The Total Economic Impact™ Of NCR Software Defined Store Enabled By Zynstra

Cost Savings And Business Benefits
Enabled By Software Defined Store

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ABOUT FORRESTER CONSULTING

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Key Benefits

Better performance and store efficiency:
$6.39 million

Avoided revenue loss due to unplanned downtime:
$2.67 million

Hardware cost savings:
$5.44 million

Software maintenance cost savings:
$1.50 million

Executive Summary

In the age of the customer, it's not just online retailers that are battling to provide customers with the most seamless, frictionless experience. With eCommerce giants encroaching into the brick-and-mortar space, traditional retailers are also under pressure to innovate and digitalize store operations. NCR Software Defined Store enabled by Zynstra provides store virtualization and automation by integrating in-store touchpoints (including front-of-store devices, back-of-store devices, and other peripherals) under an intelligent retail store architecture, run primarily on a virtualized server.

NCR and Zynstra commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying Software Defined Store. This study aims to provide readers with a framework to evaluate the potential financial impact of this solution on their retail organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed two customers with experience using Software Defined Store across a large store estate. Prior to using Software Defined Store, the customers used hardware-centric legacy IT infrastructure that was complex, lacked integration, and could not keep up with modern retail requirements. This rendered upgrades slow and cumbersome, which caused downtime affecting store operations and stores' ability to serve customers.

Forrester used inputs from the first customer to illustrate the quantifiable benefits, costs of investing in Software Defined Store, and financial analysis, while the second interview provided additional context and information around the Software Defined Store customer journey.

Key Findings

Quantified benefits. The following risk-adjusted present value (PV) quantified benefits are representative of those experienced by the company interviewed:

› **Improved performance and store efficiency by 10%.** Improving the speed of the point-of-sale (POS) system by 10%, thus speeding up checkout time, drove better customer satisfaction. This contributed to an incremental profit of $6.39 million over a three-year period, through improved revenue opportunities and a reduction in cart abandonment.

› **Avoided revenue loss due to 50% reduction in unplanned downtime.** Any unplanned downtime can be costly for a retailer as it may lead to lost business opportunities — including loss of customers and revenue. The Software Defined Store deployment helps organizations avoid losses associated with downtime or recovery from downtime more quickly. The total downtime avoidance of 1,395 hours over a three-year period translated to a present value (PV) of $2.67 million.
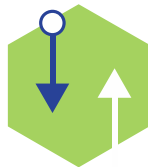
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**ROI
164%**

**Benefits PV
$15.9 million**

**NPV
$9.9 million**

***Payback
6 months**

> **Hardware cost savings of $5.44 million.** The Software Defined Store virtualization solution helped the customer overcome end-of-life challenges by enabling newer versions of POS software to run on existing hardware, reducing major costs on new hardware purchase. This resulted in annual hardware cost savings of 57% per store. All remaining workloads have been virtualized within a typical store, including six POS systems, two manager workstations, and additional applications across loyalty, kitchen production, and payments.

> **Cost savings of $1.5 million on software upgrade and maintenance.** The interviewed organization experienced a 50% reduction in break-fix and software maintenance costs since the implementation of Software Defined Store. This adds up to a total cost savings of $1.5 million over a three-year period, as the organization scaled up its deployment across all its stores.

Unquantified benefits. The interviewed organizations experienced the following benefits, which are not quantified for this study:

> **Speed and efficiency improvements in setting up new stores or integrating newly acquired stores.** With a software-defined store model, retailers can build a standard, virtualized store image that can easily be scaled and replicated across new stores. This helps organizations save almost half of their time and effort in integrating older systems (in the case of store acquisitions) and programming new hardware (in the case of organic expansions).

Costs. Total costs associated with the investment in Software Defined Store and implementation fell across three key categories:

> **License, maintenance, and service costs of $5.4 million.** These costs were incurred on the number of virtual machines (VM) required per store, amounting to a total PV of $5.4 million for the interviewed organization. NCR and Zynstra can provide a tailored quote based on specific needs and volume.

> **Due diligence, implementation, and ongoing management efforts amounting to a cost of $490,567.** The interviewed organization relayed that implementation was straightforward, and minimal resource time was required. Currently, one existing full-time employee oversees, manages, and monitors the Software Defined Store deployment.

> **Professional services, training, and workshop costs of $179,421.** As Software Defined Store implementation is likely part of a strategic investment for multiple stores, Forrester has factored in additional professional service/training/workshop costs.

Forrester's interviews with two existing customers and subsequent financial analysis found that a typical organization with approximately 750 retail stores experiences benefits of $15.9 million over three years versus costs of $6.1 million, adding up to a net present value (NPV) of $9.9 million and an ROI of 164%. The payback period is six months. Depending on the size and scope of implementation, on average most clients would expect to receive payback within six to 18 months.

