TEI™
The language of value

The Total Economic Impact™ of Migrating to HP ProCurve Adaptive Edge Technology

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Table of Contents

Executive Summary

Background

In September 2003, HP commissioned Giga Research to model the potential costs and benefits of an organization migrating away from a fragmented legacy switch environment toward a HP ProCurve Networking solution. With its HP ProCurve Adaptive EDGE Architecture, HP ProCurve can potentially provide cost and flexibility advantages as an organization moves toward secure, mobile multi-service networks. Giga used its Total Economic Impact™ (TEI) model to examine the potential costs, benefits, flexibility and risk, or uncertainty, of moving to an environment consisting of HP ProCurve solutions at the edge of the network. For more information on the specific parts of TEI, please see Appendix A.

This document provides a framework for users considering a migration to HP ProCurve Networking solutions. Preparation for this document involved a two-step process. First, Giga interviewed four customers (provided by HP) that had evaluated and had moved forward with the migration to HP ProCurve. Giga used the interview process to understand the distinct cost and value statements that the organizations saw as a result of the migration. Giga then constructed a composite model based on those individual value and cost statements. The composite model makes up the main body of this study and should be used by readers as a guide when determining the specific return on investment (ROI) for their own organizations. Specific cost and benefit estimates will vary considerably from organization to organization, and as a result the objective of this model is to illustrate how different cost and benefit categories can be applied rather than making any claims of a potential return to other organizations. Due to the limited dataset, data contained within this study does not imply industry findings and should not be used to drive behavior.

Summary Findings and Recommendations

Customer interviews yielded several important observations that guided the financial modeling found within this study. These observations include:

- Customers pointed to improved price/performance as the key factor in purchasing the ProCurve devices compared to continuing with legacy solutions. Driving this price performance advantage was the reduction in capital and maintenance costs, ease of management and installation, and interoperability with existing network devices.
- Several organizations recognized that deployment of ProCurve equipment would create an infrastructure that was wireless-ready and that eventual deployment of wireless functionality would drive further productivity efficiencies within their companies.
- Customers expressed confidence that selection of ProCurve equipment enabled them to move toward a single voice and data network and deploy VoIP on their own timetable since they already will have the infrastructure in place to do so.

This study illustrates the process of determining the potential value of migrating to HP ProCurve away from a legacy environment of 5,000 migrated users that consists of a primarily fragmented and distributed network infrastructure. The findings below are based on the results of the model outlined within this study. Data used for this model is based on findings from the customer interviews. Based on projections for each customer, Giga estimated that each customer received between 60 percent and 23 percent risk adjusted return on investment as a result of the migration to ProCurve. Both risk and non risk-adjusted values are presented. Risk adjusted values incorporate the level of uncertainty around certain cost estimates (see Tables 1 and 2).

Table 1: Financial Summary — Non-Risk-Adjusted Values

Ref	*Cash Flow*	*Year 1*	*Year 2*	*Year 3*	*Total*	*NPV*
T1	Total cost — legacy environment	$542,485	$176,160	$176,160	$894,805	$771,106
T2	Total cost — HP ProCurve	$416,335	$59,480	$59,480	$535,295	$472,332
T3	Cost savings — HP ProCurve	$126,150	$116,680	$116,680	$359,510	$298,775
T4	Flexibility	$6,917	$0	$0	$6,917	$6,917
T5	Cash flow	$133,066	$116,680	$116,680	$366,426	$305,063

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Table 2: Financial Summary — Risk-Adjusted Values

Ref	*Risk Adjusted Cash Flow*	*Year 1*	*Year 2*	*Year 3*	*Total*	*NPV*
T1	Total cost — legacy environment	$542,485	$176,160	$176,160	$894,805	$771,106
T2	Total cost — HP ProCurve	$419,096	$62,201	$62,201	$543,497	$479,134
T3	Cost savings — HP ProCurve	$123,389	$113,959	$113,959	$351,308	$291,972
T4	Flexibility	$6,917	$0	$0	$6,917	$6,917
T5	Cash flow	$130,306	$113,959	$113,959	$358,224	$298,889

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

While there was variation among each organization in the level of the return from investing in HP ProCurve solutions, there were several commonalities that were used as a basis for constructing a model for the composite organization. In particular, the interviews yielded the following findings that were used as a basis in constructing the model for the composite organization:

