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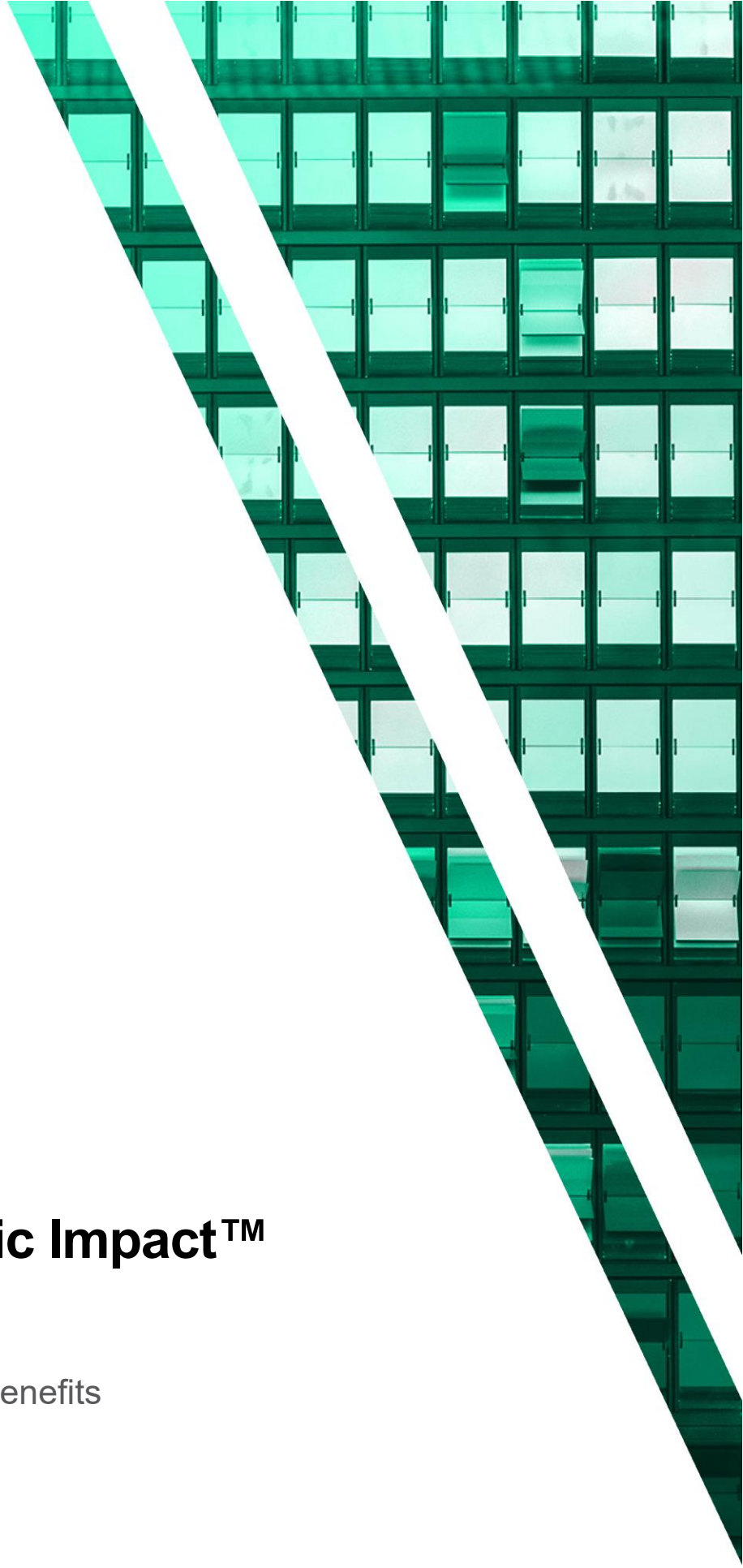

