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The Total Economic Impact™ Of Citrix DaaS For Azure
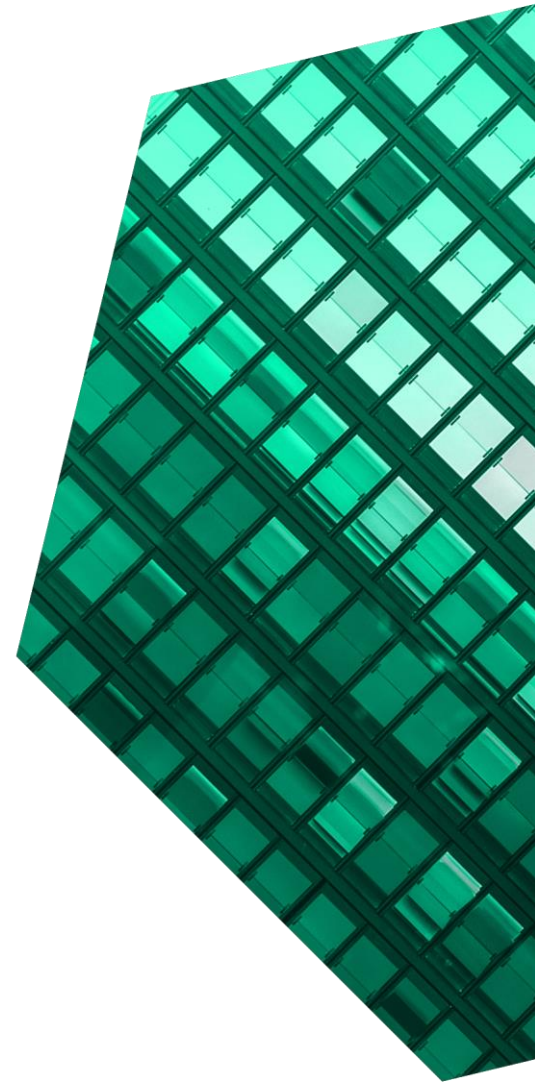
Cost Savings And Business Benefits
Enabled By Citrix DaaS For Azure

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Executive Summary

With hybrid and remote work as the new normal, firms are looking to move beyond legacy infrastructure solutions to DaaS in order to access remote desktops and applications from anywhere, improve IT management, and meet essential security requirements. Organizations that run Citrix DaaS with Microsoft Azure experience improved desktop management and security, reduced support calls and IT resource needs, and other reduced costs. End users using DaaS benefit from reduced issues and interruptions.

Citrix desktop as a service (DaaS) is a solution that allows IT departments to provision employees with a virtual PC and application environment in the cloud with performance as fast as locally installed operating systems and application software. According to a 2021 Forrester survey among infrastructure decision-makers at companies with 20 employees or more, 68% are adopting virtual desktop infrastructure (VDI) in the cloud.[1] Organizations are moving technologies like VDI to the cloud to drive better employee experience, support device flexibility and growth, secure access to enterprise resources on a global scale, and reduce on-premises server needs.[2] The result is that employees can now securely access personalized desktop environments and customized applications from any device and any location with reduced interruptions, increased stability, and higher performance. Additionally, organizations can leverage greater efficiencies by running Citrix DaaS with Microsoft Azure for enhanced integration and flexible licensing options.

Citrix commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Citrix DaaS. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact that Citrix DaaS with Microsoft Azure can have on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed

FINANCIAL SUMMARY

Return on investment (ROI)
171%

Net present value (NPV)
$6.22M

four representatives with experience using Citrix DaaS with Microsoft Azure. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization with 17,000 total employees and 3,400 regular Citrix cloud service users.

Prior to using Citrix DaaS, interviewees' organizations managed applications and desktops with non-cloud, on-premises solutions that raised security burdens and management challenges. VDI was expensive to maintain with the high cost of infrastructure in data centers, software, and licenses. Interviewees' organizations also saw high rates of support calls, and they had difficulty delivering the same consistent virtual experience to workers.

With Citrix DaaS running workloads on Microsoft Azure, interviewees' organizations were able to improve IT department efficiency and deliver secure, managed virtual experiences for employees working anywhere on any device. Given the effects of the COVID-19 pandemic, this was an especially valuable feature as organizations needed to quickly scale their virtual environments to meet the significant number of employees who needed to transition to a work-from-home model.

The interviewees' organizations migrated to Citrix DaaS from their existing Citrix on-premises virtualization implementations. Representatives reported their organizations were able to reduce help desk costs, improve business agility, speed up employee onboarding, reduce overall IT desktop management resource needs, avoid significant software and hardware costs, and provide employees with a more effective and productive application and desktop experience.

"With Citrix DaaS, the advancements in terms of capabilities and offerings that we have [and] being able to provide more levels of granularity and control have definitely been value adds. It's increased more because we were on the Citrix environment."

– Director of information technology, healthcare

KEY STATISTICS

Onboarding process improvement
60%

Employee productivity improvement
15%

KEY FINDINGS

Quantified benefits. Three-year, risk-adjusted present value (PV) quantified benefits for the composite organization include:

- **15% improvement in employee productivity.** Employees with device management or information access problems at the composite organization would often face delays that kept them from getting work done. Migrating to Citrix DaaS and leveraging optimized network capacity features allows adopters to directly reduce the number of connection disruptions and avoid productivity-degrading latency, allowing them to save significant amount of time. For the composite organization, this adds up to $5.1 million over three years.

