue to be a major driver of modernization as organizations implement more flexible infrastructures across development and operations. New cloud paradigms will highlight the need to increase flexibility and reduce complexity. The remote work infrastructure will focus on enhancing security and efficiency with better-architected solutions.

CLOUD COMPUTING GROWTH

Cloud computing will see continued growth, fueled by the desire for increased agility and resiliency in the wake of the pandemic. Deloitte predicts that cloud computing will grow at more than 30% annually through 2025. Public cloud deployment using one of the major cloud providers will maintain dominance. Two newer cloud paradigms will also see growth:

- **Distributed cloud:** Distributed cloud computing extends the cloud computing model to include location information. With the growth of edge computing, cloud offerings

need to be positioned to leverage cases where services need to live closer to the consumer for performance and efficiency. Initially, distributed clouds will be a special use case of hybrid computing where the end points are managed on-premises, but over time it will generalize to a much more dispersed model.

- **Serverless cloud:** Serverless cloud computing is a paradigm that allows you to run code without provisioning any servers. While there are servers “under the covers,” they’re hidden from development and operations to reduce complexity. Amazon Lambda and Google Cloud Functions are two examples of current serverless offerings, and more are entering the scene all the time.

REMOTE WORK INFRASTRUCTURE

Gartner predicts that by 2023 more than 90% of organizations will have a majority of their infrastructure and operations teams working remotely. Virtual desktop infrastructure (VDI) will see increased growth as many enterprises leverage cloud computing to enable their remote work infrastructure solutions.

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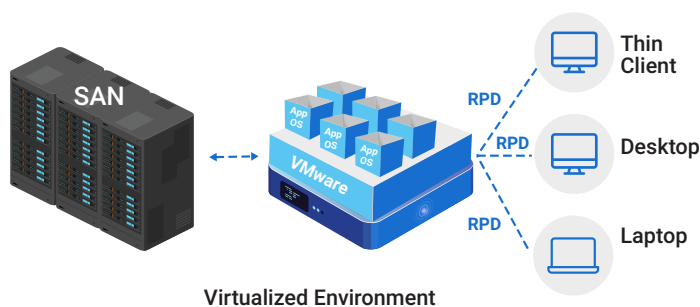


Figure 3: Virtual desktop infrastructure architecture

VDI solutions, as shown in **Figure 3**, address the critical security concerns of working from home and using employee-owned devices by hosting the actual desktop operating system on protected virtual machines in the cloud or on-premises on company-managed servers. These are also called thin clients, since all of the applications run on remote virtual machines instead of the client workstation. This solution will experience continued growth for the foreseeable future.

APPLICATION MODERNIZATION

The move to container-based microservices will accelerate as enterprises use more DevOps practices to deploy software to the cloud. In addition, companies will continue to use cluster management tools such as Kubernetes as they scale up their containers. Gartner predicts that 70% of enterprises will be running at least three containerized applications in production by 2023.

Application modernization service providers will continue to expand as demand increases. Research and Markets estimates

a growth rate of almost 20% per year, fueled by a desire to be more responsive to market demands. With the push to modernize being driven by companies responding to the impact of the pandemic, there will be a strong desire to modernize going forward.

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DEVOPS

Security will be one of the hot buttons for DevOps in the coming year. The concept of DevSecOps is not new, but it's now becoming mainstream in a way not seen before.

The tech that drives it continues to expand, too, as new AI-based tools to identify and correct potential vulnerabilities are integrated into DevOps processes. Moving ahead, AI will focus on the operational need to address security challenges, including ransomware.

Robotic process automation (RPA) will become a normal part of DevOps processes as the next level of DevOps automation. RPA removes even more of the human element from the delivery and operations environments, enabling hundreds of software product updates daily.

What You Need to Know



IT modernization is not a one-time event in the life of an enterprise—it needs to be an ongoing process to prevent unexpected events like the pandemic from exposing vulnerabilities that are difficult to address in a timely manner. Not only do you need to modernize your infrastructure, you also need to modernize your workforce.