The Total Economic Impact™ Of ControlUp

Cost Savings And Business Benefits Enabled By ControlUp

SEPTEMBER 2021

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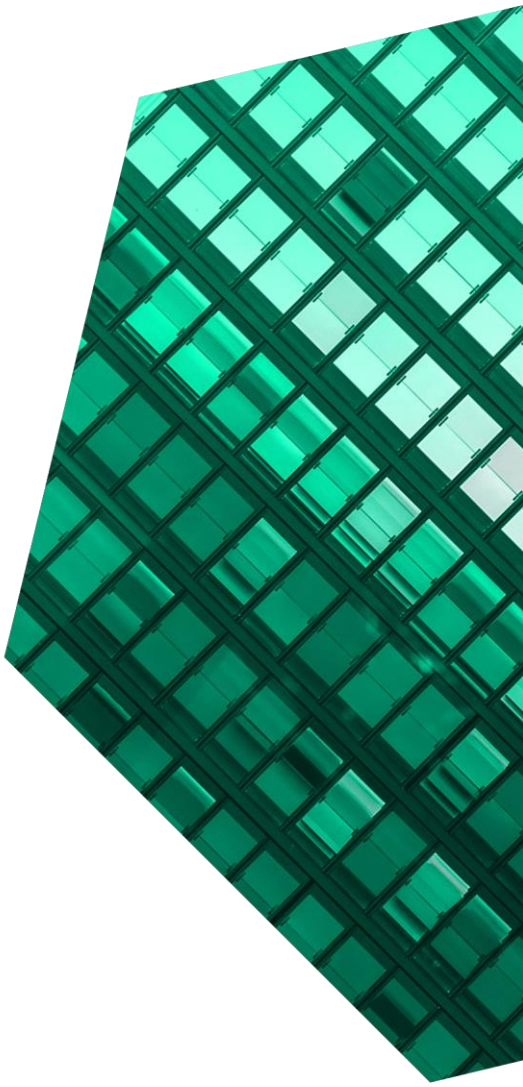


Executive Summary

Desktop and application virtualization platforms provide great value for many organizational use cases, but also create operational challenges. Issues with underlying infrastructure, the network, and other factors can negatively impact the employee's digital experience. This study profiles a ControlUp client's experience with ControlUp implementation, integration, and management reporting as well as its major role at issue prevention, identification, and resolution.

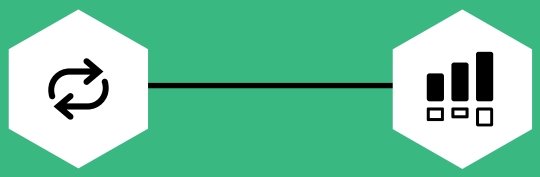
ControlUp Real-Time DX, part of the ControlUp DEX management platform, provides an issue prevention, identification, troubleshooting, and remediation solution for desktop and application virtualization platforms. It integrates data from the virtualization platform and its supporting infrastructure with a near real-time refresh rate. This solution uses a single console to identify and act upon performance issues quickly and minimize negative effects on end users. It also provides management dashboards and the ability to perform longitudinal analyses to identify trends that can lead to action before users are affected.

ControlUp commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying ControlUp.[1] The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of ControlUp on their organizations

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed an organization with experience using ControlUp. Forrester used this experience to project a three-year financial analysis.

The customer has an end-user computing (EUC) infrastructure with a well-established vendor in the industry. Prior to using ControlUp, the customer used a different monitoring platform for their EUC environment. Even after three years, the customer

KEY STATISTICS



Return on investment (ROI)
238%

Net present value (NPV)
$2.40M

only had 70% adoption of that solution in their EUC environment. A major problem was data explosion, which led to poor query and reporting performance — sometimes with response times that spanned minutes. The poor adoption and performance issues meant that it was not possible to have one console supporting EUC monitoring, issue diagnosis, and issue resolution.

The customer did a brief proof of concept with ControlUp. Not only did the customer identify issues while using ControlUp that it hadn't identified with its existing solution, but it learned the benefit of utilizing a software-as-a-service (SaaS) solution with its ability to quickly install and use.

With the investment in ControlUp, the customer not only has a single console solution for its entire EUC environment, but it included other valuable data for monitoring, diagnostics, and resolving issues. Furthermore, it is using ControlUp's scripting and

alerting capabilities to automatically prevent some issues while providing early detection of others. A major cost savings has come from analyzing underutilized VM pools and combining them based upon common application images.