- **15% improvement in IT efficiency by Year 3.** With Citrix DaaS and workloads running on Microsoft Azure, the composite organization's IT end user administrators streamline PC management through the traditional VDI benefits of building images, standardizing settings for user groups, and creating stronger security protocols such as authentication services. Moving to the Citrix cloud service also alleviate traditional server, operating system, networking, and database maintenance labor costs associated with an on-premises VDI deployment. For the composite organization, the reduced overall IT

management needs add up to $1.9 million over three years.

- **60% faster onboarding process per employee.** Each of the composite's new or transferred employees requires a PC to be configured, accounts to be created, and other physical and software resources to be provisioned. With Citrix DaaS, device setup is significantly streamlined and easily scalable with the tools available in the cloud environment and an interface that is easy to use. This results in a simpler and faster onboarding process. Moreover, new resources can be immediately modified from the central cloud-based environment for access from any device. For the composite organization, employee onboarding savings enabled by Citrix DaaS provisioning add up to $1.6 million over three years.

- **Legacy hardware and software savings totaling $769,200.** Citrix DaaS enables the reduction of the composite organization's on-premises data center servers. Reduced costs related to software licensing, database administration, resource capabilities, and data center operations services, add up to $769,200 over three years for the composite.

- **20% decrease in the number of help desk tickets and a 50% decrease in the time to resolve tickets.** With Citrix DaaS, the composite organization's IT admins standardize settings across cloud deployments, which reduces service interruptions and access problems. Additionally, accessing tools and applications is easier for end users, which leads to fewer help desk tickets. The composite avoids thousands of help desk calls each year, adding up to about 20% of all PC-related calls. Calls that still occur are resolved in half the time. For the composite, this adds up to a three-year benefit of $471,400.

> **"Citrix image portability services have been instrumental in our offering with the time [saved] and ease of migration in order to move more systems over to Citrix DaaS."**
>
> *– Director of information technology, healthcare*

Unquantified benefits. Benefits that provide value for the composite organization but are not quantified for this study include:

- **Security.** With Citrix DaaS, users don't download data to their devices, they view data from the remote virtual machines (VMs) on Microsoft Azure. Interviewees noted how security improvements with Citrix DaaS enabled their organizations to create greater security protocols and improve the accessibility to applications and information for users.

- **Employee experience.** With Citrix DaaS and resources hosted on Microsoft Azure, employees see greater ease of use with convenient tools to get work done with fewer added steps to ensure secure access.

- **Business continuity.** With Citrix DaaS, organizations are able to easily move to a remote model with virtual desktop and application access and scale the number of users accordingly. A business continuity event like the COVID-19 pandemic can significantly impact business, and interviewees said their organizations saw increased agility in their ability to react.

Costs. Three-year, risk-adjusted PV costs for the composite organization include:

- **Citrix cloud services and Microsoft Azure licensing.** License costs for both services are based on users and usage, adding up to $3.3 million over three years.

- **Implementation and ongoing costs.** Cloud migration tasks and new ongoing IT tasks add up to $289,00 over three years.

The representative interviews and financial analysis found that a composite organization experiences benefits of $9.86 million over three years versus costs of $3.64 million, adding up to a net present value of $6.2 million and an ROI of 171%.

ROI
171%

BENEFITS PV
$9.86M

NPV
$6.22M

Benefits (Three-Year)

Employee productivity improvements	$5.1M
IT management efficiency	$1.9M
Device and employee onboarding	$1.6M
Software and hardware cost savings	$769.2K
Help-desk call savings	$471.4K
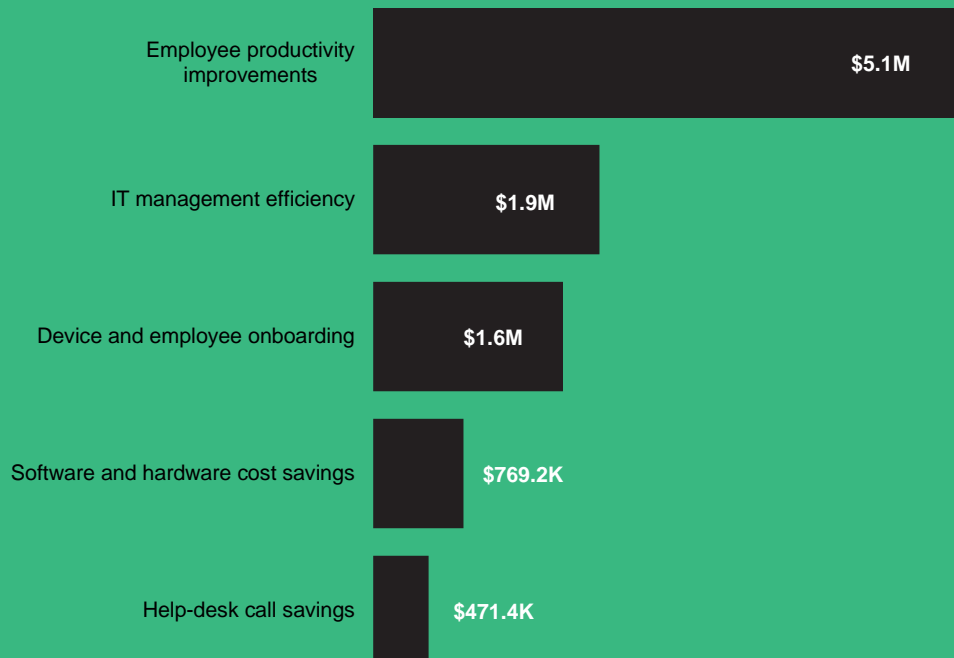
"Citrix DaaS gives more functionality and a higher level of confidence that the solution we are distributing to our end users is more 'industrial strength.' The tools available make it more flexible for us to manage the environment, and security is in place to make sure we are not letting confidential information out."