- Each organization interviewed realized a positive return either in terms of increased productivity of end user and IT staff, lower maintenance and procurement costs, or improved flexibility associated with the HP ProCurve solution compared to the legacy environment.
- Organizations with a distributed environment found the ability to manage the edge of the network centrally had a positive effect of improving the productivity of both IT and the end user. Specific areas driving an increase in the efficiency of the network included the ability to change and adapt as the mobility requirements changed for the organization.
- Most organizations saw a key element of the HP ProCurve value proposition as driving further cost efficiency within IT. Cost efficiency can be categorized in terms of direct reduction in the cost of hardware compared an organizations existing solution.
- Compared to their legacy environment, the reduction in support and maintenance costs was a compelling reason for organizations to switch to HP ProCurve Networking solutions. Most organizations saw the reduction in these costs to be one of the primary factors that allowed them to justify the migration internally.
- Several of the organizations interviewed saw that HP ProCurve provided VoIP capability was a positive attribute to simplify communications. Many of those interviewed were in the early stages of a limited deployment of VoIP for their network. Organizations that had deployed VoIP were looking to add additional sites slowly due in part to the volatility of benefits of such a migration. In addition,

most of the organizations that had deployed VoIP were looking at future deployments in new green-field sites rather than removing an old PBX-based solution. In addition to customers that had started deployment of VoIP, several customers did not have any immediate plans for such an investment.

- One of the organizations interviewed had deployed wireless functionality within their network. Wireless functionality was seen as a value-add by other organizations that were interviewed. Most organizations, however, felt that the movement toward a wireless network was not without roadblocks. These included concerns over access and security of the network as well as the need to expend the additional cost to move to a more mobile environment. The decision as to when to move forward with wireless functionality is based in part on overcoming security and cost concerns.
- The cost of migration to HP ProCurve depended in large part on the type of previous legacy devices installed within the environment as well as the distributed nature of the organization. Organizations that were interviewed indicated that the HP ProCurve provided a simple platform for installation and integration into the existing network.
- Customers did value the flexibility created by having open interoperability standards between the HP ProCurve devices and other network solutions. Another organization noted the flexibility of additional slots to existing HP switches rather than having to buy a whole other switch from a legacy platform. In addition, the option of deploying wireless technology or VoIP to their existing network can be considered an additional flexibility value for customers that did not immediately take advantage of these technologies.
- Organizations did see several risks associated with the migration that affected the costs and benefit estimates. One potential risk, as stated above, is the risk that if wireless was deployed, there would be an increase in the exposure of the organization which could be seen as a limiting factor in achieving the benefits of wireless technology. In addition, Giga found one customer commenting that HP that the basic support package did not provide 24 hour direct support.

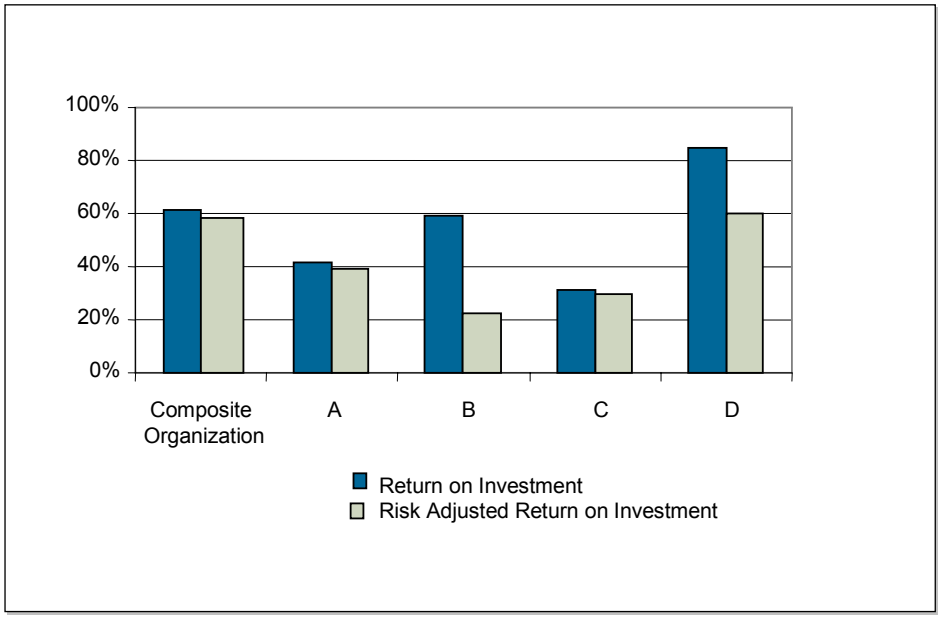
From these common assumptions, it is possible to construct a common value-based model that examines the potential issues and opportunities associated with the migration to HP ProCurve Adaptive EDGE architecture. It is also important to note that one of the primary objectives of this study is to illustrate the *process* of constructing value statements for moving toward a standardized switch environment. Estimates contained within the study are based on a statistically small sampling size and should not be used for across-the-board validation of one technology. Each organization must determine its own objectives for moving forward with HP ProCurve. Giga makes no assumptions that the findings contained within this study will be reproduced in other environments. Organizations should use the model provided to apply their own data, based on their own unique circumstances.

Applying TEI to a Composite Organization

This section outlines the different cost and benefit components created for the composite organization. All estimates should be changed to match a user's particular environment and data contained within the model should be used as a guide. Tables within this section as well as the rest of this study contain reference numbers that allow the user to track the equations used.