KEY FINDINGS

Quantified benefits. Risk-adjusted present value (PV) quantified benefits include:

- **Savings from combining virtual machine (VM) pools of $1,664,237 over three years.** The interviewee called out an unexpected benefit of using ControlUp: The organization can identify underutilized VMs and consolidate them to reduce VM costs significantly.
- **Labor savings for IT help desk agents and IT administrators of $382,882 over three years.** The interviewee described numerous ways that ControlUp provided labor savings beyond what the original solution provided, including reduced IT help desk call volume due to issue reduction; automation scripts to proactively deal with caching and unregistered device issues; monitoring and troubleshooting improvements; issue prevention actions; and Application Delivery Controllers (ADC) team productivities.
- **Eliminated software licensing, supporting infrastructure, and related services cost of $1,360,227 over three years.** The interviewee described significant savings in software licensing, on-premises infrastructure, and related services by completely retiring the organization's previous solution. Note that after eight months only 70% of the EUC environment was monitored using the previous solution.

Unquantified benefits. Benefits that are not quantified for this study include:

- **End-user experience improvements and associated satisfaction improvements.** The interviewee recognizes that the automation scripts; the improved monitoring and recovery; and the issue prevention actions has led to improvement for end users. This includes both performance improvements and minimized downtime. The organization has not attempted to quantify the improvements, nor has it measured customer satisfaction improvements associated with EUC environment improvements.
- **ControlUp responsiveness to needs.** The interviewee spoke positively about ControlUp's account executive, customer success manager, professional services support, and IT help desk support.

> **"They're very responsive when we send emails or call them. I typically get a response within an hour when I send an email. When we request an enhancement, they will frequently provide us with a temporary solution while they develop the production version."**
>
> *Virtual solutions operations/automation manager, financial technology*

- **Insightful management dashboards and reporting.** The interviewee noted that the value of ControlUp goes well beyond the improvements to monitoring, troubleshooting, and resolution activities. The organization now can view dashboards and run reports that gives it a holistic view of its EUC environment. Historical reporting has also expanded, helping with forecasting demand, identifying performance issue trends, and other time-related analyses.
- **VM pool consolidation resulting from ControlUp utilization and application visibility does not include likely application savings.** The interviewee was able to share information on savings due to combining VM pools but had not determined savings associated with application cost reductions.

- **A valuable physical endpoint monitoring tool, Edge DX, which is part of the ControlUp DEX platform, has not been used long enough to include in the study.** The customer has begun deploying a ControlUp capability to identify the cause of performance issues at work-at-home settings, but its financial benefit has not been determined yet.

Costs. Risk-adjusted PV costs include:

- **Implementation, licensing, professional services, and customer success management costs of $1,006,793 over three years.** The interviewee noted that the organization's ControlUp licensing cost is less than the combination of the previous solution's licensing cost. The interviewee also described a limited implementation effort due to ControlUp being a SaaS solution and noted that the organization utilizes both ControlUp's professional services and customer success management teams for support.

The interview and financial analysis found that this customer experiences benefits of $3.41M over three years versus costs of $1.01M, adding up to a net present value (NPV) of $2.40M and an ROI of 238%.