— Managing director, financial services

TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in Citrix DaaS running on Microsoft Azure cloud platform services.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that Citrix DaaS can have on an organization.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Citrix and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Citrix DaaS.

Citrix reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

Citrix provided the customer names for the interviews but did not participate in the interviews.

DUE DILIGENCE
Interviewed Citrix stakeholders and Forrester analysts to gather data relative to Citrix DaaS.

INTERVIEWS
Interviewed four representatives at organizations using Citrix DaaS to obtain data with respect to costs, benefits, and risks.

COMPOSITE ORGANIZATION
Designed a composite organization based on characteristics of the interviewees' organizations.

FINANCIAL MODEL FRAMEWORK
Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewees.

CASE STUDY
Employed four fundamental elements of TEI in modeling the investment impact: benefits, costs, flexibility, and risks. Given the increasing sophistication of ROI analyses related to IT investments, Forrester's TEI methodology provides a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

The Citrix DaaS For Azure Customer Journey

■ Drivers leading to Citrix DaaS for Azure investment

Interviews					
Role	**Industry**	**Region**	**Employees**	**Revenue**	**Legacy Solution**
Chief technology officer	Healthcare	North America	14,000	$2.9 billion	On-premises Citrix VDI
Managing director	Financial services	North America	5,500	$5.7 billion	On-premises Citrix VDI
Senior director of IT architecture	Financial services	North America	8,000	$3.1 billion	On-premises Citrix VDI
Director of information technology	Healthcare	North America	40,000	$5.2 billion	On-premises Citrix VDI

KEY CHALLENGES

For this study, Forrester interviewed representatives of four organizations: two financial services firms and two healthcare organizations. All the interviewees' organizations are in the process of migrating on-premises Citrix VDI implementations to Citrix DaaS. On average, 20% of all employees at the organizations use Citrix DaaS with resources hosted on Microsoft Azure.

The interviewees' organizations previously struggled with common challenges, including:

- **Management efficiency.** Interviewees noted how their organizations' legacy on-premises environments were time-consuming to maintain and that they struggled to keep up to date with the newest features and updates. The senior director of IT architecture for a financial services firm said, "[There was] complexity around managing all the infrastructure on-prem and handling all those resources required for administration for the VDI servers." Resources would spend hours patching and updating the servers and resolving employees' help desk tickets. Interviewees noted that cloud-delivered and virtualized desktop environments can be

managed in a more streamlined, standardized way by pooling workstation use cases into a few user personas that can be replicated or updated quickly and meet any scale needs.

> **"It used to take us days to help build a new image and get software loaded properly based on profiles."**
>
> *– Chief technology officer, healthcare*

- **Cloud flexibility.** Interviewees' organizations had servers and data centers on-premises with applications that were managing virtual solutions and other functions, which meant disjointed IT operations took up a lot of office space. The director of information technology at a healthcare

network noted, "We wanted to gain space back in our data centers because of the physical landscape the Citrix appliances took up in that environment."

Interviewees' organizations also saw cloud flexibility as a way to support business growth and accelerate scalability compared to the on-premises solutions that did not offer any agility. The chief technology officer for a healthcare organization said: "The ease and the efficiency to get quick scalability were items we were focused on making sure that we could get done as fast as possible. We are growing, and I wanted the ability to essentially flex the need from an infrastructure perspective [with DaaS], which would be much faster than the traditional model."

- **Security.** Interviewees' organizations looked to improve security with a cloud-delivered DaaS approach that would limit both sharing data outside the network and prevent data exfiltration. The managing director for a financial services firm said: "Security is of utmost concern to us. The first concern usually is security. Banks are very risk-averse and concerned with trillions of dollars floating through our institution."

The director of information security at a healthcare organization highlighted the need for a secure environment since there are rules and regulations that make moving to the cloud a challenging endeavor. He said: "We really needed to tighten security, ensuring that we had the right security measures in place in order to give employees the functionality that they need." The senior director of IT architecture at a financial services firm said, "Citrix offered all the security controls and the role-based access controls and compatibility that I needed to have [for a cloud migration], [which is] something that I couldn't find compatible with any of the other solutions."

Because they are in financial services and healthcare, interviewees' organizations needed a solution that improved security because client and patient data is highly regulated and requires the most current security protocols and procedures.

> **"If employees are provided the wrong CPU instance or RAM, then to change that configuration would require a new ticket that could take several hours."**
>
> *– Senior director of IT architecture, financial services*

SOLUTION REQUIREMENTS

The interviewees' organizations searched for a solution that could:

- Provide scalable DaaS to create a more agile environment.

- Provide employees convenient access to information to do their jobs.

- Improve security controls.

- Stay with the Citrix environment for ease of migration and continuity of services

- Improve IT PC management efficiency.

- Assist with cloud adoption and migration.

- Improve application development with new cloud tools and services.

- Reduce software and other costs.

- Support a cloud-first, digital transformation strategy.

With Citrix DaaS, interviewees' organizations found a solution that could deliver streamlined IT management and fewer employee interruptions while delivering high security. The DaaS solution provides remote workers with cloud-delivered screen updates of resources without moving any data outside the cloud environment.