As stated in the Executive Summary, Giga took a two-step process in examining the potential costs and benefits of migrating to HP ProCurve. First, Giga interviewed four separate organizations that had deployed HP ProCurve to understand the value that was created from such a migration. The four organizations were taken from three separate verticals including energy, transportation, and manufacturing (see figure below).

Three-Year Return on Investment By Organization



Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

The value returned varied over the verticals interviewed.

- Organization A is a US-based energy company who chose HP ProCurve to replace existing switches that were nearing the end of life. Existing legacy devices did note provide the capacity to expand when needed.
- Organization B is a US-based transportation company that was looking at expanding the number of satellite locations. This organization specifically saw the ease of use and VoIP enablement to be key features with the HP ProCurve devices.
- Organization C is a global manufacturing and distribution company headquartered in the US. The organization chose HP a means of expanding out the flexibility and functionality of its wireless network.
- Organization D is a US-based manufacturing organization. This organization had devices that were nearing the end of life and needed to upgrade its existing network as a result of recent merger activity.

Assumptions

This study looks at the potential returns of a composite organization based on a series of interviews with HP customers. HP ProCurve has been deployed in a variety of environments but the focus of this model will be to examine an enterprise deployment for an organization that requires both wired and wireless functionality. In addition, the organization plans to deploy VoIP at some point in the future based on the current investment in HP ProCurve and the Adaptive EDGE Architecture. For the purpose of this analysis, we assume the following characteristics:

- The composite organization is a midsized manufacturing organization based in the US. The organization has a central headquarters location with 15 manufacturing and distribution centers located throughout the country.
- The organization currently has roughly 10,000 employees consisting of a mix of knowledge and task workers. Forty percent of employees are located at the headquarters location while 60 percent are spread out over the manufacturing and distribution centers. For the purpose of this analysis, we assume that roughly 50 percent of the employees are PC-based and will be directly impacted by the movement to the Adaptive EDGE Architecture. As a result, we assume that 5,000 employees will be affected by this change.
- We also assume that the organization expects to grow its employees by 2 percent per year. As a result, the growth of the employees that will be covered by the network to grow from 5,000 employees in year one, to 5,100 in year two, to 5,202 in year three. This growth will impact the network by adding those additional employees every year.

In addition to full time employees, we assume that there are a certain percentage of outside contractors that will be accessing the organization's network while they are onsite. These workers will be primarily mobile and will need wireless connectivity.

Tables 3 and 4 illustrate the employee makeup of the organization.

Table 3: Organization Assumptions

Vertical	Financial
Total number of employees	10,000
Percentage of employees that will be impacted	50%
Number of employees that will be impacted	5,000
Yearly growth rate	2%
Number of outside contractors	150
Yearly growth rate	5%
Percent of full-time employees that will require wireless access	45%

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Table 4: Employee Assumptions

Employee Assumptions	Year 1	Year 2	Year 3
Total number of full-time employees	10,000	10,200	10,404
Total number of full-time employees impacted by network	5,000	5,100	5,202
Total number of full-time employees that require wireless access	2,250	2,295	2,341
Number of outside contractors	150	158	165
Total number of employees that will require wireless access	2,400	2,453	2,506
Total number of employees that will be impacted by the network	5,150	5,258	5,367

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

For the purpose of this analysis, we assume that the organization was considering upgrading its network to enable wireless connectivity as well as establishing VoIP. This meant it needed to replace existing devices with the HP ProCurve solution.

Based on these factors, we assume that the organization saw its current network infrastructure could not handle or meet the increasing demands within the organization. In addition, the organization saw the need for improving the cost efficiencies of managing existing and new devices throughout the network.

In order to look at how the potential return is calculated, we first need to evaluate what it is going to cost the composite organization to invest in the HP devices. This cost includes both capital and non-capital costs associated with installation. Capital costs include the cost of procurement of the devices themselves, the cost of any additional hardware and software devices required to integrate into the existing network and any other third-party tools required for installation. Non-capital costs include the internal and external labor resources required to plan, install and monitor the devices. We assume that most of the added investment costs will be included within the first year of analysis.

The return on the investment is measured in several different ways. In order to measure the return component of the investment we look at the specific areas where positive benefits are created from the introduction of the HP ProCurve solution within the environment. Potential areas include specific cost reductions in managing and monitoring the network, cost avoidance by adding an extra level of protection to an insecure network and providing extra capabilities into the future that will allow the organization to scale toward a converged network of voice and data.

After examining the investment that will be required and the potential return that the composite organization can achieve, the next step is to look at the level of uncertainty that will be created as a result of the investment. The presence of any type of technology has a certain degree of uncertainty around what the cost and benefits will be once implemented. Uncertainty is based on two factors: (1) the likelihood that the technology will work as expected when implemented and (2) the likelihood that the end user will go back and measure the actual costs and benefits to the anticipated. Both of these create a level of uncertainty that can change the original cost and benefit and ultimately the ROI.

