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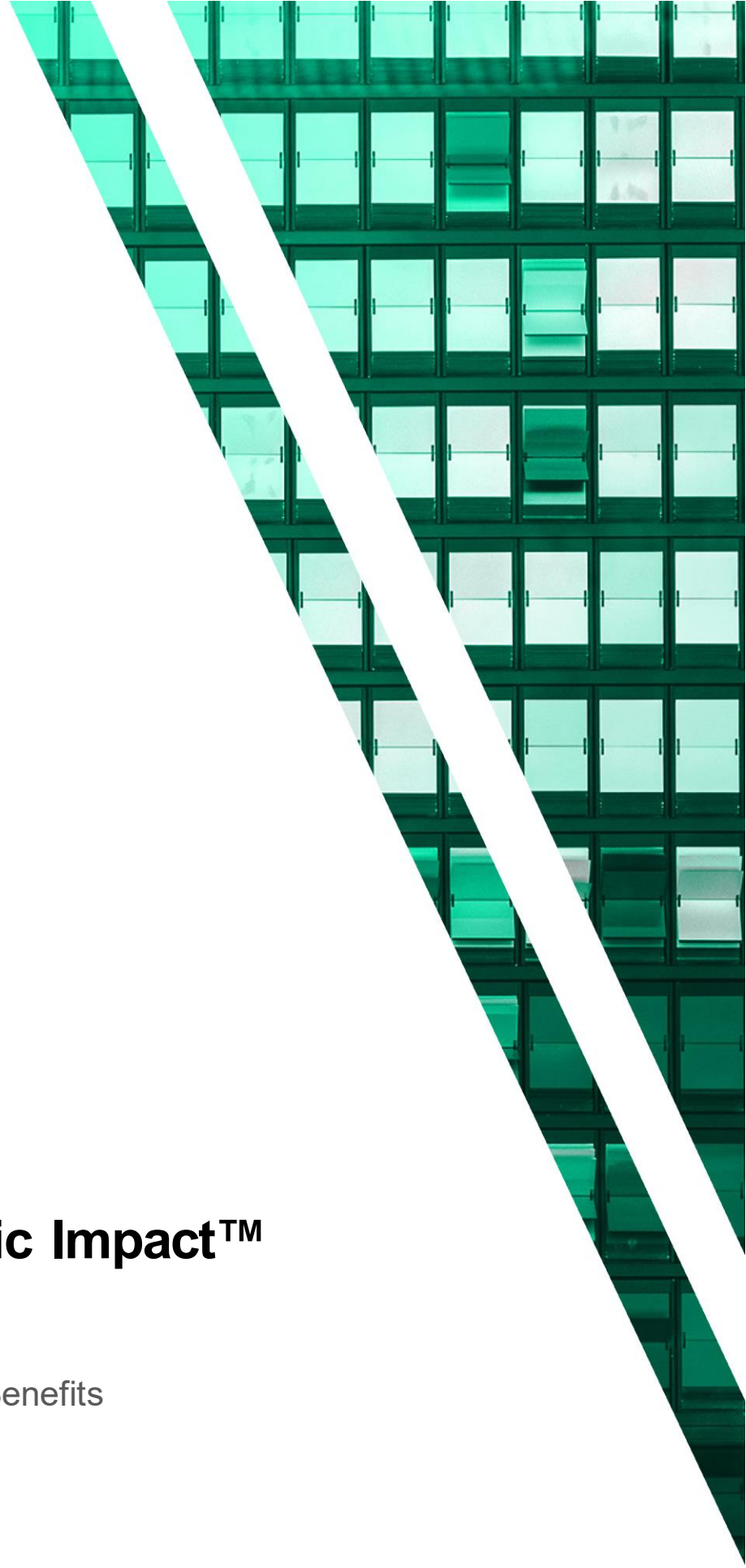

The Total Economic Impact™ Of Pindrop

Cost Savings And Business Benefits Enabled By Pindrop

JANUARY 2022

Table Of Contents

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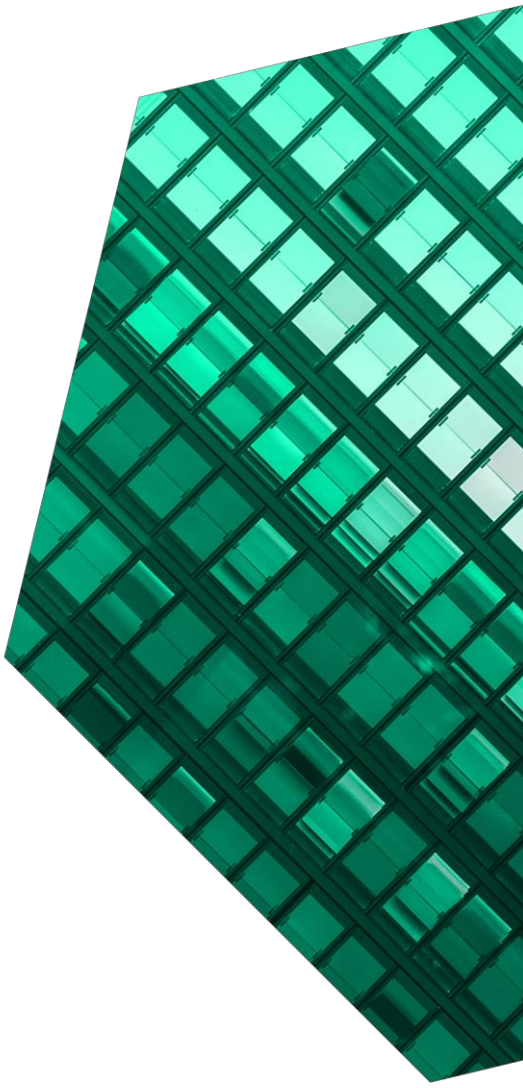


ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. For more information, visit forrester.com/consulting.