"With Software Defined Store, opening a new store is much quicker than before. There is probably 50% savings in time and effort. We expect things like faster acquisition."

Senior director, retail technology
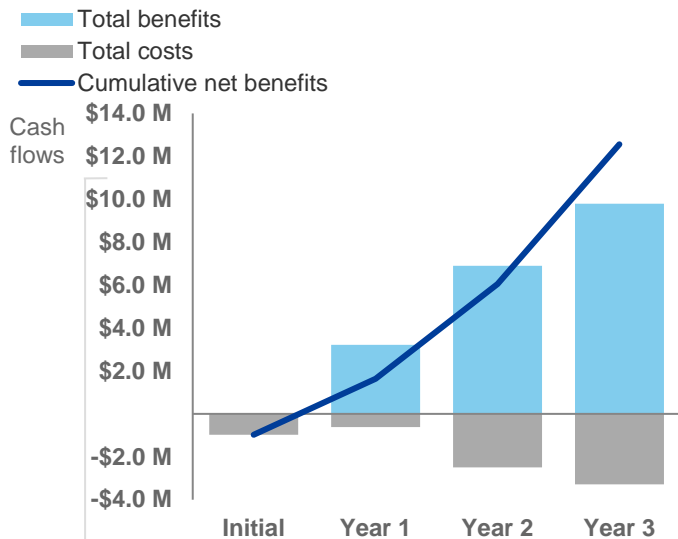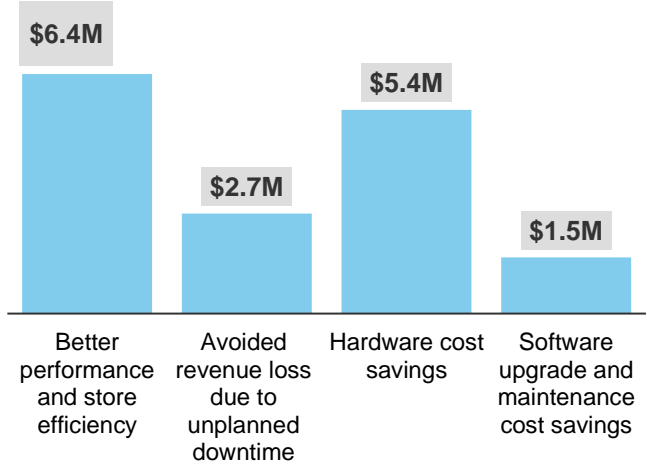
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Total benefits, total costs, and cumulative net benefits

Legend:
- Total benefits
- Total costs
- Cumulative net benefits

Cash flows chart (Initial, Year 1, Year 2, Year 3) with axis from -$4.0 M to $14.0 M.

Benefits (Three-Year)

Benefit	Value
Better performance and store efficiency	$6.4M
Avoided revenue loss due to unplanned downtime	$2.7M
Hardware cost savings	$5.4M
Software upgrade and maintenance cost savings	$1.5M

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TEI Framework And Methodology

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing NCR Software Defined Store enabled by Zynstra.

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 Software Defined Store can have on an organization:

DUE DILIGENCE
Interviewed NCR and Zynstra stakeholders and Forrester analysts to gather data relative to Software Defined Store.

CUSTOMER INTERVIEWS
Interviewed two organizations using Software Defined Store to obtain data with respect to costs, benefits, and risks.

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 interviewed organizations.

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

> The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

DISCLOSURES

Readers should be aware of the following:

This study is commissioned by NCR and Zynstra 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 report to determine the appropriateness of an investment in NCR Software Defined Store enabled by Zynstra. NCR and Zynstra make no promises or guarantees with respect to specific cost savings that may be realized through implementing Software Defined Store. A variety of customer-specific factors outside of NCR's and Zynstra's control determine cost savings, and actual financial impacts will vary.

NCR and Zynstra 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.

NCR and Zynstra provided the customer names for the interviews but did not participate in the interviews.

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The Software Defined Store Customer Journey

BEFORE AND AFTER THE SOFTWARE DEFINED STORE INVESTMENT

Interviewed Organizations

For this study, Forrester conducted two interviews with Software Defined Store customers. Both customers have a chain of retail stores in North America. Forrester used inputs from the first customer to illustrate the quantifiable benefits, costs of investing in Software Defined Store, and financial analysis, while the second interview provided additional context and information around the Software Defined Store customer journey. Interviewed customers are described as follows:

RETAILER TYPE	HEADQUARTERS	EMPLOYEES	INTERVIEWEE ROLE
Retail stores	United States	> 20,000	Senior director, retail technology
Retail stores	United States	> 40,000	Director, retail technology

Key Challenges

Prior to store virtualization, retailers typically used a hardware-centric legacy technology infrastructure and distributed software model. Applications such as point of sale (POS) usually ran on each store's local hardware, tied to in-store devices and peripherals such as scanners, cash drawers, and card readers. It required local configuration and management that could be costly and inflexible. Service innovation, customer experience enhancement, and cost management were critical — but a vision for constant, rapid in-store innovation was being held back.