HP ProCurve

As stated in the Executive Summary, the process of determining the TEI of migrating to HP ProCurve involves several steps. First, we will examine selected costs to move over to HP ProCurve from the previous environment. Second, we will examine any cost savings between the previous environment and the new HP ProCurve environment. Third, we will examine any additional unique benefits that are incurred moving to the HP environment. This section focuses on the first of these three components — the cost to procure, install and maintain the HP ProCurve environment. All costs are analyzed during a three-year time frame. A discount rate

of 10 percent is used throughout this study in calculating the net present value of cash flows. Table 5 illustrates the different cost categories used within the analysis.

Table 5: Cost Categories

Ref	Cost Categories
E1	Maintenance
E2	Hardware
E3	Support
E4	Training
E5	Change/Move

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Hardware

The procuring the HP ProCurve hardware represents the largest budget component incurred as part of a migration. We assume that for an organization of this size the following HP Products will be purchased. A standard discount of 20% was applied to list prices for all devices based upon feedback from the customer interviews. Table 6 illustrates the cost of devices purchased.

Table 6: Cost of Devices Purchased

Devices Used	Type	List Price	Quantity	Discount Applied	Total Procurement Cost
(J4138A)	HP ProCurve Routing Switch 9308m	$13,279	6	20%	$63,739
(J4848A)	HP ProCurve Switch 5372xl	$7,129	50	20%	$285,160
(J4899A)	HP ProCurve Switch 2650	$1,569	4	20%	$5,021
(J4902A)	HP ProCurve Switch 6108	$2,169	1	20%	$1,735
	HP ProCurve Manager	$0	80	20%	$0
	Total cost				$355,655

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

We assume that the capital costs associated with the investment of the devices will be amortized only in the year that they are purchased.

Maintenance

All HP ProCurve devices have a lifetime warranty included in the original purchase price. As a result no additional maintenance expenses are required once the devices have been purchased. Organizations that were interviewed did indicate that the reduction in billable maintenance expense was a key factor in choosing the HP ProCurve devices. For organizations that require 24-hour support, there is an additional support package that can be purchased. However, for this model, we assume that the organization will be comfortable with basic support.

Table 7: Maintenance

Ref	HP ProCurve Environment/Maintenance	
L1	Number of devices	8
L2	Average monthly cost per device	0
L3	Number of months per year	12
L4	Number of years	3
L5	Total number of months	36
L6	Total yearly cost	$0

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Support

Organizations interviewed did indicate that the difference in support requirements between legacy and HP ProCurve was in some cases significant depending on the type of device that was in the environment previously. Several organizations noted that the purchase of the HP ProCurve solution was based in part due to the fact that internal support of existing hubs and switches were increasing and the devices themselves were nearing the end of life. Other organizations had a relatively simple environment and as a result the differences in support were small. Table 8 illustrates an estimate for internal support with the HP ProCurve devices.

Table 8: Estimate for Internal Support for HP ProCurve Devices

Ref	HP ProCurve Environment-Support		HP ProCurve
N1	Number of FTEs assigned to support devices	2	
N2	Cost per FTE	$76,000	
N3	Percent of their time devoted to support	10%	
N4	Total yearly cost	$15,200	
N5	Time spent for:		
N6	*Configuration*	20%	$3,040
N7	*Management*	40%	$6,080
N8	*Fault and performance management*	40%	$6,080
N9	Total yearly cost		$15,200

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Training

The impact of training is another cost component for migrating towards the HP ProCurve solution. We assume that for the purpose of this analysis, the organization $1,200 to bring in a consultant to train their IT staff.

Table 9: HP ProCurve Environment-Training

Ref		
P1	Cost for initial training	$1,200

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Change/Move

The final area we will examine is around the impact to change or move a user. Table 10 illustrates an estimated cost within the HP environment. The ability to control from the center was a major factor in allowing end users to change with minimal impact to IT. Table 11 illustrates the total costs.

Table 10: Estimated Cost

Ref	HP ProCurve Environment-Change/Move		
O1	Time it took to move user (hour)		0.5
O2	Cost per user	$38	$19.00
O3	IT cost per user	$34	$17.00
O4	Number of users per year	1,230	1,230
O5	*Total yearly cost*		$44,280

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Table 11: Total Costs

Ref	Total HP ProCurve Cost	Year 1	Year 2	Year 3	Total	NPV
Q1	HP ProCurve Environment-Maintenance	$0	$0	$0	$0	$0
Q2	HP ProCurve Environment-Hardware	$355,655	$0	$0	$355,655	$323,323
Q3	HP ProCurve Environment-Support	$15,200	$15,200	$15,200	$45,600	$37,800
Q4	HP ProCurve Environment-Change/Move	$44,280	$44,280	$44,280	$132,840	$110,118
Q5	HP ProCurve Environment-Training	$1,200	$0	$0	$1,200	$1,091
Q6	Total Cost	$416,335	$59,480	$59,480	$535,295	$472,332

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Total net present value of HP ProCurve costs for are estimated at $472,332 during three years.