Executive Summary

Today's consumers expect a seamless and secure experience when having telephony interactions with enterprises. Organizations must balance creating a personalized experience with quick resolutions for customers while also safeguarding assets against cyberattacks. Implementing Pindrop's suite of products helps companies enhance caller authentication and customer interactions while improving operational efficiencies and fraud loss prevention.

Through its suite of enterprise solutions, Pindrop allows organizations to improve call experiences through streamlined authentication while leveraging their multifactor analytics to better protect customer data against evolving external fraud threats. Moreover, the elimination of more manual processes, such as asking knowledge-based authentication (KBA) questions to callers, can lead to significant operational efficiencies.

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

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed six decision-makers with experience using Pindrop Protect, Passport, and VeriCall solutions. For the purposes of this study, Forrester aggregated the interviewees' experiences and combined the results into a single composite organization.

Total benefits PV:

$18.4 million

KEY STATISTICS

Return on investment (ROI)
171%

Net present value (NPV)
$11.60M

Prior to implementing Pindrop, these interviewees noted how their organizations were utilizing manual processes or homegrown solutions for customer authentication and fraud detection. The lack of automation in the identity verification process led to friction with customers and long call times, which have a negative impact on customer satisfaction (CSAT). Where the phone channel remains the primary interaction mode for more complex customer service interactions, a poor phone conversation has a disproportionate impact on overall CSAT — which ultimately impacts customer retention, enrichment, advocacy, and ultimately, revenue. Additionally, organizations faced increasing external risk from fraud attacks as bad callers maneuvered the company's internal controls. Interviewees' companies recognized the need to invest in a best-in-class solution designed to address their holistic issues for phone interactions.

"I think that they are no doubt one of the best vendor groups I've worked with personally in my tenure. So I have nothing but recommendations of their service."

Senior director of IVR, telecommunications

After the investment in Pindrop, the interviewees' companies improved customer experience (CX) through streamlined authentication and personalization. Moreover, companies were able to redeploy customer service agent resources by increasing the number of calls contained within the interactive voice response (IVR) system. Security teams used risk scores and analytics to evaluate threats more comprehensively and in real time.

KEY FINDINGS

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

- **Reduced fraud incidents and losses by 15% based on improved detection and analytics.** Pindrop enabled interviewees' organizations to better evaluate calls for risk at each step of the process while significantly improving their overall fraud detection rates. Improved efficiencies and effectiveness of security operations led to a decrease in fraud losses immediately after implementation. Ultimately, this led to a reduction in fraud losses generating $5.5 million in savings over three years.
- **Streamlined experience for live interactions resulting in 10% operational gains for call centers.** By optimizing the authentication process for callers and eliminating two manual KBA questions, companies reduced call times by 45 seconds. Organizations saw an immediate improvement in their average handle times, with incremental productivity gains in subsequent years. Total operational gains were worth $6.8 million to the compositive organization.
- **Increased IVR containment driving $5.9 million in savings.** Pindrop enabled interviewees' organizations to use automatic number identification (ANI) verification to customize the user experience for callers. Personalized experiences helped to simplify the process, ease customer concerns with the automated system, and avoid costly interactions with call center agents. For the composite organization, this led to a 2% improvement in IVR containment over three years.
- **Improved security operations effectiveness, leading to more than $200,000 in savings.** Through improved analytics capabilities and ease of use for Pindrop's fraud protection tools, organizations reduced their investigation times by 25%. With additional productivity gains related to a drop in fraud alerts, companies could free up time for their teams valued at $217,699.

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

- **Improvement in customer and employee satisfaction.** Streamlined authentication and personalization helped to enhance the experience for callers. Internally, the ease of use of Pindrop's tools made processes easier for call center agents and security analysts alike.
- **Enablement of omnichannel call conversions.** With better information on customers' phone numbers, companies were able to convert customers to digital conversations, for example, SMS. Cross-channel conversations can help to improve interactions and garner operational gains.

> **It's better for our customers, better for our agents. It is certainly saving us money on fraud, and it does allow us to adjust faster to new trends and be able to capture them.**
>
> — VP of authentication and identity technology, banking

Costs. Risk-adjusted PV costs include:

- **Enterprise license fees of $5 million comprise 73% of total costs.** Pindrop license fees are dependent on the solutions purchased and may vary based on type of interaction and total volume. Over three years, the composite organization pays $5 million in license fees.
- **Architecting, integration, and testing costs of $1.1 million including IT team member time.** Organizations dedicated internal resources, acquired new hardware, and employed professional services to help implement and maintain Pindrop's solutions. Overall impact for the composite organization was $1.1 million.
- **Internal maintenance costs for ongoing planning and validation of $722,000.** Ongoing IT support for maintenance and projects required a small team of internal resources equivalent to 10 FTEs.