The interviewed organizations faced the following challenges:

› **Traditional POS systems not keeping up with customer expectations of checkout speed.** Keeping checkout speeds as short as possible is integral for providing good customer experience and improving store associate productivity.

› **Unplanned downtime.** The complex store IT infrastructure, common in many retail operations, makes delivery and management of software difficult on multiple types of devices, a major operational challenge often leading to unplanned downtime due to hardware and software malfunction.

› **Legacy systems hindering the retail store modernization.** Retailers need to experiment with new applications and services to deliver better customer experiences, and then deploy quickly when value is proven. But legacy IT solutions don't provide the flexibility and control required to deliver continuous innovation, without risks to business continuity.

> "We see improved point-of-sale transaction speed from Software Defined Store investments. Another benefit seen is reduced downtime whether planned or unplanned."
>
> *Senior director, retail technology*

> "Software Defined Store enables faster rollout of applications, which can be time-consuming, especially when there are multiple stores across the country."
>
> *Senior director, retail technology*

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Solution Requirements

The interviewed organizations searched for a solution that:

› **Was easy to deploy and required minimal hardware investments.** Deploying technology innovation that drives business value from self-service to loyalty apps in each location takes months of planning. This held back the company's ambitions — driving costs up and throttling down the speed of innovation. The company sought a solution that optimized its existing store technology and avoided expensive store IT overhauls.

› **Reliability, resilience, scalability, and associate enablement.** The bottom line: If the POS operations fails, retailers cannot trade. POS solutions and integrated peripherals must guarantee trading continuity during network failure or operating system malfunction and provide improved scalability under variable workloads. The interviewed organization required a more secure and scalable solution. Additionally, it wanted to boost store associate efficiency as it increasingly aimed to deliver better in-person services and improved customer experience.

› **Improved performance and faster remediation.** The organization need an intelligent control plane (ICP) to monitor the performance of the stores remotely. This would improve store operations, speed identification of issues, provide timely resolution, mitigate risks, and reduce outages.

"Our global initiative, which we call Next Gen Retail Platform (NGRP) to define technology for future stores led us to a virtualization solution."

Director, retail technology

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Key Results

The interviews revealed that key results from the Software Defined Store investment include:

› **Improved store performance and efficiency**. Virtualizing existing POS systems has significantly enhanced transaction performance, enabling the store associates to deliver better services and customer experience while reducing line-waiting times. With faster checkout speeds, store associates are better equipped to drive higher levels of engagement with customers.

› **Avoided revenue loss due to unplanned downtime and maintenance.** Interviewed organization reported that outdated, cumbersome legacy systems and applications have a high risk of unplanned downtime, software maintenance, and break-fix. The advantage of Software Defined Store for that customer organization is the ability to remotely manage store infrastructure and systems. With a comprehensive picture of the physical and virtual environments, including workload distribution, real-time system performance, and health metrics, the customer has experienced faster root-cause analysis and fewer help desk tickets.

› **Hardware optimization and faster rollout.** Moving to Software Defined Store has helped the organizations overcome operating system end-of-life challenges, reuse existing hardware, greatly reduce the cost for new hardware purchase, and quickly deploy new applications or capabilities in-store more efficiently.

> "With everything being virtualized, I'm able to leverage Software Defined Store to look at the entire environment and help me troubleshoot or fix a problem much quicker than I have in the past."
>
> *Senior director, retail technology*

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Analysis Of Benefits

QUANTIFIED BENEFIT DATA

Total Benefits

Ref.	Benefit	Year 1	Year 2	Year 3	Total	Present Value
Atr	Better performance and store efficiency	$993,384	$2,643,229	$4,391,171	$8,027,784	$6,386,715
Btr	Avoided revenue loss due to unplanned downtime	$432,000	$1,116,000	$1,800,000	$3,348,000	$2,667,408
Ctr	Hardware cost savings	$1,544,832	$2,519,364	$2,594,944	$6,659,140	$5,436,131
Dtr	Software upgrade and maintenance cost savings	$243,000	$627,750	$1,012,500	$1,883,250	$1,500,417
	Total benefits (risk-adjusted)	$3,213,216	$6,906,343	$9,798,616	$19,918,174	$15,990,671

Better Performance And Store Efficiency

According to the interviewed organization, the primary benefits of Software Defined Store investments are improved POS speed, better performance, and increased store efficiency. POS systems are critical to manage store sales, returns, pricing, discounts, and loyalty policies; provide detailed performance reports; and optimize cash management across multiple locations and store formats. Virtualizing existing POS systems has increased the transaction performance and improved customer experience.