"We had aging infrastructure for our current virtual desktop environment. A challenge was managing some of the IT workloads that we had. And because it took up a lot of time, we wanted to be able to focus more on simple deployments and utilization of the cloud."

– Director of information technology, healthcare

COMPOSITE ORGANIZATION

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four interviewees, and it is used to present the aggregate financial analysis in the next section. While readers' organizations will likely be larger or smaller than the composite, many — if not all — of the modeled benefits should remain valid, and they can use the calculations shown in the benefit and cost tables to fill in and total their own business KPIs and

financial estimates. The composite organization has the following characteristics:

Description of composite. The composite organization is a $4 billion global enterprise, with 17,000 employees across offices worldwide. The organization uses the Citrix on-premises VDI solution and one-fifth of employees regularly access work using Citrix cloud virtual solutions. The composite has 80 IT resources working on end user compute. It estimates that 6,500 help-desk calls are made per year related to PC issues, and each call takes on average 120 minutes to resolve. Employees who go through on-boarding, whether as a new hire or as a transfer to a different department, take 40 hours to complete the process.

Deployment characteristics. About 3,400 (or one fifth of) employees have Citrix DaaS access, and they use it regularly to access work resources. For the composite organization, migration from the Citrix on-premises VDI solution took six months before it was fully operational for all DaaS users.

Key Assumptions

- **$4 billion revenue**
- **17,000 employees**
- **3,400 Citrix cloud services users**
- **6,500 PC-related help desk calls per year**
- **Existing Citrix on-premises VDI solution**

Analysis Of Benefits

■ Quantified benefit data as applied to the composite

Total Benefits						
Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Employee productivity improvements	$2,036,736	$2,036,736	$2,036,736	$6,110,208	$5,065,061
Btr	IT management efficiency	$628,992	$786,240	$943,488	$2,358,720	$1,930,453
Ctr	Device and employee onboarding	$651,168	$651,168	$651,168	$1,953,504	$1,619,358
Dtr	Software and hardware cost savings	$225,000	$315,000	$405,000	$945,000	$769,159
Etr	Help-desk call savings	$189,540	$189,540	$189,540	$568,620	$471,358
	Total benefits (risk-adjusted)	$3,731,436	$3,978,684	$4,225,932	$1,936,052	$9,855,389

EMPLOYEE PRODUCTIVITY IMPROVEMENTS

Evidence and data. Interviewees said the improvements in imaging, patching, and application access with Citrix DaaS reduced interruptions for end users. Moreover, end users saw an improvement in productivity given less latency and connectivity issues. And Citrix DaaS with Microsoft Azure provided a platform on which employees could securely access work resources from any device at any location with performance from Citrix HDX user experience technology, Citrix Gateway Service points of presence and global Azure resources.

- The managing director for a financial services firm estimated a 10% improvement annually for employee productivity. He explained that the Citrix environment helped employees with improvements in availability, overall service levels, and response time. He said, "You just know that you're on the right path and you're providing higher levels of service."

- The CTO of a healthcare firm noted an increase in productivity for teams utilizing the virtual desktop environment with Citrix DaaS. He said, "I would estimate close to 25% productivity increases for the teams that have the Citrix employment deployed, and I can definitely vouch for the environment being used."

- The director of information technology at a healthcare network estimated a 10% to 15% improvement in employee productivity.

- The senior director for IT architecture at a financial services firm estimated a nearly 20% uplift in productivity for the software engineering team using Citrix DaaS. He said: "[Citrix DaaS] helps with right-sizing of the resources from an optimization perspective. Now that I get all the intelligence from a provisioning perspective based on analytical data, [employees] have been able to perform better. That means no lagging. For example, when they are doing video

conference or collaboration spaces, [there is] no slowness in their environment."

Employee productivity improvement

15%

Modeling and assumptions. For the composite organization, Forrester assumes:

- While all employees see some degree of improvement, the number of employees that deal with regular frustration and interruptions is reduced to 680 employees or 20% of all Citrix DaaS users.

- Those employees that see measurable improvement are able to save 15% of their time.

- The average fully burdened hourly rate for these employees is $30.

- As a standard, Forrester assumes that not all end users' time saved is used for additional work. Breaks or socializing with colleagues are likely part of that time saved, which can provide value to the company. But for the purposes of this study, Forrester applied a 40% productivity realization factor.

Risks. The number of employees most impacted by Citrix DaaS at an organization may differ. Additionally, overstated benefits may occur if the benefit impact estimate is too high.

Results. To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year, risk-adjusted total PV of $5.1 million.

Employee Productivity Improvements					
Ref.	Metric	Source	Year 1	Year 2	Year 3
A1	Employees most impacted by services enabled by Citrix DaaS	Composite	680	680	680
A2	Productivity improvement	Interviews	15%	15%	15%
A3	Average hourly salary for information worker (fully burdened)	TEI Standard	$30	$30	$30
A4	Productivity realization factor	TEI Standard	40%	40%	40%
At	Employee productivity improvements	A1*A2*A3 *A4*2080	$2,545,920	$2,545,920	$2,545,920
	Risk adjustment	↓20%			
Atr	Employee productivity improvements (risk-adjusted)		$2,036,736	$2,036,736	$2,036,736
	Three-year total: $6,110,208		Three-year present value: $5,065,061		

IT MANAGEMENT EFFICIENCY

Evidence and data. Interviewees said with Citrix DaaS and workloads running on Microsoft Azure, IT resources such as end-user compute administrators can use tools within the Citrix DaaS environment such as Citrix Provisioning Services and Citrix Image Portability Service to simplify operations and set priorities for working more efficiently compared to in the on-premises environment. Their organizations streamlined and centralized IT management.