Through the interviews and financial analysis, Forrester found that a composite organization experiences benefits of $18.37 million over three years versus costs of $6.77 million, adding up to a net present value (NPV) of $11.60 million and an ROI of 171%.

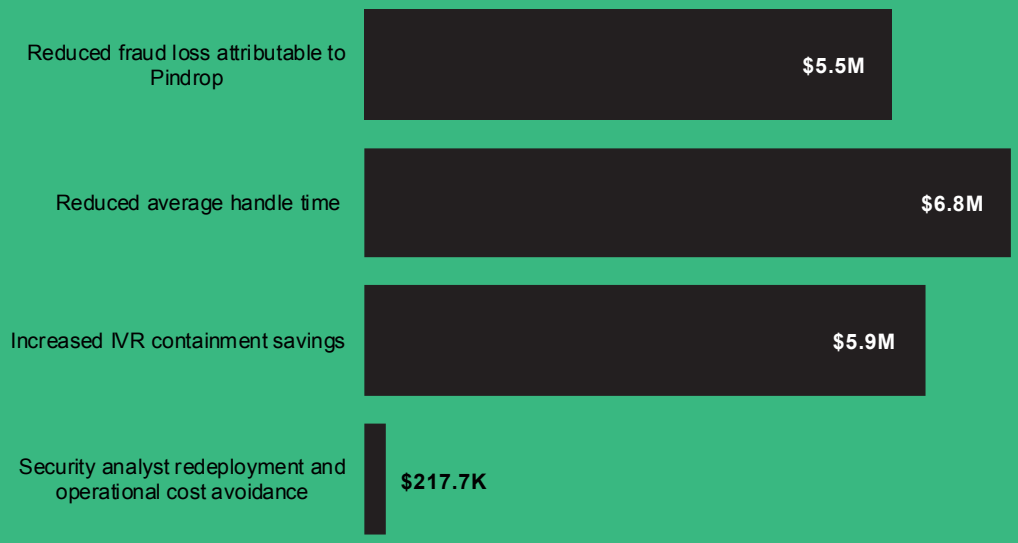
ROI
171%

BENEFITS PV
$18.37M

NPV
$11.60M

PAYBACK
<6 months

Benefits (Three-Year)



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 Pindrop

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 Pindrop can have on an organization.

DUE DILIGENCE

Interviewed Pindrop stakeholders and Forrester analysts to gather data relative to the Pindrop Protect, Passport, and VeriCall solutions.

DECISION-MAKER INTERVIEWS

Interviewed six decision-makers at organizations using Pindrop 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 decision-makers.

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 Pindrop Customer Journey

Drivers leading to the Pindrop investment

Interviewed Decision-Makers

Interviewee	Industry	Region	Revenue	Calls
Senior IT business analyst	Financial services	North America	$30 billion	20 million
Director of product and experience management	Banking	North America	$7.3 billon	50 million
Senior director of IVR	Telecommunications	North America, Europe	$100+ billion	200 million
Head of fraud and investigations	Banking	Europe	$600 million	2.5 million
VP of authentication and identity technology	Banking	North America	$5.5 billion	90 million
Voice self-service product manager	Banking	North America, Europe	$26 billion	N/A

KEY CHALLENGES

Prior to their investment in Pindrop, interviewees' organizations utilized homegrown and manual processes for their call authentication and fraud protection solutions.

The interviewees noted how their organizations struggled with common challenges, including:

- **Spiked fraud incidents with legacy solutions.** Lacking a formal fraud protection framework, interviewees' companies struggled to stay current with fraudster trends. Prior solutions were manual and inefficient in capturing fraudulent activity. The head of fraud and investigations at a banking stated: "We didn't have any control. So basically, the controls were if we heard a bad voice, we'd be playing out that recording to the agents."
- **Inefficiencies in legacy tools and processes, leading to longer average handle times and more support resources from call center agents and security operations team.** Interviewees described environments with homegrown solutions — or no solution at all. In the absence of better tools, organizations used more time-intensive, often reactionary, and manual processes to meet business objectives that could not be standardized across larger contact centers.

> **"Fraudsters came up with ways to beat our homegrown spoof detection, causing downstream impacts for account takeovers and customers losing money."**
>
> *Voice self-service product manager, banking*

- **Friction created by manual authentication processes with customers, resulting in a poor user experience.** Interviewees' companies were more dependent on verifying customer identities through KBA questions that callers were reluctant or unable to answer. The director of product and experience management at a banking organization described the experience: "Frustration as soon as you get to an agent. Then to have to manually ask them all sorts of

questions and verify their identity, when the customer just wants the answer to their question or their problem."

SOLUTION REQUIREMENTS/INVESTMENT OBJECTIVES

The interviewees' organizations searched for a solution that could:

- Reduce fraudulent activity and improve customer data protection by providing more secure authentication and enabling increased effectiveness of security operations analysts.
- Improve operational efficiencies across call center and fraud protection teams.
- Improve end-user experience and self-service through passive authentication and customer personalization.

"It's really about the risk mitigation to say that we are putting our customer needs first and doing our due diligence to ensure that we're keeping their accounts safe."

Senior IT business analyst, financial services

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 six decision-makers that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization has the following characteristics:

Description of composite. The composite organization is a multinational corporation that provides business-to-consumer support within the financial services industry. The organization generates $5 billion in annual revenue and employs 50,000 people. Its customers generate 50 million calls annually, which are supported by 1,000 call center agents. A team of 50 security operations analysts supports enterprise fraud protection.