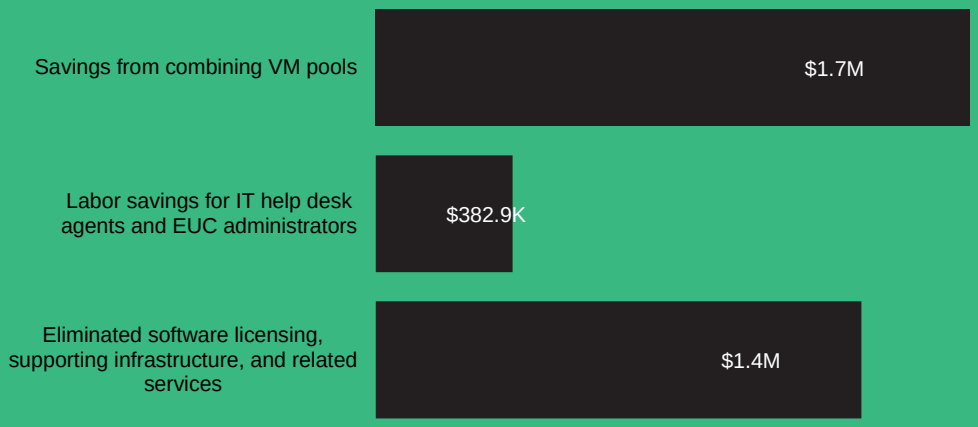
ROI
238%

BENEFITS PV
$3.41M

NPV
$2.40M

PAYBACK
<6 months

Benefits (Three-Year)



"ControlUp identifies the source of problems over 90% of the time. Whether the issue is EUC-related, or needs to be transferred to another team, the problem resolution occurs sooner than before."

"We did a one-month proof of concept with three companies, ControlUp being one of them. One required too much customization. The other did the same level of monitoring but ControlUp stood out because we were able to go beyond just identifying the process that was causing an issue — we simply right-clicked on the process and killed it."

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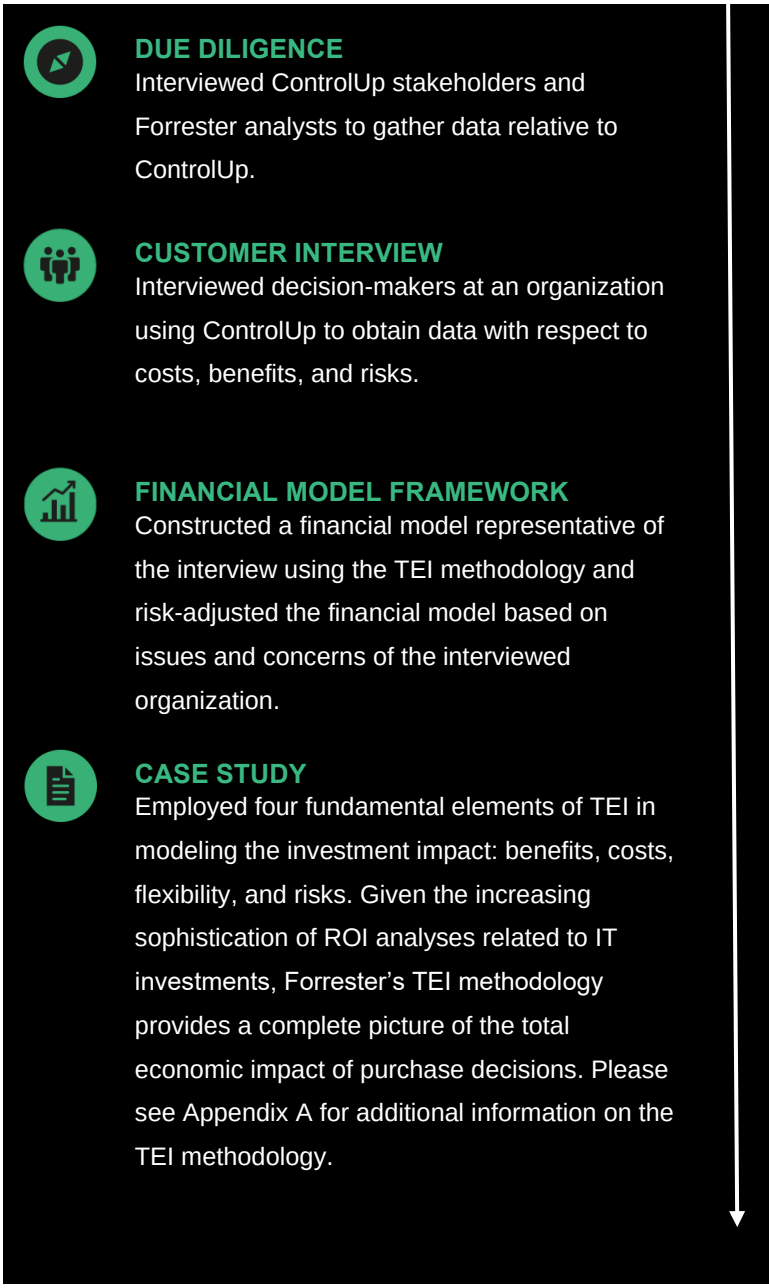
TEI FRAMEWORK AND METHODOLOGY

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for those organizations considering an investment in ControlUp.