CONTINUOUS MODERNIZATION

IT modernization should be a continual practice for organizations. When left alone, applications don't age well, which can cause operational nightmares. If you're several releases out of date, you're inviting trouble. Good IT hygiene includes continuous modernization that's built into development plans.

WORKFORCE MODERNIZATION

Modernizing infrastructure without investing in staff education will leave you with ineffective architects, engineers, and developers. Hiring your way out of skills deficiencies can work, but it is typically more expensive and often results in lower morale in existing IT professionals. Ongoing training for IT professionals should be a regular budget item.

Beyond Tomorrow: The Long-Term Outlook

IT modernization depends on the next big wave of technology that motivates businesses to upgrade. While continuous modernization is important, it's large IT modernization projects that shift enterprises to new technology and drive the marketplace. Here are just a couple of examples of technologies that could have major implications for modernization strategies.

QUANTUM COMPUTING

Technology giants such as IBM, Intel, and Google have delivered working quantum computing systems and are just starting to commercialize them for specific workloads that include very complex mathematical calculations, such as RSA encryption.

Quantum computing uses principles of quantum physics to store and manipulate data in elements called quantum bits (qubits). Qubits are unlike classical computer bits because they can store multiple states at the same time. This, and other properties, enables them to perform calculations that have been unsolvable with classical computers.

The quantum computing evolution will be much more widespread by the middle of the decade as vendors continue to commercialize it with new applications.

AI ADVANCES

Advancements in AI will become the backbone of many new innovations. Even now we're seeing AI applications that include machine learning, computer vision, neural networks, robotics, and speech recognition. You can expect to see applications like driverless transportation becoming mainstream.



The McKinsey Global Institute sees the financial impact of AI continuing to accelerate for the rest of the decade, providing a substantial boost to the world's economy:

AI has the potential to deliver additional global economic activity of around \$13 trillion by 2030, or about 16% higher cumulative GDP compared with today. This amounts to 1.2% additional GDP growth per year.

In fact, you'll see AI applications in fields as varied as smart warfare and robotic surgery become the norm. AI will relieve humans of many mundane tasks, potentially changing the workforce as we know it. As more applications of AI are developed, they'll become the core of IT modernization as companies seek to gain competitive advantage.

A recent IDC study revealed that customer satisfaction is higher for companies that modernize in place.

Even now, AI is modernizing IT by predicting hardware failures, security breaches, fraudulent transactions, and customer buying patterns. The possibilities seem endless. Physicist Stephen Hawking said in 2016, “The rise of powerful AI will be either the best or the worst thing ever to happen to humanity. We do not yet know which.” Most companies are banking on the former.

Yield Quick and Positive Results

The only sure thing (other than death and taxes) is that the rate of technology change will continue to accelerate. IT modernization is a moving target, but the longer you do nothing, the further behind you’ll be and the greater the risk that some global event, like the pandemic, will throw your IT systems into disarray.

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Start with an IT modernization assessment and then build a prioritized plan to begin addressing the most pressing needs before you get trapped into a no-win situation by the next unexpected event. Don't try to boil the ocean by taking on grandiose IT projects that engender large expenses and even larger risks. Rather, pick low-hanging fruit at first to achieve quick wins and demonstrate success.

In this Gorilla Guide, you've learned about the major trends impacting the current IT modernization landscape, and we've introduced you to the highlights of future trends. IT modernization is nothing to fear—in fact, if you plan well and implement carefully, it can yield quick and positive results in your organization.

In other words, don't wait to begin to modernize. If you do, you risk falling even further behind the competition.

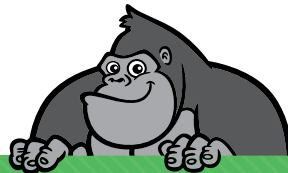
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