Deployment characteristics. The composite organization utilizes the VeriCall solution across all calls coming through its IVR system, while Passport and Protect solutions support live agent calls. Prior to the Pindrop launch, 25% of calls required customer service agent support, with agents answering six calls per hour totaling 12.5 million interactions annually. The security operations team supports telephony with a team of 30 security analysts who dedicate 10% of their time to phone calls.

Key assumptions

- **$5 billion annual revenue**
- **50 million annual calls**
- **12.5 million annual live interactions**
- **1,000 customer service agents**
- **50 security operations analysts**

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	Reduced fraud loss attributable to Pindrop	$2,243,490	$2,219,775	$2,195,805	$6,659,070	$5,523,802
Btr	Reduced average handle time	$2,720,000	$2,684,640	$2,752,640	$8,157,280	$6,759,537
Ctr	Increased IVR containment savings	$2,040,000	$2,380,000	$2,720,000	$7,140,000	$5,865,064
Dtr	Security analyst redeployment and operational cost avoidance	$79,560	$89,107	$95,472	$264,139	$217,699
	Total benefits (risk-adjusted)	$7,083,050	$7,373,522	$7,763,917	$22,220,489	$18,366,102

REDUCED FRAUD LOSS ATTRIBUTABLE TO PINDROP

Evidence and data. Each of the interviewed decision-makers indicated that implementing Pindrop's solutions helped to increase their coverage against external fraud attacks while staying current on fraudster trends through the tool's analytic capabilities.

- Organizations noted annual savings as high as $5 million from fraud loss prevention based on their investments in Pindrop. The VP of authentication and identity technology for a banking organization described their experience: "You can look at the value that we actually prevent. We don't see the levels of attack that we've seen previously, and we saw that massively in the first year we had implemented [Pindrop]. We know other banks are seeing things through the telephony channels, but we're not seeing them."
- Using the combined capabilities of ANI verification, voice biometrics, and caller analytics resulted in improved efficiencies and effectiveness for security operations teams. The senior IT business analyst at a financial services organization stated: "Instead of having a reactionary model, where people are manually checking lists, we wanted something that is more proactive and automated to do the risk assessment. Fraudsters are smart, and the Pindrop tool is going to alert you on things you need to watch."
- Companies were able to improve their fraud detection rates by 20%-25% from implementation through year three of their investment.

"From a fraud incident perspective, we're able to get on top of them a lot faster than we could before. We now have the ability to see the trending for when a fraudster is coming into multiple lines of business at the same time."

Senior IT business analyst, financial services

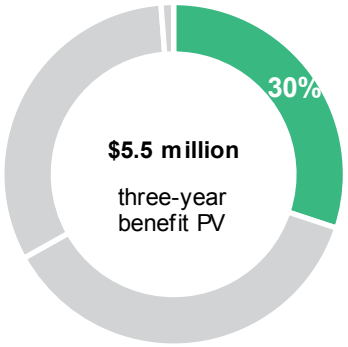
Modeling and assumptions. For the analysis, Forrester assumes the following:

- The composite organization realizes an immediate benefit from implementing Pindrop's solutions from a fraud protection perspective.
- Savings are based on external fraud loss associated with live customer service agent interactions.
- The average fraud loss per incident for organizations in the financial services industry is $2,000. This includes both large and small incidents from external telephony attacks.
- At the time of implementation the composite organization has around 60,000 fraud alerts for external fraud, ultimately leading to a $17.6 million annual fraud loss.
- Pindrop decreases fraud incidents and losses by 15% on top of existing controls and systems previously leveraged by the composite organization.

Risks. The impact of this benefit will vary among organizations depending on the following factors:

- Fraud loss per incident based on industry and business interaction type.
- Investment in security operations resources dedicated to telephony and their supporting training.

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 more than $5.5 million.



Reduced Fraud Loss Attributable To Pindrop					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
A1	Number of live agent interactions net of IVR containment	Composite	11,731,200	11,606,400	11,481,600
A2	Percentage of calls representing external fraud alerts	Interviews	0.50%	0.50%	0.50%
A3	Total annual external fraud alerts	A1*A2	58,656	58,032	57,408
A4	Percentage of external fraud alerts representing fraud incidents	Interviews	30%	30%	30%
A5	Percentage of calls representing external fraud incidents	A2*A4	0.15%	0.15%	0.15%
A6	Annual calls that represent fraud exposure	A1*A5	17,597	17,410	17,222
A7	Percentage of calls that represent actual fraud	Forrester research	50%	50%	50%
A8	Total annual external fraud incidents that cause loss	A6*A7	8,798	8,705	8,611
A9	Fraud loss per incident	Forrester research	$2,000	$2,000	$2,000
A10	Total annual external fraud cost	A8*A9	$17,596,000	$17,410,000	$17,222,000
A11	Percentage reduction in external fraud loss incidents after deployment of Pindrop	Interviews	15%	15%	15%
At	Reduced fraud loss attributable to Pindrop	A10*A11	$2,639,400	$2,611,500	$2,583,300
	Risk adjustment	↓15%			
Atr	Reduced fraud loss attributable to Pindrop (risk-adjusted)		$2,243,490	$2,219,775	$2,195,805
	Three-year total: $6,659,070		**Three-year present value: $5,523,802**		

REDUCED AVERAGE HANDLE TIME

Evidence and data. Pindrop solutions, particularly VeriCall and Passport, provided the interviewees' companies with improved efficiencies through caller ID and passive authentication. This enabled call centers to reduce the need to use KBAs and verify identities quicker, which led to operational gains within the call center.