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 ControlUp can have on an organization.



The ControlUp Customer Journey

Drivers leading to the ControlUp investment

INTERVIEWED ORGANIZATION

Forrester interviewed a ControlUp customer with the following characteristics:

- Global online financial transaction company.
- Revenue over $15 billion per year.
- EUC environment primarily used to connect with business partners around the world.
- Over 20,000 partner devices and approximately 2,500 employee devices utilizing the EUC environment.

KEY CHALLENGES

The client used a virtualization platform monitoring and diagnostic application for three years when it concluded that there had to be a better solution. The organization had not fully deployed the application, so there were gaps in knowledge in breadth and depth. The application's database had grown to multiple terabytes and response times were frequently very slow. Data was frequently inaccurate, which caused issues at times. On the whole, the customer didn't feel that the organization was getting the appropriate value for the cost.

The interviewed organization struggled with common challenges, including:

- **Challenges due to lack of adoption.** After three years, the previous solution was only approximately 70% deployed. In addition to not including all EUC environments, there was no data on ADCs and very limited non-EUC-related data. These deficiencies meant that it was not possible to have a single monitoring and diagnostic console within the EUC environment.
- **Database size and speed were both unacceptable.** The database size grew rapidly and query/report response times were unacceptable, frequently exceeding ten minutes. A team from the client and vendor were not able to resolve these slow query response times. As an on-premises solution, both hardware and administrative costs associated with the implementation challenges like this were primarily born by the client.
- **Data inaccuracy, which led to issues getting worse and a reduction in confidence in the solution.** Inaccurate and untimely data delayed proper action, leading to end-user issues. The client developed a lack of trust in the legacy solution due to the data issues.

SOLUTION REQUIREMENTS/INVESTMENT OBJECTIVES

The interviewed organization searched for a solution that could:

- Provide a single-console solution that could encapsulate the entire EUC environment without performance issues.
- Provide scripting and alerting capabilities to enable proactive actions to prevent issues or reduce their effect on end users.
- Reduce cost of licensing and services.
- Include more data sources that relate to the EUC environment.
- If possible, transition to a SaaS or mostly SaaS solution.

USE CASE DESCRIPTION

The use case for this customer is a ControlUp implementation that replaces a legacy solution that also handles issue prevention, identification, troubleshooting, and remediation solution for desktop and application virtualization platforms. Note that the previous solution's benefits included preventing some

potential issues as well as identifying other issues sooner to reduce end-user disruption and provide labor savings to IT help desk and virtualization platform engineering teams. ControlUp completely replaced this solution, providing further labor savings, non-labor productivities, and a lower cost. Also, the previous solution had scaling drawbacks, while ControlUp is a SaaS solution that scales to support this customer's desktop and application virtualization platforms.

For this use case, Forrester has modeled benefits and costs over three years.

Analysis Of Benefits

Quantified benefit data

Total Benefits

Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Savings from combining VM pools	$510,000	$680,000	$850,000	$2,040,000	$1,664,237
Btr	Labor savings for IT help desk agents and EUC administrators	$140,400	$154,620	$169,650	$464,670	$382,882
Ctr	Eliminated software licensing and services	$498,750	$548,625	$603,488	$1,650,863	$1,360,227
	Total benefits (risk-adjusted)	$1,149,150	$1,383,245	$1,623,138	$4,155,533	$3,407,346

SAVINGS FROM COMBINING VM POOLS

Evidence and data. ControlUp enabled the combining of underutilized EUC servers.

Modeling and assumptions. The client identifies a large set of underutilized servers the first year and additional servers in the subsequent years. This process is helpful during the pandemic.

Risks. Risks associated with savings from combining VM pools include:

- The ability to balance VM pools previously.
- Potential divisional, departmental, or geographic region constraints on combining VM pools.
- The commonality of application on the VM pools.