- The managing director for a financial services firm said there was a 10% to 15% efficiency gain for resources working on IT management through tools such as Citrix's Cloud Health Check Tool to monitor activity in the cloud. He said: "[Citrix DaaS] made management more centralized and easier to manage. A lot of the promises of cloud are only really enabled through the real use of Citrix: being able to dynamically provide storage, monitor cache, allocate resources, compute resources, and balance workloads."

- The chief technology officer for a healthcare organization noted that the cloud DaaS environment improved their organization's IT management by 10% to 20%. He said, "By going to DaaS, it took [the management process] beyond the golden image and the ability to extend these capabilities in a way that cut down from the team's time [by] using machine creation services, provisioning services, and image mobility."

- The director of information technology for a healthcare organization stated IT management efficiency increased by 10% with the move into the cloud from the on-premises solution.

- The senior director for IT architecture at a financial services firm noted an increased management efficiency of 15%. He said: "RAM and CPU are optimized and work better with the collaboration tools that I already have with Microsoft. And so the resources that I used to have managing the infrastructure are now allocated to another environment. We can simplify operations because now I don't need to fine-tune all my servers from a scalability perspective to allocate the right amount of instances that I want to be running per server. That's something that goes away from an administration perspective."

> **"The reliability, security, and scalability of all these components come into play. The ability to quickly initiate and provide sessions has really paid dividends."**
>
> *– Chief technology officer, healthcare*

- 80 total IT FTE end-user compute resources are focused on all corporate PC management activities.

- The average fully burdened hourly rate for these FTEs is $42.

- Citrix cloud services and Microsoft Azure enables a 10% improvement in overall IT management efficiency in Year 1, which increases to 15% in Year 3.

Risks. The number of IT resources working on IT management at an organization may differ. Additionally, overstated benefits may occur if the benefit impact estimate is too high.

Modeling and assumptions. Based on interviews and Forrester assumes the following for the composite organization:

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $1.9 million.

IT Management Efficiency

Ref.	Metric	Source	Year 1	Year 2	Year 3
B1	IT resources (FTEs)	Composite	80	80	80
B2	Average hourly salary for desktop management resource (fully burdened)	TEI Standard	$42	$42	$42
B3	Efficiency due to Citrix DaaS and Azure	Interviews	10%	12.5%	15%
Bt	IT management efficiency	B1*B2*B3*2,080	$698,880	$873,600	$1,048,320
	Risk adjustment	↓10%			
Btr	IT management efficiency (risk-adjusted)		$628,992	$786,240	$943,488
	Three-year total: $2,358,720		**Three-year present value: $1,930,453**		

DEVICE AND EMPLOYEE ONBOARDING

Evidence and data. Interviewees said that prior to using Citrix DaaS, desktop provisioning with the appropriate individual security protocols within the organization was a time-consuming process for IT, facilities, and HR resources. With Citrix DaaS,

desktop provisioning significantly improved given the greater level of control for access and security settings. Setting up a new machine from providing the right access to the necessary updates was simplified dramatically with services such as image portability and machine creation services available with Citrix DaaS.

- The chief technology officer of a healthcare firm stated their organization could onboard employees in new departments with their individual requirements in two days with Citrix DaaS, whereas before it could have taken a week or more to complete the onboarding process. He said "[One of the] biggest benefits is the ability to onboard new departments quickly. With desktop-as-a-service, we built an environment that allows us to create templates that we can duplicate, and we are able to push those templates out to various groups. The ability for us to launch those changes and push them into the DaaS umbrella while using Microsoft Azure was very easy for us. And that is significantly valuable."

- The senior director for IT architecture at a financial services firm said it previously could take between one to two weeks to create a new set of images for employees, but that provisioning with DaaS takes only a couple of days. He said: "When I need to create a new instance or a new type of desktop with specific policies controls, Citrix DaaS has been a great uplift. For example, if I am moving one application, a BI (business intelligence) tool that is a corporate solution that I have on-premises … to the cloud, [DaaS helps] me create an instance that I can then provision."

- The director of information technology for a healthcare network said the time to onboard decreased by nearly 50%. He said: "It's simply been more manageable for us from an onboarding and off-boarding perspective to add licenses to give employees the right access. When someone creates a request for the access they need based on the profile with the active directory within Azure, [we can determine] what sort of access and control that they need. And Citrix DaaS has really helped with our automation of making sure that Day 1 when the employee

starts, they have the access and tools they need in order to do their job."

Time per employee onboarding reduced from 40 hours to 16 hours

Modeling and assumptions. For the composite organization, Forrester assumes:

- 680 new or transferred employees are onboarded to the company or to a new department each year. This is 20% of the organization's total employees using Citrix cloud.

- The company's overall turnover rate is 10%, so the annual net company change in the number of employees is 0%. Readers can adjust Year 2 or Year 3 numbers to reflect their organization's own growth.

- Before using Citrix cloud services, employee onboarding took 40 total hours from IT, facilities, and HR resources.

- With Citrix cloud services, employee onboarding now takes 16 hours.

- The average fully burdened hourly rate for these FTEs is $42.

Risks. Forrester has identified the following variables as factors that could potentially lead to overestimation. Both risks are largely due to an organization's specific onboarding provisioning environment, as compared to the composite organization:

- The hours required to complete onboarding tasks.