- Organizations utilized ANI verification and ANI match to optimize the process for incoming calls. The senior director of IVR at a telecommunications company stated: "We use [VeriCall] to validate that the phone number is legitimate and so that we know we're actually speaking to that customer. Then we're able to personalize the experience for our customers since we know that they've already been passively authenticated, and we don't need to ask some additional authentication information if it matches to the mobile number we have on file."

"I do know our AHT is one of the lowest in the industry. … The Passport solution just helps us stay ahead of everyone else."

Director of product and experience management, banking

- Interviewees also were able to utilize voice biometrics and caller analytics to reduce KBAs and overall call handle times. The senior IT business analyst at a financial services company said: "Where we have the voiceprint on file, that has drastically improved our authentication process. It's given us the confidence to say you feel pretty confident you're speaking with the person who is calling in because you have both Passport and Protect running." Ultimately this helped improve CX and ease of use for agents.
- After deploying Pindrop's solutions, customers reduced average handle times an average of 45 seconds and as much as 90 seconds.

Call center manual authentication gains

Reduction of 2 KBA questions per call

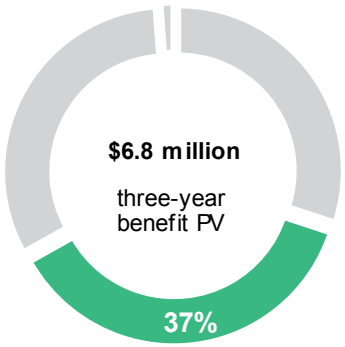
Modeling and assumptions. To reflect the interviewees' experiences, Forrester assumes the following about the composite organization:

- The composite organization sees a decrease in average handle time from deploying Pindrop's solutions in the first year, with additional efficiency gains realized in Years 2 and 3.
- The average customer service agent at the composite spends 80% of their time actively servicing customers, with the remaining portion of their work being dedicated to administrative or personal tasks.
- The average fully burdened annual salary for a customer service agent at the composite organization is $50,000.
- A conservative time savings estimate factors in a time recapture metric of 80%.

Risks. The risks associated with the reduction in average handle time benefit are as follows:

- Salaries may vary based on geographical factors, industry and employee experience.
- The average handle time and call center agent time spent with customers will impact the percentage reduction in average handle time. For instance, cutting 60 seconds off a 300-second call vs. a 600-second call is the difference between a 20% reduction and a 10% reduction.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of nearly $6.8 million.



Reduced Average Handle Time					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
B1	Number of customer service agents	Composite	1,000	940	920
B2	Percentage of customer service agent time spent servicing customers	Assumption	80%	80%	80%
B3	Percentage reduction in average handle time	Interviews	10.0%	10.5%	11.0%
B4	Customer service agent fully burdened annual compensation	TEI standard	$50,000	$50,000	$50,000
B5	Productivity recapture	Assumption	80%	80%	80%
Bt	Reduced average handle time	B1*B2*B3*B4*B5	$3,200,000	$3,158,400	$3,238,400
	Risk adjustment	↓15%			
Btr	Reduced average handle time (risk-adjusted)		$2,720,000	$2,684,640	$2,752,640
	Three-year total: $8,157,280			**Three-year present value: $6,759,537**	

INCREASED IVR CONTAINMENT SAVINGS

Evidence and data. Interviewees stated that implementing Pindrop resulted in an increase in the number of calls contained within the IVR system. The decrease in the number of live agent interactions helped the organizations to realize increasing operational gains over time.

- Interviewees described how using Pindrop's risk scores helped customize the process while streamlining calls for "green" or verified customers. The senior director of IVR at the telecommunications company said: "We know that our customers enjoy the fact that we can personalize the greeting in the IVR with their first name: We see that they're tied to the phone number on file and it's next caller green."
- The voice self-service product manager of a banking company explained: "We're protecting customer data through [Pindrop]. It's allowing fewer calls to the contact center because ANI authentication is simpler and it's also because there are calls that transfer out to the contact center and they come through as ANI-verified."

> **"Because of VeriCall, because of ANI authentication, it has opened the door for self-service capabilities within the IVR."**
>
> *Voice self-service product manager, banking*

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

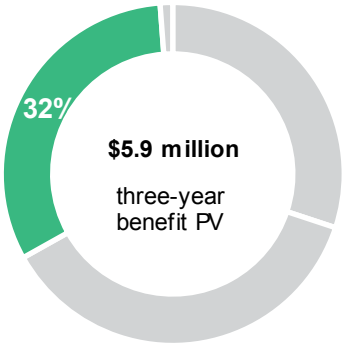
- Prior to investing in Pindrop, 20% of calls required interactions with a call center agent.
- With the use of ANI verification and customer personalization, the composite organization was able to increase the number of calls contained within the IVR system by 1.5% in the first year. The organization was able to increase its gains in subsequent years.

- The average fully burdened salary for a customer service agent at the composite organization is $50,000.
- A conservative time savings estimate factors in a time recapture metric of 80%.