› The interviewed organization reported a 10% improvement in POS speed after installation of Software Defined Store.

› The first wave of Software Defined Store implementation focuses on 180 retail stores in Year 1. In Year 2, the organization virtualizes an additional 38% of stores (285 stores) under Software Defined Store. In Year 3, an additional 285 stores migrate to a software-defined store model.

› According to the interviewed organization, the average number of customers served per day in each store is estimated at 2,100. For Year 2 and Year 3 the model assumes 3% growth rate for the number of customers served by Software Defined Store.

Modeling and assumptions. Based on customer interviews, the model assumes:

› Three in 200 store customers might abandon their shopping carts due to slower POS checkout.

› The model also adjusts for a 50% retention ratio because not every customer retained due to enhanced engagement and faster POS checkout enabled by Software Defined Store might put back into company revenue.

› In addition, the model uses a $12 average POS order value per customer.

The model accounts for a risk adjustment that could impact the value of benefits. Below are risks to consider:

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total benefits to be a PV of more than $15.9 million.

"In the virtualized environment, I have much better control over stores. With everything virtualized with a single platform, I feel much better about encryption and security and transactions over the wire. So, I have improved my security posture as well as the implementation."

Senior director, retail technology

Better performance and store efficiency: 40% of total benefits

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

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› Variance in store customers leaving due to slower POS checkout.

› Variance in POS order value per store customer.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of $6,386,715.

	Better Performance And Store Efficiency: Calculation Table				
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
A1	Number of retail stores enabled with Software Defined Store	Customer provided	180	465	750
A2	Average number of customers served each day per store	Year 1: Customer provided. Year 2 and Year 3: Assumption (incl. 3% YoY increase)	2,100	2,163	2,228
A3	Average number of customers served annually by the stores	A1*A2*365	137,970,000	367,115,175	609,884,888
A4	Percentage of existing or potential customers lost due to slow POS checkout	Assumption	1.50%	1.50%	1.50%
A5	Average number of customers lost due to slow POS checkout	A3*A4	2,069,550	5,506,728	9,148,273
A6	POS speed improvement enabled by Software Defined Software	Customer provided	10%	10%	10%
A7	Average percentage of customers retained due to engagement enhancement and faster POS checkout enabled by Software Defined Store	Assumption	50%	50%	50%
A8	Number of customers retained due to engagement enhancement and faster POS checkout enabled by Software Defined Store	A5*A6*A7	103,478	275,336	457,414
A9	Average order value per customer transaction	Assumption	$12	$12	$12
At	Better performance and store efficiency	A8*A9	$1,241,730	$3,304,037	$5,488,964
	Risk adjustment	↓20%			
Atr	Better performance and store efficiency (risk-adjusted)		$993,384	$2,643,229	$4,391,171

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Avoided Revenue Loss Due To Unplanned Downtime

Any unplanned downtime can be costly as it may lead to lost business opportunities — including loss of customers and revenue. Software Defined Store deployment may help organizations avoid losses associated with downtime and fix issues faster.

The interviewed organization has avoided 50% of downtime due to the enablement of Software Defined Store. Speedier diagnosis and resolution of issues have led to a clear advantage, and reduced preparation and execution effort have resulted in fewer interventions and costly site visits for updates.

Modeling and assumptions. Based on customer interviews, the model uses $3,000 for average revenue loss per year due to downtime per store.

The model accounts for a risk adjustment that could impact the value of benefits. Below are risks to consider:

› Variance in revenue loss due to downtime per store.

› Variance in downtime avoided due to Software Defined Store enablement.

To account for these risks, Forrester adjusted this benefit downward by 20%, yielding a three-year risk-adjusted total PV of $2,667,408.

Reduction in unplanned downtime: 17% of total benefits

"Software Defined Store has introduced lots of flexibility; we are able to do things like mobile point of sale."