Legacy environment

The second part of the analysis focuses the different investment categories in the previous legacy environment. We assume for the purpose of this analysis, based on the environment of the customers that Giga had interviewed, that the organizations had an environment consisting of legacy devices that were nearing the end of life. Most organizations were deciding whether to continue on the existing platform or to move to HP ProCurve. If they had stayed on the existing platform, they would have had to refresh their existing devices. The cost components of the legacy environment are similar to that of the HP ProCurve costs (see Table 12).

Table 12: Cost Categories of the Legacy Environment

Ref	Cost Categories
E1	Maintenance
E2	Hardware
E3	Support
E5	Change/Move

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Maintenance

In the case of maintenance, we assume that the composite organization had been paying $25 per device per month for maintenance on the devices. Organizations that were interviewed indicated that the actual cost of maintenance varied depending on the type of discount as well as the type of device but typically ranged between $40 and $100 per device. Table 13 illustrates the costs associated with the calculation used for the maintenance costs of the devices.

Table 13: Maintenance Costs

Ref	*Legacy Environment-Maintenance*	
G1	Number of devices	72
G2	Average monthly cost per device	25
G3	Number of months per year	12
G4	Number of years	3
G5	Total number of months	36
G6	Total yearly cost	$64,800

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Hardware

For the purpose of this analysis, we assume that the environment of the composite organization prior to the purchase of HP ProCurve consisted of devices that were nearing their end of life. As a result, the organization needed to consider refreshing their legacy devices with new hardware. Organizations interviewed indicated that if they had chosen to reinvest in legacy devices, the cost of those devices would be marginally higher than a similar HP ProCurve solution. For the purpose of this analysis, we assume that the organization would have had to spend an additional 3 percent on legacy hardware compared to the HP ProCurve solution. The calculations for hardware are seen in Table 14.

Table 14: Calculations for Hardware

Ref	*Legacy Environment-Hardware*	
H1	% greater than HP ProCurve	3%
H2	Total cost of devices	$366,325

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Support

Internal support is another area where the costs of legacy devices and the cost of the HP ProCurve solution differed (see Table 15).

Table 15: Internal Support

Ref	*Legacy Environment-Support*		
I1	Number of FTEs assigned to support devices	3	
I2	Cost per FTE	$76,000	
I3	Percent of their time devoted to support	10%	
I4	Total yearly cost	$22,800	
I5	Time spent for		
I6	*Configuration*	20%	$4,560
I7	*Management*	40%	$9,120
I8	*Fault and performance management*	40%	$9,120
I9	Total yearly cost		$22,800

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Change/Move

Table 16 illustrates the cost previously in the legacy environment. Differences between the two environments are partly attributable to the fact that the new HP ProCurve devices allows control from a centralized location reducing the time and effort it takes to move a user.

Table 16: Previous Costs

Ref	*Legacy Environment-Change/Move*		
J1	Time it took to move user (hour)		1
J2	Cost per user	$38	$38.00
J3	IT cost per user	$34	$34.00
J4	Number of users per year	1,230	1,230
J5	*Total yearly cost/savings*		$88,560

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Savings Between the HP ProCurve and Legacy Environment

Comparing the two scenarios, continuing on the path of the previous legacy environment or moving to an HP ProCurve environment, it's possible to observe areas of cost efficiencies within the HP ProCurve environment. Table 17 indicates the difference in cost efficiencies between the two alternatives.

Table 17: Difference in Cost Efficiencies

Ref	Cost Savings	Year 1	Year 2	Year 3	Total	NPV
R1	Maintenance	$64,800	$64,800	$64,800	$194,400	$161,148
R2	Hardware	$10,670	$0	$0	$10,670	$9,700
R3	Support	$7,600	$7,600	$7,600	$22,800	$18,900
R4	Training	-$1,200	$0	$0	-$1,200	-$1,091
R5	Change/move	$44,280	$44,280	$44,280	$132,840	$110,118
R6	Total savings	$126,150	$116,680	$116,680	$359,510	$298,775

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Flexibility

A key part of the TEI model is the consideration of the indirect benefits created as a result of investing in a more flexible or scalable platform. Flexibility within this TEI model can be seen in the ability to leverage capabilities of the technology into the future. In the case of the HP ProCurve solutions, several organizations saw that one of the benefits related to HP ProCurve was multi-service networks, more specifically VoIP. In addition, many the found value in HP ProCurve mobility solutions for accommodating future growth and change.