- The share of improvement enabled by Citrix DaaS.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV is $1.6 million.

> **"The time [to onboard] has gone down because of the initial provisioning. So now it's self-service, self-running. Before having the automation capabilities, you would have to [provision a new device] each and every single time. Now there's zero involvement unless you need to make a change."**
>
> *– Director of information technology, healthcare*

Device And Employee Onboarding					
Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Onboardings each year (new and transferred employees)	Composite	680	680	680
C2	Hours to complete onboarding process before Citrix DaaS	Composite	40	40	40
C3	Hours to complete onboarding with Citrix DaaS	Composite	16	16	16
C4	Blended average hourly salary for onboarding support employees (fully burdened)	TEI Standard	$42	$42	$42
Ct	Device and employee onboarding	C1*(C2-C3)*C4	$685,440	$685,440	$685,440
	Risk adjustment	↓5%			
Ctr	Device and employee onboarding (risk-adjusted)		$651,168	$651,168	$651,168
	Three-year total: $1,953,504		Three-year present value: $1,619,358		

SOFTWARE AND HARDWARE COST SAVINGS

Evidence and data. With Citrix DaaS and Microsoft Azure, interviewees said their organizations scaled and managed capacity as needed. Legacy applications and licenses, on-premises servers, and data center operations or services costs were reduced or retired.

- The chief technology officer of a healthcare firm said, "We have decommissioned approximately 30 to 40 host servers internally which saved resource capabilities."

- The managing director for a financial services firm found 10% to 15% efficiency from freeing up unused, latent capacity. He said, "Opposed to growing the environment, [decommissioning] gives us a bigger buffer. It gives us capacity."

- The director of IT architecture at a financial services firm stated, "There was a reduction in the entire environment, saving around 25% of my spend from server to electricity, cooling, and

networking as well as all the licenses that I am moving out."

Modeling and assumptions. For the composite organization, Forrester's assumes the following:

- In Year 1, software and hardware cost savings total $250,000.

- In Years 2 and 3, those same cost savings total $350,000 and $450,000, respectively. This reflects the necessary ramp-up time to fully migrate functionality, retire on-premises data centers, and end-licensing contracts.

Risks. The impact of this benefit will vary depending on the organization's previous implementations and the amount of software and hardware able to be retired.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $769,200.

Software And Hardware Cost Savings					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
D1	Software and hardware costs savings reduced or retired with Citrix DaaS	Composite	$250,000	$350,000	$450,000
Dt	Software and hardware cost savings	D1	$250,000	$350,000	$450,000
	Risk adjustment	↓10%			
Dtr	Software and hardware cost savings (risk-adjusted)		$225,000	$315,000	$405,000
	Three-year total: $945,000		**Three-year present value: $769,159**		

HELP DESK CALL SAVINGS

Evidence and data. With Citrix DaaS and workloads running on Microsoft Azure, interviewees said their organizations have been able to reduce support requests with more efficient IT management. In their on-premises environments, IT resources had to deal with a larger number of support requests, and each

ticket could take hours to resolve. Citrix DaaS brought end users better connectivity to applications and systems, reducing end-user interruptions and avoiding operating system (OS) support issues. Application and operating system updates are efficiently applied to the master image, and then they are replicated to thousands of cloud VMs, avoiding traditional patching misconfiguration problems. With

the security and policy controls with Citrix DaaS, interviewees noted fewer issues related to usage. They said Citrix tools are easy to use and that employees do not spend a lot of time logging in to various systems to find information and that when tickets are filed, they are resolved faster. Additionally, they said with better management of their organizations' environments, there was less downtime for applications and fewer capacity-related issues for resource usage.

- The chief technology officer for a healthcare firm conservatively estimated that prior to using Citrix DaaS, help desk tickets could take 3 to 4 hours and that with Citrix DaaS, they could be resolved in 45 minutes. He said: "Our first-case resolution related to Citrix has improved quite a bit. Most of the time, it really comes down to someone just needing to have the proper access versus having to open up [multiple] tickets which [were] then [passed on] to somebody else and so on and so forth. The whole process was streamlined significantly."

- The managing director of a financial services firm said the number of calls decreased by approximately 20% and that incident time decreased by nearly 50% with the environment and tools available through Citrix DaaS. He said: "The number of calls went down because the environment is better managed, and we have tools and centralization in place to be able to

control the environment better. I think the IT team has more tools available to respond quicker."

- The senior director for IT architecture at a financial services firm stated their organization's number of tickets decreased by 25% and the time to resolve decreased by nearly 50%. He said: "For example, [if a] virtual desktop is performing slow, IT now doesn't need to do a right-sizing because the solution is already doing the right-sizing based on analytical data. From tickets on security controls to policy controls to monitoring components or app protection, there is an optimization [for time on tickets] for the IT team. And with no downtime from app refreshes, IT is seeing a decrease in tickets."

- The director of information technology for a healthcare network described their organization's help desk environment and said the number of tickets decreased by 25% and the time to resolve went down from nearly 2.5 hours with the legacy environment to 1 hour with Citrix DaaS. He said, "We were able to look at our virtual desktop infrastructure and desk services for the users that we've migrated over, [and] there are a lot less tickets overall with better performance [and it's] easier for us to manage."

Modeling and assumptions. For the composite organization, Forrester assumes:

- Prior to using Citrix DaaS, there were 6,500 PC-related help desk support requests from employees accessing company resources.

- Each request took 2 hours to complete.