Senior director, retail technology

Avoided Revenue Loss Due To Unplanned Downtime: Calculation Table					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
B1	Number of retail stores enabled with Software Defined Store	Customer provided	180	465	750
B2	Average downtime per store due to unplanned outage before Software Defined Store (in hours/year)	Assumption	2	2	2
B3	Downtime avoided due to Software Defined Store enablement	Customer provided	50%	50%	50%
B4	Total downtime avoided for stores	B1*B2*B3	180	465	750
B5	Average revenue loss due to downtime per store per year	Assumption	$3,000	$3,000	$3,000
Bt	Avoided revenue loss due to unplanned downtime	B4*B5	$540,000	$1,395,000	$2,250,000
	Risk adjustment	↓20%			
Btr	Avoided revenue loss due to unplanned downtime (risk-adjusted)		$432,000	$1,116,000	$1,800,000

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Hardware Cost Savings

Prior to deploying Software Defined Store, the interviewed organization was impacted by hardware dependency and changes to the lifecycle of its operating system at every lane. Device-driven POS systems, with each terminal running its own hardware, operating system, and application, are completely dependent on vendor-dictated product and support cycles. The traditional hardware cost per store would have been $16,536 for Year 1, which includes six POS systems, two manager workstations, and additional applications across loyalty, kitchen production, and payments. This was a significant concern, as the organization would have to replace perfectly functional POS solutions to enable continued support and compliance, with significant costs. However, moving to a virtualized POS solution not only helped the organization overcome end-of-life challenges at every lane, but also extend the life of existing hardware to reduce major costs on new hardware purchases.

Looking ahead, the interviewed organization now has the flexibility to invest in thin client hardware at a considerably cheaper cost than traditional hardware due to Software Defined Store virtualization. In addition, the organization can run multiple applications on a single device, thus reducing the number of single-purpose pieces of hardware in the store.

Based on the interviewed organization's specific requirements, the average hardware cost estimated per store in a software-defined store model is $7,000 for Year 1. This results in direct hardware cost savings of $9,536 per store. This benefit further multiplies when calculated for all stores.

The model accounts for a risk adjustment that could impact the value of benefits. Below are risks to consider:

› Variance in hardware costs.

› Ongoing thin client/reduction in physical footprint and costs.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $5,436,131.

Hardware cost savings: 34% of total benefits

Hardware Cost Savings: Calculation Table					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
C1	Number of retail stores enabled with Software Defined Store	Customer provided	180	285	285
C2	Traditional hardware cost per store before Software Defined Store	Assumption (incl. 3% YoY increase)	$16,536	$17,032	$17,543
C3	Average hardware cost per store with Software Defined Store (*Specific to customer requirement/need)	Assumption (incl. 3% YoY increase)	$7,000	$7,210	$7,426
C4	Hardware cost savings per store with Software Defined Store	C2-C3	$9,536	$9,822	$10,117
Ct	Hardware cost savings	C1*C4	$1,716,480	$2,799,293	$2,883,272
	Risk adjustment	↓10%			
Ctr	Hardware cost savings (risk-adjusted)		$1,544,832	$2,519,364	$2,594,944

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Software Upgrade And Maintenance Cost Savings

Software upgrades and maintenance across multiple computing touchpoints running multiple applications and operating systems can be very complex — even more so when retail stores are distributed across a wide geographic region and manually managed, site by site, application by application. It demands expensive and highly skilled systems integration and support resources, leading to inefficiency and increasing costs from an ever-growing list of IT equipment, mushrooming support costs, staff training, and built-in business inflexibility, all at a time when there is mounting pressure to reduce the cost to serve.

Software Defined Store has a centralized management platform that has enabled the interviewed organization to rapidly deploy software updates remotely to in-store systems at approximately half the cost, with less effort, improved turnaround time, and reduced field visits. In addition, the removal of the hard drive from the POS removes the need for site visits to reimage discs from broken or corrupted hard drives.

Forrester assumes that, prior to deploying Software Defined Store, the average break-fix and software upgrade cost for device-driven applications was $3,000 per store, annually. This cost included standard break-fix, physical hardware, three to five site visits, software upgrades, maintenance, and other subsidiary costs.

The model accounts for a risk adjustment that could impact the value of benefits. Below are risks to consider:

> Variance in the break-fix and software upgrade cost.

> Level of inefficiencies across software applications.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of $1,500,417.