The estimation of the future value of VoIP on a given organization is, at best, highly volatile. As mentioned in the Executive Summary, VoIP was a consideration for several organizations interviewed. One organization had completed a limited deployment of VoIP but was making limited investments in the technology into the future. VoIP is an investment that has currently received a fair degree of attention in recent years. While there has been interest in organizations receiving tangible benefits around VoIP. Organizations that currently have a large investment in existing PBX technology would want to avoid the sunk cost of shifting to a new converge voice and data environment. Most of the organizations interviewed indicated that they were holding on VoIP or taking a step-by-step approach.

However, organizations did see the deployment of VoIP on the horizon and the capability around VoIP for the HP ProCurve devices was a factor in the purchasing decision. As a result, we assume for the purpose of this analysis that the presence of VoIP capabilities does provide flexibility value associated with a deployment. For the purpose of this analysis, we assume that if the organization chose to build out its existing PBX solution, the three-year cost associated with that expansion would be $53,028. If the organization chose to build out using VoIP, the cost would be $46,111. The cost savings would be estimated to be $7,037, which can be seen as the value of the option that is created as a result of the investment in HP ProCurve (see Table 18).

Table 18: Black-Scholes Option Price (Value)

Variable	Description	Amount	Value
S	Value of the assets associated with the future adoption of new business tools and methods	$46,111	Dollars
X	Spending required to acquire the assets	$53,028	Dollars
T	Length of time spending can be deferred (expiration)	1.5	Year(s)
R	Risk-free rate of return	6.5%	Years
σ	Market volatility, per year of potential assets market-based	0.35	Per year
Black-Scholes Option Price (Value)		**$7,037**	

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

For further information on flexibility, please see Appendix A.

Risk

Risk is the final component within the TEI model and is used as a filter to estimate the amount of uncertainty of different cost and benefit estimates. Uncertainty is seen from several different perspectives, including the likelihood that the actual estimates will equal the original projections. In addition, uncertainty can be seen as the likelihood that organizations will track the cost and benefit estimates into the future. If no accountability exists around different investments, then there is a very high likelihood that the specific benefits will not be translated to the organization's bottom line.

For the purpose of this analysis, we risk-adjusted several variables to better reflect the level of uncertainty that exists around certain estimates. The TEI model uses a triangular distribution method for calculating risk-adjusted values. In order to construct the distribution, it is necessary to first estimate the low, most likely and high values that could occur within the current environment. The risk-adjusted value is therefore the mean of the distribution of those points. For further information on the triangular distribution method, please see Appendix A.

Risk adjustments were applied to migration costs as well as to selected future costs within the HP ProCurve environment. The risk adjustments reflect the uncertainty that several customers had regarding their existing environment.

Findings and Analysis

Overall, each of the organizations interviewed saw the purchase of HP ProCurve as a part in meeting their tactical and strategic security needs. As stated in the Executive Summary, the interviews with ProCurve customers yielded the following observations:

- Customers pointed to improved price/performance as the key factor in purchasing the ProCurve devices compared to continuing with legacy solutions. Driving this price performance advantage was the reduction in capital and maintenance costs, ease of management and installation, and interoperability with existing network devices.
- Several organizations recognized that deployment of ProCurve equipment would create an infrastructure that was wireless-ready and that eventual deployment of wireless functionality would drive further productivity efficiencies within their companies.
- Customers expressed confidence that selection of ProCurve equipment enabled them to move toward a single voice and data network and deploy VoIP on their own timetable since they already will have the infrastructure in place to do so.

Based on the findings for the composite organization, the use of HP ProCurve generated a positive return on investment not only in terms of improved IT efficiency but also enhanced capabilities to the entire organization. The following tables provide summary information on the savings that can be achieved as a result of the migration to HP ProCurve (see Tables 19 and 20)

Table 19: Financial Summary — Non-Risk-Adjusted Values

Ref	Cash Flow	Year 1	Year 2	Year 3	Total	NPV
T1	Total cost — legacy environment	$542,485	$176,160	$176,160	$894,805	$771,106
T2	Total cost — HP ProCurve	$416,335	$59,480	$59,480	$535,295	$472,332
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T5	Cash flow	$133,066	$116,680	$116,680	$366,426	$305,063

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Table 20: Financial Summary — Risk-Adjusted Values

Ref	Risk-Adjusted Cash Flow	Year 1	Year 2	Year 3	Total	NPV
T1	Total cost —- legacy environment	$542,485	$176,160	$176,160	$894,805	$771,106
T2	Total cost — HP ProCurve	$419,096	$62,201	$62,201	$543,497	$479,134
T3	Cost savings — HP ProCurve	$123,389	$113,959	$113,959	$351,308	$291,972
T4	Flexibility	$6,917	$0	$0	$6,917	$6,917
T5	Cash flow	$130,306	$113,959	$113,959	$358,224	$298,889

Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

The findings indicate that the composite organization will achieve a positive return on the basis of efficiency improvements alone. However, Giga advises that all organizations look both at the positive and negative impact of the introduced technology on both the IT and end user organization. These values were based on the following findings from the organizations interviewed:

- Most organizations saw a key part of the value proposition in terms of improving the cost efficiency of IT. Cost efficiency can be categorized in terms of direct reduction in the cost of hardware compared to other existing alternatives.
- Organizations that were distributed environment saw that the ability to manage the edge of the network centrally had the effect of improving the productivity of both IT and the end user.
- Compared to the legacy environment, the reduction in support and maintenance costs was another reason that compelled organizations to switch to HP ProCurve. Most organizations saw the reduction in these costs to be one of the primary factors that allowed them to justify the migration internally.
- Several of the organizations were in the early stages of a limited deployment of VoIP for their network. Those organizations that had deployed VoIP were looking to add additional sites slowly due in part of the volatility of benefits around such a migration. In addition, most of the organizations that had deployed VoIP were looking at future deployments in new green field sites rather than removing an old PBX-based solution. In addition to customers that had deployed VoIP, several customers were holding off into the longer term. The fact that HP ProCurve provided VoIP capability was a positive feature seen by all organizations.
- One of the organizations interviewed had deployed wireless functionality within their network. Most organization, however, felt that the movement toward a wireless network was not without roadblocks. These included concerns over access and security of the network as well as the need to expend the additional cost to move to a more mobile environment. However, those organizations that had not deployed wireless functionality did see the value of wireless functionality within their HP ProCurve devices.
- The cost of migration to HP ProCurve depended in large part on the type of previous legacy devices installed within the environment as well as the distributed nature of the organization. Organizations that were interviewed did indicate that the HP ProCurve solution was relatively simple to install and get up and running.
- Customers did value the flexibility created by having open interoperability standards between the HP ProCurve devices and other network solutions. Another organization noted the flexibility of additional slots to existing HP switches rather than having to buy a whole other switch from a legacy platform. In addition, the option of deploying wireless technology or VoIP to their existing network can be considered an additional flexibility value for customers that did not immediately take advantage of these technologies.
- Organizations did see several risks associated with the migration that affected the costs and benefit estimates. One potential risk, as stated above, is the risk that if wireless was deployed, there would be an increase in the exposure of the organization which could be seen as a limiting factor in achieving the benefits of wireless technology.

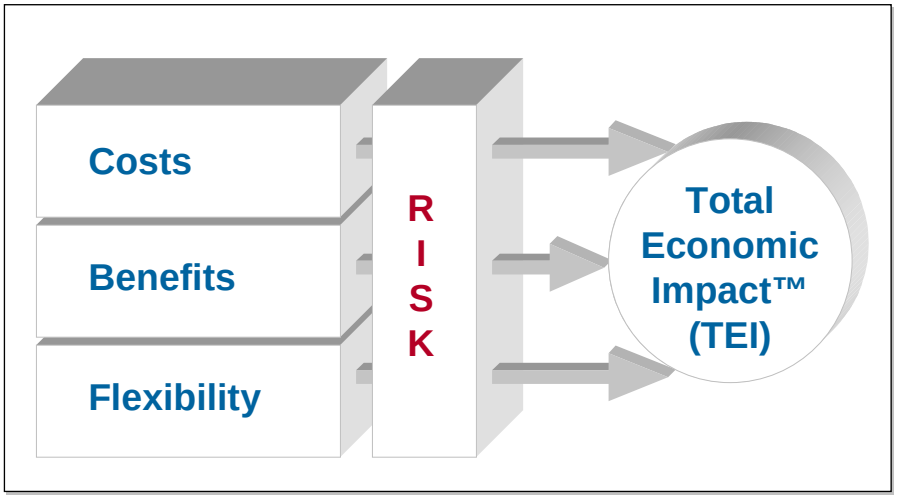
Appendix A: Total Economic Impact™ Primer

Total Economic Impact™ is primarily a common language tool, designed to capture and properly communicate the value of IT initiatives in a common business language. In so doing, TEI considers four elements of any initiative:

1. Benefits
2. Costs (sometimes referred to as total cost of ownership (TCO))
3. Flexibility
4. Risk

The figure below shows the TEI methodology conceptually. Benefits, flexibility and costs are considered, through the filter of risk assessment, in determining an expected ROI for any given initiative.

TEI Conceptual Diagram



Source: Giga Research, a wholly owned subsidiary of Forrester Research, Inc.

Benefits

Benefits represent the *value* delivered to the business by the proposed project. Oftentimes, IT project justification exercises focus on cost (e.g., TCO) and cost reductions. Among industry leaders, IT is deployed as an offensive weapon, with value expectations greater than simple cost reduction, especially when those cost reductions tend to focus within IT. TEI captures the value proposition of the proposed project by measuring the benefits against the incurred costs.