Risks. The benefits for increased IVR containment will vary based on the following:

- The organization's prior solution and its capabilities.
- The volume of live agent calls as a percentage of total calls prior to implementation.
- Total call volume within the IVR system.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of nearly $5.9 million.



Increased IVR Containment Savings

Ref.	Metric	Source	Year 1	Year 2	Year 3
C1	Total call volume	Composite	49,920,000	49,920,000	49,920,000
C2	Increased IVR containment due to Pindrop deployment	Interviews	1.50%	1.75%	2.00%
C3	Decreased live agent calls due to IVR containment	C1*C2	748,800	873,600	998,400
C4	Annual calls serviced per call center agent	Composite	12,480	12,480	12,480
C5	FTE redeployment for call center agents due to IVR containment	C3/C4	60	70	80
C6	Customer service agent fully burdened annual compensation	TEI standard	$50,000	$50,000	$50,000
C7	Productivity recapture	Assumption	80%	80%	80%
Ct	Increased IVR containment savings	C5*C6*C7	$2,400,000	$2,800,000	$3,200,000
	Risk adjustment	↓15%			
Ctr	Increased IVR containment savings (risk-adjusted)		$2,040,000	$2,380,000	$2,720,000
	Three-year total: $7,140,000			**Three-year present value: $5,865,064**	

SECURITY ANALYST REDEPLOYMENT AND OPERATIONAL COST AVOIDANCE

Evidence and data. Interviewees shared experiences with manual, inefficient legacy solutions that limited the operational effectiveness of their security operations teams. Pindrop's solutions helped to reduce the volume of fraud investigations their teams completed and redeploy resources based on efficiencies gained.

- Interviewed companies used Pindrop's solution to fine-tune their fraud alerts and replace more time-intensive manual processes.
- The senior IT business analyst at a financial services company described how they've used Pindrop to improve fraud detection and gain operational efficiencies: "We're constantly fine-tuning the types of fraud that we're targeting within our environments tofeed the program better information. As the tool is generating the cases, the faster you can work cases and give the feedback of 'Was this a genuine call or was it a fraud call?', then it helps the system learn and improve how it does its evaluations."
- She continued with describing some of the tool's most valuable functionality: "It's the reporting that is available and the ability to deep-dive into the data from their user interface. It's also the ability to get the alerts and then see the trending over time."
- Decreased fraud incidents also contributed to security analyst resources being redeployed to other priorities.
- Interviewees' organizations experienced up to a 50% improvement in the time spent on each individual fraud investigation.

Modeling and assumptions. To reflect the interviewees' experiences, Forrester assumes the following about the composite organization:

- The composite organization has a team of 50 security analysts. Sixty percent of these analysts dedicate 10% of their time to call center support.
- A 15% decrease in the number of fraud alerts and incidents results in a corresponding decrease in operational support for the security operations team.
- The organization is able to improve the efficiency of its fraud investigations in the first year of operation. Additional gains come in future years as the team became more proficient with the tool.
- A conservative time savings estimate factors in a time recapture metric of 80%.

> **"There's operational efficiencies. Say I can reduce my red caller populations — even if I can get them to yellow — it's still a significant operational save."**
>
> *Director of product and experience management, banking*

Risks. Forrester recognizes that these results may not be representative of all experiences, and the benefits will vary depending on:

- The organization's prior solution and its capabilities.
- The skill set and training of the security operations analysts using the tool.

Results. To account for these risks, Forrester adjusted this benefit downward by 15%, yielding a three-year, risk-adjusted total PV of nearly $218,000.

Security Analyst Redeployment And Operational Cost Avoidance					
Ref.	**Metric**	**Source**	**Year 1**	**Year 2**	**Year 3**
D1	Number of security analysts	Composite	50	48	45
D2	Security analyst fully burdened annual compensation	TEI standard	$130,000	$130,000	$130,000
D3	Percentage of security analysts supporting call center fraud	Interviews	60%	60%	60%
D4	Percentage of time dedicated to call center support	Interviews	10%	10%	10%
D5	Percentage reduction in average fraud investigation time	Interviews	15%	20%	25%
D6	Subtotal: reduction in fraud investigation costs	D1*D2*D3*D4*D5	$58,500	$74,880	$87,750
D7	Deflected fraud incidents based on Pindrop deployment	Interviews	15%	15%	15%
D8	Subtotal: deflected fraud incident costs	D1*D2*D3*D4*D7	$58,500	$56,160	$52,650
D9	Productivity recapture	Assumption	80%	80%	80%
Dt	Security analyst redeployment and operational cost avoidance	(D5+D7)*D9	$93,600	$104,832	$112,320
	Risk adjustment	↓15%			
Dtr	Security analyst redeployment and operational cost avoidance (risk-adjusted)		$79,560	$89,107	$95,472
	Three-year total: $264,139			**Three-year present value: $217,699**	

UNQUANTIFIED BENEFITS

Additional benefits that interviewees' organizations experienced but were not able to quantify include:

- **Improvement of customer and employee satisfaction scores.** Interviewees described how improved handle times, reductions in KBA questions, and personalization improved the call experience for customers and employees alike.
    - **Reduction in friction during live agent interactions.** By eliminating the need for manual authentication, agents were able to avoid situations where customers were reluctant or frustrated to share personal information.
    - **Focused conversations with consumers.** As shared by the head of fraud and investigations for a banking company: "It's enabled us to focus on customer experience in other areas. Rather than worrying about [authentication], now we can channel agents in a way to deliver better conversations outside of the [authentication] process and not taking up too much time there."
    - **Ease of use for internal users.** Interviewees described a seamless experience for call center agents coupled with an interface that helped make risk analysis easier for security analysts.