Software upgrade and maintenance cost savings: 9% of total benefits

Software Upgrade And Maintenance Cost Savings: Calculation Table					
Ref.	Metric	Calculation	Year 1	Year 2	Year 3
D1	Number of retail stores enabled with Software Defined Store	Customer provided	180	465	750
D2	Average break-fix and software upgrade cost for device-driven applications per store annually (before SDS)	Assumption	3,000	3,000	3,000
D3	Average break-fix and software upgrade cost for device-driven applications for all stores annually (before SDS)	D1*D2	540,000	1,395,000	2,250,000
D4	Reduction in break-fix and software upgrade cost post enabling Software Defined Store	Customer provided	50%	50%	50%
Dt	Software upgrade and maintenance cost savings	D3*D4	$270,000	$697,500	$1,125,000
	Risk adjustment	↓10%			
Dtr	Software upgrade and maintenance cost savings (risk-adjusted)		$243,000	$627,750	$1,012,500

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Unquantified Benefits

The interviewed organizations experienced the following benefits, which are not quantified for this study:

› **Speed and efficiency improvements in setting up new stores or integrating newly acquired stores.** With Software Defined Store, retailers can build a standard, virtualized store image that can easily be scaled and replicated across new stores. This helps organizations save almost half of their time and effort in integrating existing systems into the desired store format (in the case of store acquisitions) and provisioning new hardware (in the case of organic expansions).

Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Software Defined Store and later realize additional uses and business opportunities, including:

› Faster expansion of the geographic store footprint globally.

› Easier implementation of Mobile POS.

› Extension of the use of existing hardware, i.e., being able to consider different technology platforms and operating systems and better manage financial risks.

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

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a future additional investment. This provides an organization with the "right" or the ability to engage in future initiatives but not the obligation to do so.

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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	License, maintenance, and service costs	$665,280	$495,000	$2,332,110	$3,115,860	$6,608,250	$5,383,635
Ftr	Due diligence, implementation, and ongoing management	$198,000	$114,400	$117,832	$121,367	$551,599	$490,567
Gtr	Professional services, training, and workshop costs	$110,000	$0	$44,000	$44,000	$198,000	$179,421
	Total costs (risk-adjusted)	$973,280	$609,400	$2,493,942	$3,281,227	$7,357,849	$6,053,623

License, Maintenance, And Service Costs

Fees for Software Defined Store include licensing fees, annual maintenance, and service fees. The license, maintenance, and service costs post risk-adjustment is $1.16 million for 180 stores. Costs total $2.3 million in Year 2 and $3.1 million in Year 3 as the remaining 570 stores are deployed.

Licensing, maintenance, and service costs will vary based on the number of retail stores and number of systems virtualized.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $5,383,635.

> The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total costs to be a PV of nearly $6.1 million.

License, Maintenance, And Service Costs: Calculation Table							
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	
E1	Number of retail stores enabled with Software Defined Store	Customer provided		180	465	750	
E2	Average number of checkout lanes per store	Customer provided		6	6	6	
E3	License, maintenance, and service cost (annually) for all stores enabled with Software Defined Store	NCR/Zynstra provided	$604,800	$450,000	$2,120,100	$2,832,600	
Et	License, maintenance, and service costs	E3	$604,800	$450,000	$2,120,100	$2,832,600	
	Risk adjustment	↑10%					
Etr	License, maintenance, and service costs (risk-adjusted)		$665,280	$495,000	$2,332,110	$3,115,860	

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Due Diligence, Implementation, And Ongoing Management

According to the customer, Software Defined Store deployment was straightforward, and the required resource time was minimal. Successful deployments require resource hours at project feasibility and an implementation stage over a few weeks. Specific due diligence and implementation tasks include:

› Spending time with NCR and Zynstra to understand how the solution could support management of the virtual infrastructure.

› Working with NCR and Zynstra on requirements, software setup, network and environment integration, configuration, testing, and customization.

Now that the solution is up and running, the interviewed organization dedicates one existing full-time employee to oversee, manage, and monitor the Software Defined Store deployment.

Implementation costs will vary depending on:

› Resource salary/costs.

› The size and scope of implementation.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $490,567.

Due diligence, implementation, and ongoing management: 8% of total costs

One FTE spends 100% of time on ongoing management and support of Software Defined Store.

Due Diligence, Implementation, And Ongoing Management: Calculation Table						
Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
F1	Internal FTEs involved in planning, testing, and deployment	Customer provided	10			
F2	Average fully loaded salary per hour	Assumption (incl. 3% YoY increase)	$50.00	$50.00	$51.50	$53.05
F3	Per FTE hours spent on planning, testing, and deployment	Customer provided	360			
F4	Internal FTEs for ongoing management and support	Customer provided		1	1	1
Ft	Due diligence, implementation, and ongoing management	(F1*F2*F3)+(F4*2,080*F2)	$180,000	$104,000	$107,120	$110,334
	Risk adjustment	↑10%				
Ftr	Due diligence, implementation, and ongoing management (risk-adjusted)		$198,000	$114,400	$117,832	$121,367

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Professional Services, Training, And Workshop Costs

As a Software Defined Store implementation is likely part of a strategic investment for multiple stores, Forrester has factored in additional professional service/training/workshop costs to provide formal support, training material, and efficient store operations.