"We can identify usage between the pools and combine images, sometime reducing three pools into one. Utilizing ControlUp we could identify underutilized pools, match pools by applications used, and combine them."

Virtual solutions operations/automation manager, financial technology

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1,664,237.

Savings From Combining VM Pools

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Combining VM pools due to usage analysis	Company	300	400	500
A2	VM cost (annual)	Estimate	$2,000	$2,000	$2,000
At	Savings from combining VM pools	C1*C2	$600,000	$800,000	$1,000,000
	Risk adjustment	↓15%			
Atr	Savings from combining VM pools (risk-adjusted)		$510,000	$680,000	$850,000
	Three-year total: $2,040,000		**Three-year present value: $1,664,237**		

LABOR SAVINGS FOR IT HELP DESK AGENTS AND EUC ADMINISTRATORS

Evidence and data. The organization has seen benefits from using ControlUp at preventing issues, automating the correction of issues, reducing IT help desk call volume, and improving monitoring, diagnostics, and resolution activities. Benefits include:

- A reduction in end-user issues, which has led to fewer IT help desk calls.
- The creation of automation scripts, most notably to restart unregistered devices and proactively prevent or resolve device cache issue. This has saved significant manual effort to do the same.
- Monitoring, root cause analysis, and problem resolution activities are easier than in the past, and issue diagnoses and resolutions of non-EUC-related issues can frequently be resolved within ControlUp.
- Alerts that are used to prevent future issues. An example would be a notification that unnecessary services or processes are running on devices that could cause resource utilization or other issues.
- Increased centralized visibility. The VM ADC team had no centralized visibility in the prior solution. With ControlUp, they improved their monitoring and troubleshooting capabilities.

Modeling and assumptions. The client quickly implements ControlUp, driving improvements after implementing. Benefits per original device counts include:

- The IT help desk sees a reduction in calls leading to a savings of approximately 30 hours per week or 0.75 FTEs.
- ControlUp automation scripts save approximately 16 hours per week or 0.4 FTEs in manual processes to monitor and reboot devices due to cache issues or the devices becoming unregistered.
- The client spends approximately 20 hours per week, or 0.5 FTEs less time monitoring, diagnosing, and resolving issues due to ControlUp's nearly real-time collection of multiple data sources into one easy-to-use console.
- ControlUp's alerting capability is used to identify possible issues before they occur, leading to a time savings of approximately 12 hours per week, or 0.3 FTEs.

Risks. The risk associated with IT help desk agent and VM administrator time savings include:

- Labor rates may vary significantly.
- The prior state of the associated processes.
- The available opportunities for improvement from automation and alerts.
- The ability to change the organization's culture to support new approaches.

Results. To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of $382,882.

Labor Savings For IT Help Desk Agents And EUC administrators					
Ref.	**Metric**	**Calculation**	**Year 1**	**Year 2**	**Year 3**
B1	Labor savings within IT help desk team	Company	0.75	0.83	0.91
B2	IT help desk agent labor cost	Payscale	$40,000	$40,000	$40,000
B3	**Labor savings within IT help desk**	**B1*B2**	**$30,000**	**$33,200**	**$36,400**
B4	Labor savings due to ControlUp automation scripts	Company	0.40	0.44	0.48
B5	Labor savings due to monitoring and troubleshooting improvements	Company	0.50	0.55	0.61
B6	Labor savings from future issue prevention	Company	0.30	0.33	0.36
B7	Labor savings within ADCs team	Company	0.20	0.22	0.24
B8	Total labor savings (FTE)	B4+B5+B6+B7	1.40	1.54	1.69
B9	EUC administrator labor cost	Payscale	$90,000	$90,000	$90,000
B10	**Labor savings for EUC administrators**	**B8*B9**	**$126,000**	**$138,600**	**$152,100**
Bt	Labor savings for IT help desk agents and EUC administrators	B3+B10	$156,000	$171,800	$188,500
	Risk adjustment	↓10%			
Btr	Labor savings for IT help desk agents and EUC administrators (risk-adjusted)		$140,400	$154,620	$169,650
	Three-year total: $464,670		**Three-year present value: $382,882**		

ELIMINATED SOFTWARE LICENSING AND SERVICES

Evidence and data. The interviewee spoke of a significant cost reduction in licensing, related services, and the on-premises infrastructure to run the software and database.