“The feedback that we have gotten from the agents has been very positive. In general, we are helping to make their lives easier to be able to authenticate the account.”

— VP of authentication and identity technology, banking

- **Ability to convert calls to digital authentication.** Interviewees discussed how Pindrop features helped their companies verify customer information and improve operations across communication channels. The senior director of IVR at a telecommunications organization stated: “One of the big things we want to do is get as many customers to digital as possible. And we want people to know we’re dealing with as many as we can on their verified mobile number on file because we’re able to send them service-related alerts.”

FLEXIBILITY

The value of flexibility is unique to each customer. There are multiple scenarios in which a customer might implement Pindrop and later realize additional uses and business opportunities, including improved business agility to drive other business initiatives. The senior director of IVR at a telecommunications company discussed how Pindrop enables other projects and workflows: “We’ve been able to leverage the VeriCall technology to our advantage on other projects. Now we know definitively that we’re dealing with the customer. So now, we don’t need to ask additional challenge questions. It has made it a lot easier; it’s been less cumbersome.” It also helps improve the agent experience, allowing them to focus on the customer and their needs. This ultimately impacts agent satisfaction with their toolset, and it helps lengthen their tenure at a company.

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 as applied to the composite

Total Costs							
Ref.	**Cost**	**Initial**	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present Value**
Etr	Software license fees	$0	$1,996,800	$1,996,800	$1,996,800	$5,990,400	$4,965,746
Ftr	Architecting, integration, and testing costs	$863,480	$88,232	$88,232	$88,232	$1,128,176	$1,082,900
Gtr	Planning and validation costs	$0	$290,138	$290,138	$290,138	$870,414	$721,531
	Total costs (risk-adjusted)	$863,480	$2,375,170	$2,375,170	$2,375,170	$7,988,991	$6,770,177

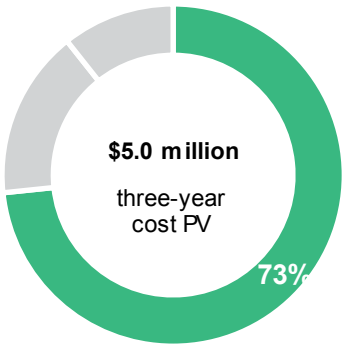
SOFTWARE LICENSE FEES

Evidence and data. This category reflects the direct costs that the composite organization pays to Pindrop for its products. License fee costs are dependent on which solutions are deployed as well as the number of calls utilizing each of Pindrop's products.

Modeling and assumptions. For the analysis, Forrester assumes that the subscription tier was selected based on a composite with 50 million total calls and 12.5 million live call center agent interactions.

Risks. The risks associated with Pindrop license fees category include how an organization utilizes Pindrop's solutions for its calls, which can impact the combined pricing of license fees.

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV (discounted at 10%) of less than $5.0 million.



Software License Fees						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
E1	Average license fee for combined Pindrop products	Interviews		$1,996,800	$1,996,800	$1,996,800
Et	Software license fees	E1	$0	$1,996,800	$1,996,800	$1,996,800
	Risk adjustment	0%				
Etr	Software license fees (risk-adjusted)		$0	$1,996,800	$1,996,800	$1,996,800
	Three-year total: $5,990,400			**Three-year present value: $4,965,746**		

ARCHITECTING, INTEGRATION AND TESTING COSTS

Evidence and data. The interviewees revealed the following about their organizations' initial implementation and continued IT architecture costs for Pindrop's solutions:

- Organizations required a dedicated team ranging from four to 15 internal resources — including senior leaders, business analysts, IT infrastructure architects, and security analysts — during implementation. Key tasks included planning/mapping, integration and testing of the solution during implementation as well as limited IT architecture support after implementation.
- Additional implementation costs were typically required for new hardware (such as additional servers), as were professional services fees for integration tasks or other services including API development and carrier setup costs.
- Implementation of Pindrop's solutions typically lasted three to seven months. Longer implementations utilized phased rollouts and smaller support teams.

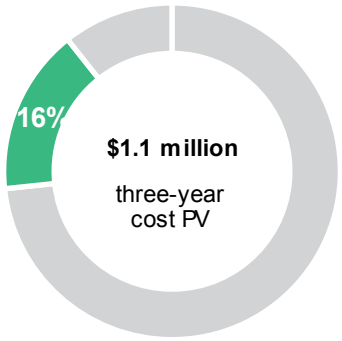
Modeling and assumptions. For the financial analysis, Forrester assumes that:

- An IT infrastructure architect earns a fully loaded annual compensation of $146,894; this was used as the model for the entire implementation team.
- Ongoing maintenance of hardware and integrations is 25% of initial investment for the composite organization.
- The composite organization opted to implement the solution all at once rather than using a phased approach.

Risks. The impact of these costs will vary among organizations depending on the following factors:

- Size of team and length of implementation depends on Pindrop products implemented and complexity of the organization's existing infrastructure.
- Salaries depend on industry, geography, and the skill set of individuals executing tasks.

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of less than $1.1 million.