- After implementing Citrix DaaS, help desk calls are reduced to 5,200 support requests per year, and each takes 60 minutes to resolve.

- Each call that now takes place requires 20 minutes to complete.

- The average fully burdened hourly rate for help-desk technicians is $27.

Time to resolve help desk calls with Citrix DaaS

50% faster

Risks. The impact of this benefit will vary depending on the number of help desk calls and the time to resolve each call.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $471,400.

Help Desk Call Savings					
Ref.	Metric	Source	Year 1	Year 2	Year 3
E1	PC-related help desk calls per year for users before Citrix DaaS	Composite	6,500	6,500	6,500
E2	Time to resolve help desk calls before Citrix DaaS (minutes)	Composite	120	120	120
E3	PC-related help desk calls with Citrix DaaS per year	Composite	5,200	5,200	5,200
E4	Time to resolve help desk calls with Citrix DaaS (minutes)	Composite	60	60	60
E5	Hourly salary for help desk support technician (fully burdened)	TEI Standard	$27	$27	$27
Et	Help desk call savings	(E1*E2-E3*E4)*E5/60	$210,600	$210,600	$210,600
	Risk adjustment	↓10%			
Etr	Help desk call savings (risk-adjusted)		$189,540	$189,540	$189,540
	Three-year total: $568,620		Three-year present value: $471,358		

UNQUANTIFIED BENEFITS

Additional benefits that customers experienced but were not able to quantify include:

- **Security.** With the security features and access controls tools available through Citrix DaaS and the integration with the security tools within Microsoft Azure, interviewees' organizations gained greater data protection for their cloud environments. Data security was a key consideration for each organization due to substantial healthcare and financial sector regulations. The director information technology at a healthcare network described all the different tools used for security and said: "With Citrix, for security we use the centralized AES, the 256 encryption, cloud connector, session recording, watermarking and federated authentication services. Employees also utilize single sign-on."

"All the way from encapsulating the actual session itself to the secure browser to locking in specific applications in a way that you wouldn't have as much flexibility on a desktop, Citrix DaaS has definitely made a difference [for security]."

– Chief technology officer, healthcare

The senior director of IT architecture at a financial services firm said, "Data Loss Prevention, OS Screen Capture Blocking, and app protection helps me with greater compliance and, at the same time, reduces the amount of different infrastructure or services that I need to have."

- **Employee experience.** Interviewees said with Citrix DaaS and Microsoft Azure, employees are provided convenient tools to get work done with fewer added steps to ensure secure access. Employees have the mobility to access the virtual desktop and applications from anywhere. Additionally, there are fewer interruptions and simpler processes to fix issues. The director of information technology for a healthcare firm said, "There is less amount of strain on the network, and [employees] are seeing fewer performance issues."

- **Business continuity.** With Citrix DaaS, interviewees' organizations were able to easily shift employees to a work-from-home model. The director of information technology at a healthcare network said, "During [the COVID-19 pandemic], when work from home increased dramatically, a lot of employees were able to take advantage of the remote work options and we were able to deploy in record time." Representatives also discussed how disaster recovery was an important feature for business continuity and how it allowed their organizations to recover faster. The managing director of a financial services company said, "[With Citrix DaaS and disaster recovery,] if there is a failure, it gives us another tool to help manage the redeployment of these resources across the organization."

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Citrix DaaS and later realize additional uses and business opportunities. For the composite organization, future options are particularly focused on expanding its current implementation to more users, including:

- **Increasing the number of Citrix DaaS users.** The composite organization wants to continue increasing the number of users to virtual workspaces. This could mean even more benefit opportunities for organizations that need increased security or greater remote worker support.

- **Increased focus on the Azure Virtual Desktop entitlement.** The composite organization plans to add Windows 10 multisession with Citrix DaaS by leveraging its Azure Virtual Desktop entitlement. The organization could see savings over time with more focus on reporting, management, and increasing the number of services and applications. Moreover, the composite organization could see improved networking performance with greater resource capacity, decreased latency, and more efficient processes.

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

> **"For the future, Citrix DaaS will help [my organization] be more agile by easily onboarding solutions faster. [With] Citrix DaaS in place with the continued Microsoft Azure and Citrix collaboration, it will be easier to optimize everything."**
>
> *– Senior director of IT architecture, financial services*

Analysis Of Costs

■ Quantified cost data as applied to the composite

Total Costs

Ref.	Cost	Initial	Year 1	Year 2	Year 3	Total	Present Value
Ftr	Licensing costs	$0	$1,346,400	$1,346,400	$1,346,400	$4,039,200	$3,348,298
Gtr	Ongoing costs	$0	$36,036	$36,036	$36,036	$108,108	$89,616
Htr	Implementation costs	$199,584	$0	$0	$0	$199,584	$199,584
	Total costs (risk-adjusted)	$199,584	$1,382,436	$1,382,436	$1,382,436	$4,346,892	$3,637,498

LICENSING COSTS

Modeling and assumptions. For the composite organization, the cloud environment and compute cost for its Citrix DaaS subscription is $571,000 per year, and the expanded Microsoft Azure subscription costs are $653,000 per year.

Risks. License subscription costs are based on the number of users and Azure subscription costs will vary based on the organization's compute environment.

Result. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of $3.3. million.