> **"We had our prior solution for three years and still couldn't see 30% of our EUC environment. We had the entire EUC environment online in just two weeks with ControlUp, including the ADCs."**
>
> *Virtual solutions operations/automation manager, financial technology*

Modeling and assumptions. The prior contract involves base licensing and some annual services. The supporting infrastructure is the responsibility of the client.

Risks. The base licensing contract, associated services, and supporting infrastructure costs could vary.

Results. To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of $1,360,227.

Eliminated Software Licensing And Services					
Ref.	**Metric**	**Calculation**	**Year 1**	**Year 2**	**Year 3**
C1	Eliminated previous software licensing and services	Company	$480,000	$528,000	$580,800
C2	Eliminated on-premises hardware supporting previous application	Company	$45,000	$49,500	$54,450
Ct	Eliminated software licensing and services	A1+A2	$525,000	$577,500	$635,250
	Risk adjustment	↓5%			
Ctr	Eliminated software licensing and services (risk-adjusted)		$498,750	$548,625	$603,488
	Three-year total: $1,650,863			**Three-year present value: $1,360,227**	

UNQUANTIFIED BENEFITS

Additional benefits that the customer experienced but was not able to quantify include:

- **End-user experience improvements and associated satisfaction improvements.** The interviewee recognizes that the automation scripts; the improved monitoring and recovery; and the issue prevention actions have led to end-user experience improvements. Customer satisfaction surveys are not specific enough to associate changes with ControlUp-related user experience improvements. The customer was not able to quantify the time savings associated with these improvements

"I've been working in Level 1, Level 2, and Level 3 operations support for 21 years. ControlUp has been the most approachable and responsive team that I have ever worked with. They're great."

Virtual solutions operations/automation manager, financial technology

- **ControlUp responsiveness to needs.** The interviewee spoke positively about the ControlUp team. Specifically, the interviewee spoke of ControlUp's quick response related to work-at-home needs resulting from the pandemic as well as a willingness to make modifications to expand use beyond the EUC environment.
- **Insightful management dashboards and reporting.** The interviewee spoke highly of ControlUp's ability to view dashboards and run reports that give the company a holistic view of its EUC environment. Historical reporting has also expanded, helping with forecasting demand, identifying performance issue trends, and other time-related analyses.

"The reporting capabilities go beyond what the prior solution provided, as well as what the EUC infrastructure vendor's tools provide. We see trending data that allows us to scale up and down, allowing us to optimize the trade-off between performance and cost."

Virtual solutions operations/automation manager, financial technology

- **VM pool consolidation resulting from ControlUp utilization and application visibility does not include likely application savings.** The interviewee shared information on savings

from combining VM pools, but had not determined savings associated with application cost reductions.

- **A valuable physical endpoint monitoring tool, Edge DX, which is part of the ControlUp DEX platform, has not been used long enough to include in the study.** The customer has begun deploying a ControlUp capability to identify the cause of performance issues at work-at-home settings, but its financial benefit has not been determined yet.

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement ControlUp and later realize additional uses and business opportunities, including:

- **Scaling without the burden of on-premises infrastructure for the monitoring solution.** ControlUp did not hinder expansion during the pandemic and provided a means to understand workload changes and adjust VM pools appropriately.

> **"During the pandemic, everybody started doing remote work. When someone has a performance issue at home, we can tell them whether there is an ISP issue or whether there may be excessive streaming activity in their household."**
>
> *Virtual solutions operations/automation manager, financial technology*

- **Ease-of-use and capability controls providing flexibility in ControlUp user assignments.** The customer provided focused capabilities to the IT help desk agents. They identified and resolved certain end-user issues.