The model uses $100,000 as upfront professional services, training, and workshop costs in Year 1. However, for subsequent years, the model expects the annual cost to reduce to $40,000. This is primarily because the initial training/support programs can be repurposed for the following years and because of increased comfort/awareness of Software Defined Store among store-level associates.

Professional services, training, and workshops costs will vary depending on the size and scope of implementation.

To account for the above risk, Forrester adjusted this cost upward by 10%, yielding a three-year risk-adjusted total PV of $179,421.

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
Professional Services, Training, And Workshop Costs: Calculation Table						
G1	Professional services, training, and workshop costs (annually)	Assumption	$100,000		$40,000	$40,000
Gt	Professional services, training, and workshop costs	G1	$100,000	$0	$40,000	$40,000
	Risk adjustment	↑10%				
Gtr	Professional services, training, and workshop costs (risk-adjusted)		$110,000	$0	$44,000	$44,000

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Financial Summary

CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

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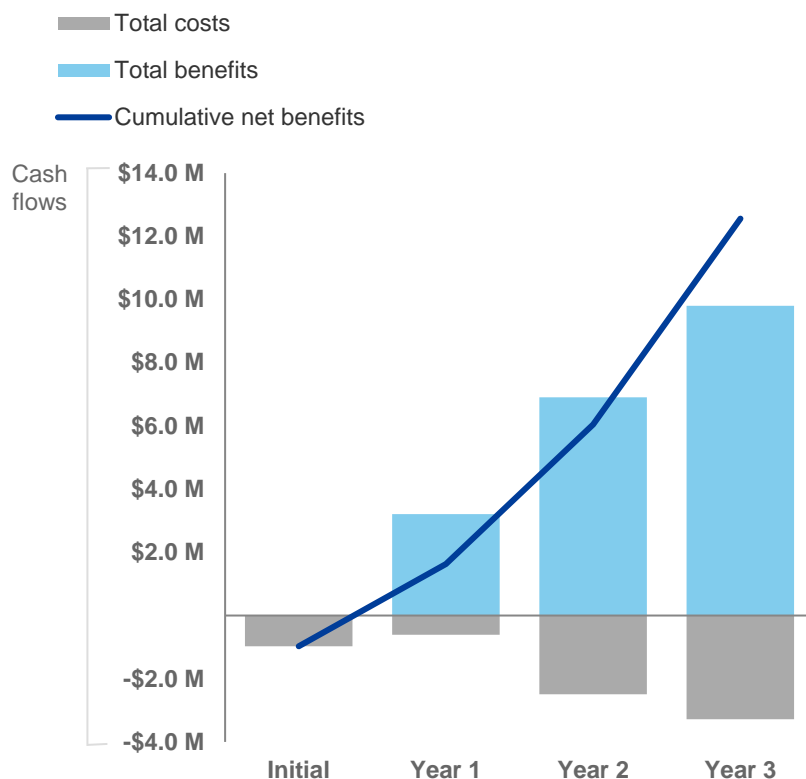
The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the composite organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.

Legend:
- Total costs
- Total benefits
- Cumulative net benefits

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	($973,280)	($609,400)	($2,493,942)	($3,281,227)	($7,357,849)	($6,053,623)
Total benefits	$0	$3,213,216	$6,906,343	$9,798,616	$19,918,174	$15,990,671
Net benefits	($973,280)	$2,603,816	$4,412,401	$6,517,389	$12,560,325	$9,937,048
ROI						164%
Payback period (months)						< 6

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NCR Software Defined Store enabled by Zynstra: Overview

The following information is provided by NCR and Zynstra. Forrester has not validated any claims and does not endorse NCR or Zynstra or their offerings.