Licensing Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
F1	Citrix DaaS license costs	Composite		$571,200	$571,200	$571,200
F2	Windows Azure consumption costs for Citrix cloud solution	Composite		$652,800	$652,800	$652,800
Ft	Licensing costs	F1+F2	$0	$1,224,000	$1,224,000	$1,224,000
	Risk adjustment	↑10%				
Ftr	Licensing costs (risk-adjusted)		$0	$1,346,400	$1,346,400	$1,346,400
	Three-year total: $4,039,200			**Three-year present value: $3,348,298**		

ONGOING COSTS

Modeling and assumptions. Only the incremental costs of added or expanded virtual desktop management is included in the composite organization's ongoing costs, such as new tasks specific to the cloud environment with Citrix DaaS and Microsoft Azure.

For the composite organization, a total of 15 hours per week of new task time is estimated for the entire IT team.

Risks. The ongoing costs will vary depending on time required for new cloud service tasks.

Results. To account for risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of nearly $90,000.

Ongoing Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
G1	Total additional resource time required for new cloud services tasks (hours per week)	Composite		15	15	15
G2	Average hourly salary for desktop management resource (fully burdened)	TEI Standard		$42	$42	$42
Gt	Ongoing costs	G1*G2*52	$0	$32,760	$32,760	$32,760
	Risk adjustment	↑10%				
Gtr	Ongoing costs (risk-adjusted)		$0	$36,036	$36,036	$36,036
	Three-year total: $108,108			Three-year present value: $89,616		

IMPLEMENTATION COSTS

Evidence and data. The Citrix DaaS solution implementation costs include migrating existing on-premises virtualization infrastructure to Microsoft Azure and expanding to a larger cloud-based virtualization infrastructure.

Modeling and assumptions. For the composite organization, it takes four FTEs six months to complete implementation of Citrix DaaS.

Risks. The implementation costs will vary depending on the number of resources and time required to complete implementation of Citrix DaaS.

Results. To account for risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total cost of $200,000.

Implementation Costs

Ref.	Metric	Source	Initial	Year 1	Year 2	Year 3
H1	Resources required for Citrix DaaS deployment (FTE)	Composite	4			
H2	Time to deploy Citrix DaaS (hours)	Composite	1080			
H3	Average hourly salary for desktop management resource (fully burdened)	TEI Standard	$42			
Ht	Implementation costs	H1*H2*H3	$181,440	$0	$0	$0
	Risk adjustment	↑10%				
Htr	Implementation costs (risk-adjusted)		$199,584	$0	$0	$0
	Three-year total: $199,584			Three-year present value: $199,584		

Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

Cash Flow Chart (Risk-Adjusted)
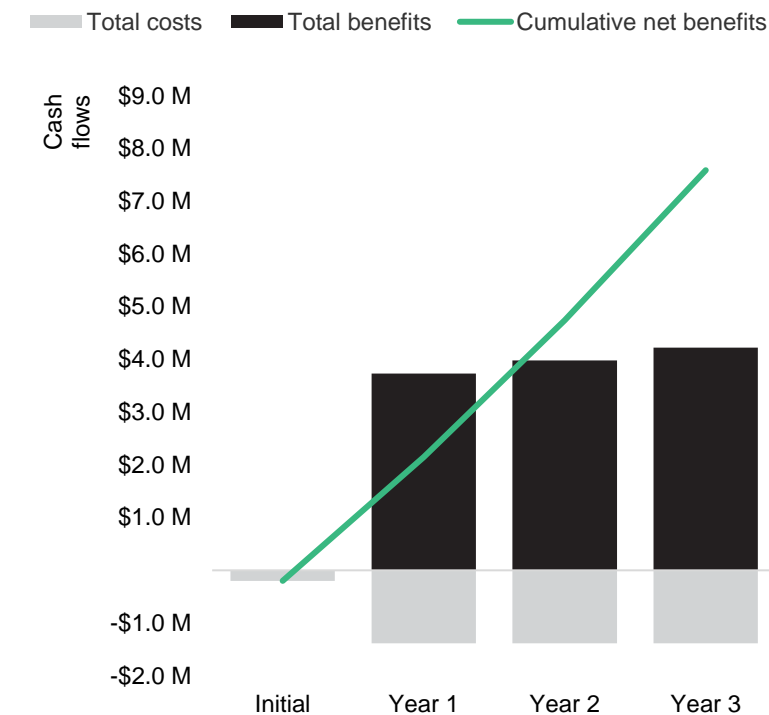
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI and NPV for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI and NPV values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

Cash Flow Analysis (Risk-Adjusted Estimates)

	Initial	Year 1	Year 2	Year 3	Total	Present Value
Total costs	($199,584)	($1,382,436)	($1,382,436)	($1,382,436)	($4,346,892)	($3,637,498)
Total benefits	$0	$3,731,436	$3,978,684	$4,225,932	$11,936,052	$9,855,389
Net benefits	($199,584)	$2,349,000	$2,596,248	$2,843,496	$7,589,160	$6,217,891
ROI						171%
Payback						<6 months

Appendix A: Total Economic Impact

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

TOTAL ECONOMIC IMPACT APPROACH

Benefits represent the value delivered to the business by the product. The TEI methodology places equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization.

Costs consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.

Flexibility represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.

Risks measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.

PRESENT VALUE (PV)

The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total NPV of cash flows.

NET PRESENT VALUE (NPV)

The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

RETURN ON INVESTMENT (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.

DISCOUNT RATE

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.

Appendix C: Endnotes

[1] Source: "VDI Heads To The Clouds," Forrester Research, Inc., May 9, 2022.

[2] Source: "Forrester's Essential Modern Technology Operations Research," Forrester Research, Inc., January 27, 2022.

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