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

Analysis Of Costs

Quantified cost data

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Dtr	Implementation, licensing, professional services, and customer success management	$22,000	$396,000	$396,000	$396,000	$1,210,000	$1,006,793
	Total costs (risk-adjusted)	$22,000	$396,000	$396,000	$396,000	$1,210,000	$1,006,793

IMPLEMENTATION, LICENSING, PROFESSIONAL SERVICES, AND CUSTOMER SUCCESS MANAGEMENT

Evidence and data. In addition to licensing fees, the client utilized ControlUp for implementation, ongoing professional services, and customer success management.

Modeling and assumptions. Forrester assumes the following:

- The licensing, professional services, and customer services costs are based upon list rates.
- The client's implementation labor cost is an estimate and is presented together with ControlUp's professional services costs.
- Additional professional services were provided on an ongoing basis for customer scripting, reporting requirements, and other development.
- Customer success management and adoption and training was provided at no cost because of the customer's size.

Risks. Forrester associated the following risks with the implementation, licensing, professional services, and customer success management costs:

- The need for professional services and customer success management professionals will vary.
- Licensing costs may be negotiable based upon volume discounts, payment terms, and more.
- Non-EUC data requirements and data availability may vary.

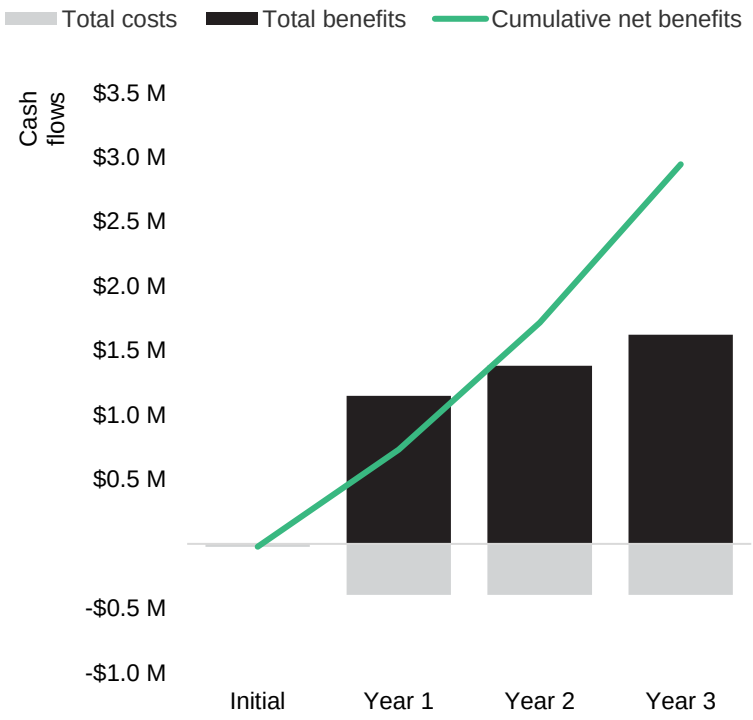
Results. To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of $1,006,739.

Implementation, Licensing, Professional Services And Customer Success Management						
Ref.	**Metric**	**Calculation**	**Initial**	**Year 1**	**Year 2**	**Year 3**
D1	Implementation and training cost	Company	$20,000			
D2	Professional services cost	Company		$40,000	$40,000	$40,000
D3	Licensing	Company		$320,000	$320,000	$320,000
Dt	Implementation, licensing, professional services	D1+D2+D3	$20,000	$360,000	$360,000	$360,000
	Risk adjustment	↑10%				
Dtr	Implementation, licensing, professional services and customer success management (risk-adjusted)		$22,000	$396,000	$396,000	$396,000
	Three-year total: $1,210,000			**Three-year present value: $1,006,793**		

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, NPV, and payback period for the organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

These risk-adjusted ROI, NPV, and payback period 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	($22,000)	($396,000)	($396,000)	($396,000)	($1,210,000)	($1,006,793)
Total benefits	$0	$1,149,150	$1,383,245	$1,623,138	$4,155,533	$3,407,346
Net benefits	($22,000)	$753,150	$987,245	$1,227,138	$2,945,533	$2,400,553
ROI						238%
Payback period (months)						<6

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%.

PAYBACK PERIOD

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

Appendix B: Endnotes

[1] 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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