Software Defined Store architecture
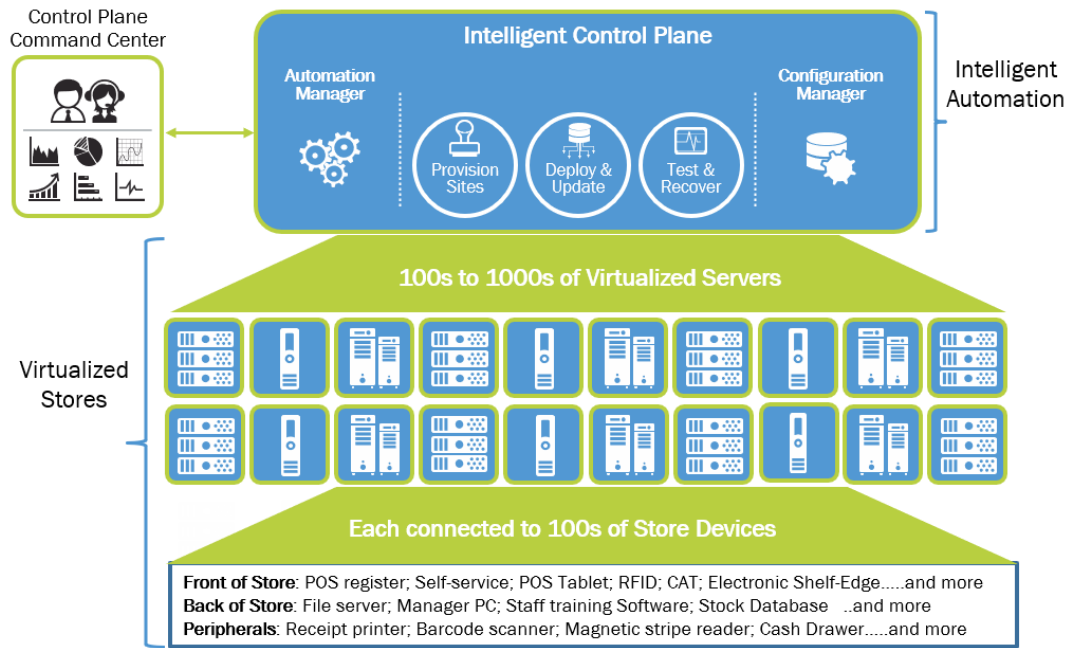
Virtualized POS architecture example
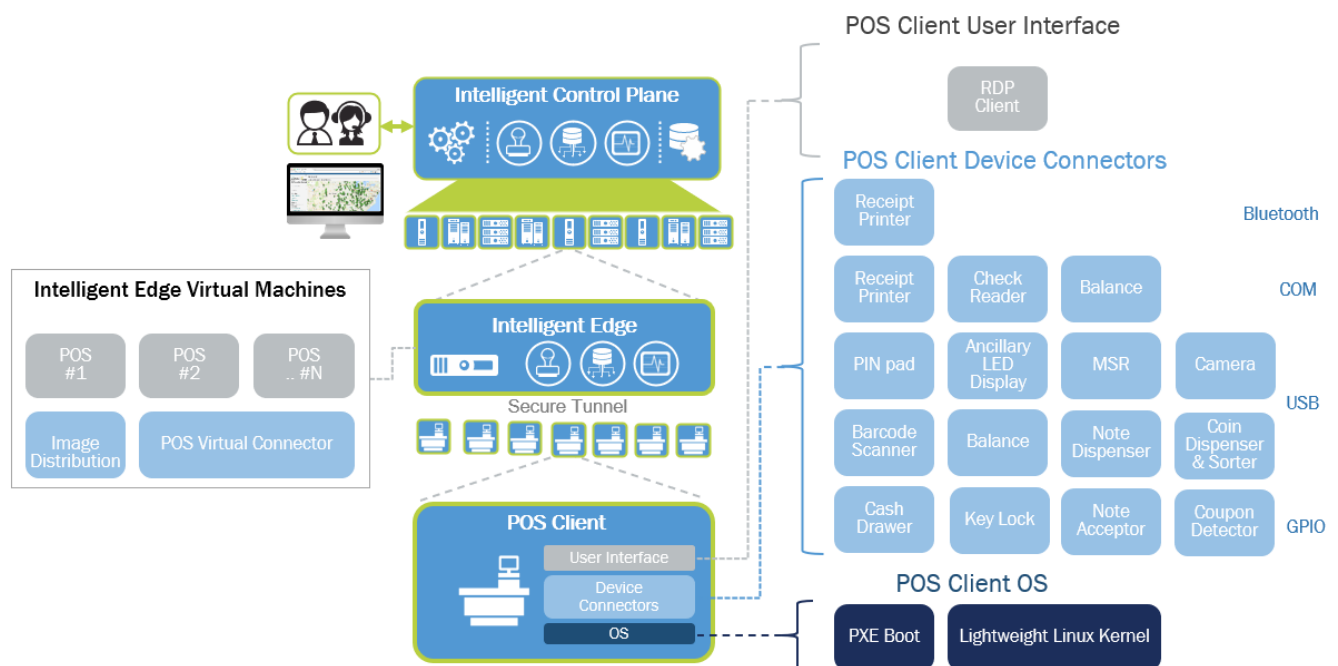
For more information, please visit www.zynstra.com or www.ncr.com.

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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.

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Appendix B: Supplemental Material

Related Forrester Research

"Retail Technology Plans, 2019," Forrester Research, Inc., May 30, 2019

"Check Out The Hidden Powers And Pitfalls Of Top POS Solution Providers," Forrester Research, Inc., September 11, 2018

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