Architecting, Integration, And Testing Costs						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
F1	Number of FTEs supporting implementation tasks	Interviews	10	1	1	1
F2	IT infrastructure architect fully burdened annual compensation	TEI standard	$146,894	$146,894	$146,894	$146,894
F3	Length of support (months)	Interviews	6	12	12	12
F4	Percentage of IT infrastructure architect's time dedicated to implementation	Interviews	75%	50%	50%	50%
F5	Subtotal: IT architecture costs	F1*F2*(F3/12)*F4	$550,853	$36,724	$36,724	$36,724
F6	Hardware and integrations	Interviews	$200,000	$40,000	$40,000	$40,000
Ft	Architecting, integration and testing costs	F1*(F2/2)*F6	$750,853	$76,724	$76,724	$76,724
	Risk adjustment	↑15%				
Ftr	Architecting, integration and testing costs (risk-adjusted)		$863,480	$88,232	$88,232	$88,232
	Three-year total: $1,128,176			**Three-year present value: $1,082,900**		

PLANNING AND VALIDATION COSTS

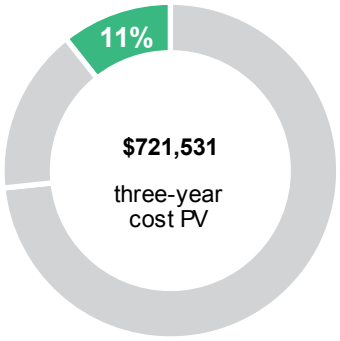
Evidence and data. The cost category represents the internal resource costs required to maintain and support Pindrop's solutions. Based on feedback from the six interviewees, a small team was dedicated to IT support and projects related to Pindrop.

Modeling and assumptions. For the analysis, Forrester assumes that two IT analysts and one IT business lead are fully dedicated to supporting Pindrop's solutions internally at the composite organization.

Risks. The risks associated with the planning and validation costs category are as follows:

- Salaries are variable, depending on industry, geography, and the skill set of individuals executing tasks.
- Ongoing support for Pindrop depends on products deployed and the skill set of the individuals dedicated to those products.

Results. To account for these risks, Forrester adjusted this cost upward by 15%, yielding a three-year, risk-adjusted total PV of less than $722,000.

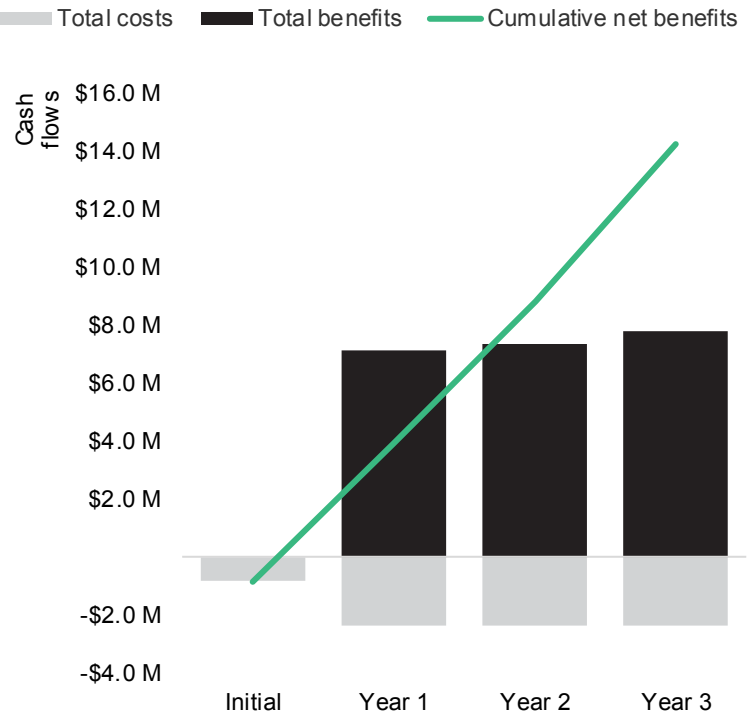


Planning And Validation Costs						
Ref.	**Metric**	**Source**	**Initial**	**Year 1**	**Year 2**	**Year 3**
G1	Number of IT support analysts	Interviews		2	2	2
G2	IT support analyst fully burdened annual compensation	TEI standard		$72,847	$72,847	$72,847
G3	Subtotal: IT support analyst costs	G1+G2		$145,694	$145,694	$145,694
G4	Number of IT business leads	Interviews		1	1	1
G5	IT business lead fully burdened annual compensation	TEI standard		$106,600	$106,600	$106,600
G6	Subtotal: IT business lead costs	G4+G5		$106,600	$106,600	$106,600
Gt	Planning and validation costs	G3+G6	$0	$252,294	$252,294	$252,294
	Risk adjustment	↑15%				
Gtr	Planning and validation costs (risk-adjusted)		$0	$290,138	$290,138	$290,138
	Three-year total: $870,414			**Three-year present value: $721,531**		

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 composite 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	($863,480)	($2,375,170)	($2,375,170)	($2,375,170)	($7,988,991)	($6,770,177)
Total benefits	$0	$7,083,050	$7,373,522	$7,763,917	$22,220,489	$18,366,102
Net benefits	($863,480)	$4,707,880	$4,998,352	$5,388,747	$14,231,498	$11,595,925
ROI						171%
Payback (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 Sources are calculated for each total cost and benefit estimate. NPV Sources in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value Sources 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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