All benefits captured by TEI must be traceable back to one or more critical success factors (CSFs). These CSFs are directly linked to a higher-level business strategy. If a proposed technology investment generates benefits that cannot be satisfactorily linked to a CSF, then it will not be included as a benefit for the organization in the model. In these cases, TEI requires that the benefit be discarded.

Under TEI, benefits may only accrue to the business units. "Benefits" derived through cost reductions within IT accrue as negative TCO to the IT budget, thereby showing a reduced TCO. (TCO is considered by TEI to be a single-dimension, cost-centric focus on the IT budget.)

The TEI process begins with a discovery of potential benefit areas. A representative from the organization under examination who has the ability to capture the benefit in question must validate each benefit captured during discovery. In other words, values cannot arbitrarily be assigned to a benefit if that person is not in a position to deliver that benefit should the project be approved. Additionally, projects that are expected to deliver business value require some effort on the part of the business to realize that value. That effort may be in the form of training, organizational change or a modification of existing business processes. Therefore, TEI requires dialog with the business leaders actually responsible for making the necessary changes, in order to capture the proposed benefit during the justification phase. TEI captures this dialog in the form of the names of the individuals, which validates the value calculation of each benefit.

Within TEI, each benefit entered has a specific capture date. Although the benefit may be captured over time, TEI requires the specification of a date when most of the benefit has been captured. TEI will then place the value delivered in the appropriate time frame within the project.

Costs

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs. These may be in the form of fully burdened labor, subcontractors or materials. Additionally, costs consider all the investment and expenses necessary to deliver the value proposed.

Flexibility

Flexibility, as defined by TEI, represents investing in additional capacity that can, for some future additional investment, be turned into business benefit — for instance, an investment in an enterprisewide upgrade of the desktop word processor application where the primary driver may be standardization (to increase efficiency) and licensing (to decrease IT costs). However, a collaborative workgroup feature may translate into greater worker productivity when the organization is ready to absorb the discipline necessary to capture that benefit. The collaboration feature does not promise benefit during this phase of the project and must be captured later, incorporating additional investment, most likely in the form of training. However, the existence of the option has a present value that can be estimated. The flexibility component of TEI captures that value.

Flexibility can also be calculated by acknowledging that management has several decision points along the way for any given project. At each point, management can steer the project to a different outcome or cancel it altogether. Many net present value evaluations fail to take this management flexibility into account. Since TEI's flexibility component uses the industry standard Black-Scholes options formula, the management flexibility factor is taken into consideration.

TEI divides a project into multiple phases. The first phase is considered the "benefits" phase — it is the phase expected to deliver the primary benefits. The benefits phase is usually no more than one budget cycle long and it is the primary reason the project is being considered. All other phases are "options" or "flexibility" phases. For additional investment at some point in the future, business benefit can be captured during these "options" phases. TEI applies the Black-Scholes options pricing equation to all phases other than the benefits phase. The Black-Scholes equation uses five inputs to calculate the present-day value of flexibility or options:

1. The value, or business benefit, that can be captured when the option is exercised; this value is expressed in present value terms.

2. The time, to the date, at which point the option or flexibility expires. Expiration could be due to business changes or technology obsolescence.

3. The cost of the investment to exercise the option and capture benefit.

4. The risk-free interest rate (typically the interest rate of government securities is used).

5. The volatility of the industry or sector; TEI uses the volatility of the stock prices within the market sector as this input.

Risk

Risks are used to widen the possible outcomes of the project. Since the future cannot be accurately predicted, there is risk inherent in any project. TEI captures risk in the form of risks-to-benefits and risks-to-costs.

Risks-to-benefits consider all possible risks to each possible benefit. Likewise, risks-to-costs considers all possible risks to each possible cost. Then, a range is chosen by applying best judgment for each cost and benefit, based on the set of risks assigned to each cost and benefit. The range is entered in the form of a low estimate, a most likely value and a high estimate. For example, the risks to a cost may result in a range from the expected value as the low estimate, to two times the expected value as the high for a particular cost (representing a potential two times cost overrun).

TEI applies a probability density function known as "triangular distribution" to the values entered. The expected value — the mean of the distribution — is used as the risk-adjusted cost or benefit number. The risk-adjusted costs and benefits are then summed to yield a complete risk-adjusted summary and ROI.

Typical project risk factors to consider include the following:

- *Vendors*: The risk that the vendor of a product or technology may need to be replaced at some point during the project duration
- *Products*: The risk that a product will not deliver the functionality expected
- *Architecture*: The risk that the current product architecture will not allow future infrastructure decisions and changes
- *Culture*: The risk that an organization will be unable to absorb the new technology or adapt to its implementation
- *Delays*: The impact on revenues of a project delay or cancellation
- *Size*: The direct correlation of project risk to the size of the project, as measured by application size or budget