

A Forrester Total Economic Impact™ Study Prepared For Cisco

# The Total Economic Impact™ Of Cisco Catalyst Access Switches

Project Director: Norman Forbush

January 2012

FORRESTER

Headquarters | Forrester Research, Inc.  
400 Technology Square, Cambridge, MA 02139 USA  
Tel: +1 617.613.6000 | Fax: +1 617.613.5000 | [www.forrester.com](http://www.forrester.com)

Forrester Consulting  
Making Leaders Successful Every Day

# TABLE OF CONTENTS

Executive Summary.....	2
Disclosures.....	6
TEI Framework And Methodology.....	7
Analysis.....	9
Interview Highlights.....	9
Costs.....	11
Benefits.....	13
Flexibility.....	24
Risk.....	24
Financial Summary.....	26
Cisco Access Switching: Overview.....	28
Appendix A: Composite Organization Description.....	29
Appendix B: Total Economic Impact™ Overview.....	29
Appendix C: Glossary.....	30

© 2012, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to [www.forrester.com](http://www.forrester.com).

## About Forrester Consulting

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit [www.forrester.com/consulting](http://www.forrester.com/consulting).

## Executive Summary

Cisco commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying Cisco Catalyst Access Switches. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Cisco Catalyst Access Switching on their organization. For this study, Forrester conducted interviews with five existing Cisco customers and completed an online market survey of 104 senior network managers. The analysis showed that operating expense (opex) contributed up to 70% of total cost of ownership (TCO), which is combination of upfront capital costs and operational costs incurred during the life cycle of the switch. In addition, opex costs are broken down in the categories shown in Figure 1.

**Figure 1**

Network Administrator Activity Breakdown

“On an average, how do your network administrators and other IT network professionals spend their time on your access (edge) switches?”



Source: A commissioned study conducted by Forrester Consulting on behalf of Cisco, June 2011

Subsequent financial analysis found that a composite organization of 2,500 employees based on the interviewed companies experienced the risk-adjusted ROI, costs, and benefits shown in Table 1. See Appendix A for a description of the composite organization. As the composite organization in this study is doing a full upgrade of its access switching network, this analysis looks at the **incremental** costs (the cost paid above and beyond the costs of non-Catalyst

switches) and incremental benefits (those solely associated with Catalyst switches). Readers should note that the full benefits of using Catalyst switches can only be achieved by actively switching on the associated functionality. This analysis assumes important Catalyst functionality is fully utilized. However, not all organizations may opt to use all functionality based on their business and IT environment; and other organizations may receive benefits above and beyond those outlined in this study.

**Table 1**

Composite Organization Five-Year Risk-Adjusted

ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value	%TCO savings
135%	21 months	\$646,274	\$274,966	\$371,308	14%

Source: Forrester Research, Inc.

- **Benefits.** The composite organization/organization experienced the following benefits:
  - **Reduction in energy costs:** The organization enables EnergyWise to monitor and control energy usage of campus IT devices attached to Cisco Catalyst Switches. The organization manages IP telephones and other devices with energy savings of more than \$25,000 per year. EnergyWise contributes to 13% of the overall TCO benefits from using Cisco Catalyst Access Switching.
  - **Reduction in installation, deployment, configuration, and testing costs:** A significant reduction in operational costs are realized through SmartOperations, which includes features such as Smart Install and Auto Smartports, that enable quick deployment of switches and dynamically configuring switch ports based on the automatic detection of the device type attached to the network. SmartOperations contributes to 26% of the overall TCO savings from using Cisco Catalyst Access Switching.
  - **Increased business and IT productivity due to high availability:** Increased network uptime minimizes business impact (planned and unplanned), increasing business productivity and allowing IT staff to focus on other value-added activities. Improved high availability because of Cisco Catalyst Access Switching features contributes to 12% of overall TCO benefits.
  - **Elongated refresh cycles:** Cisco Catalyst Access Switching provides the composite organization with better support, functionality, and updates of the latest standards and technologies that allow it to delay refresh cycles by a year. Improved refresh cycles with Cisco Catalyst Access Switching contributes to 36% percent of overall TCO benefits.
  - **Policy compliance and reduced virus/malware incidents:** Cisco Catalyst Access Switches enable end-to-end security solutions and reduce the number of security incidents by using identity-based policy and threat intelligence capabilities. These solutions prevent unauthorized access to the network and helps organizations

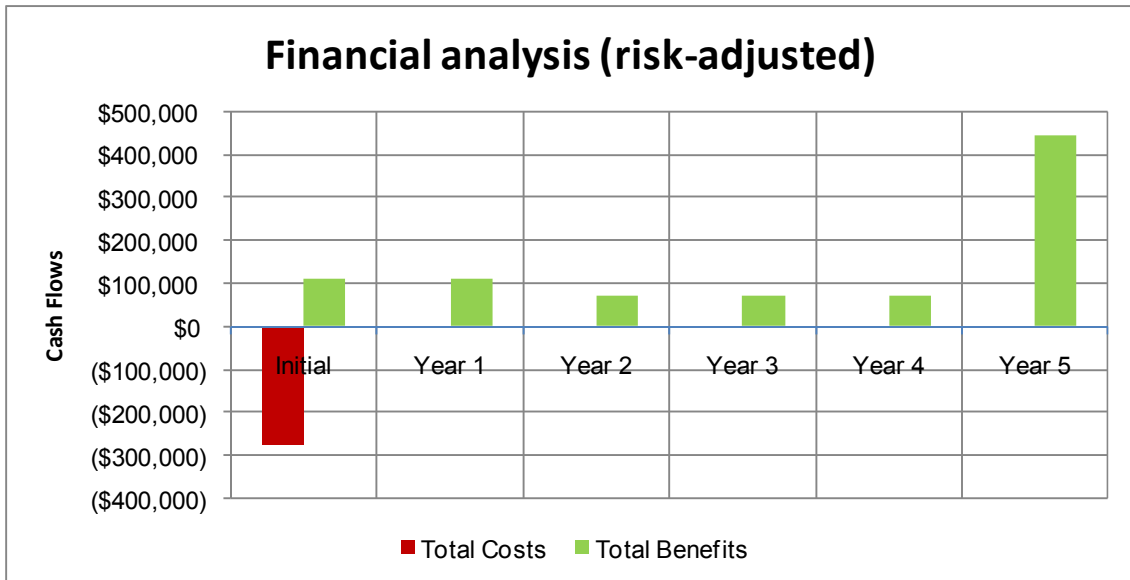
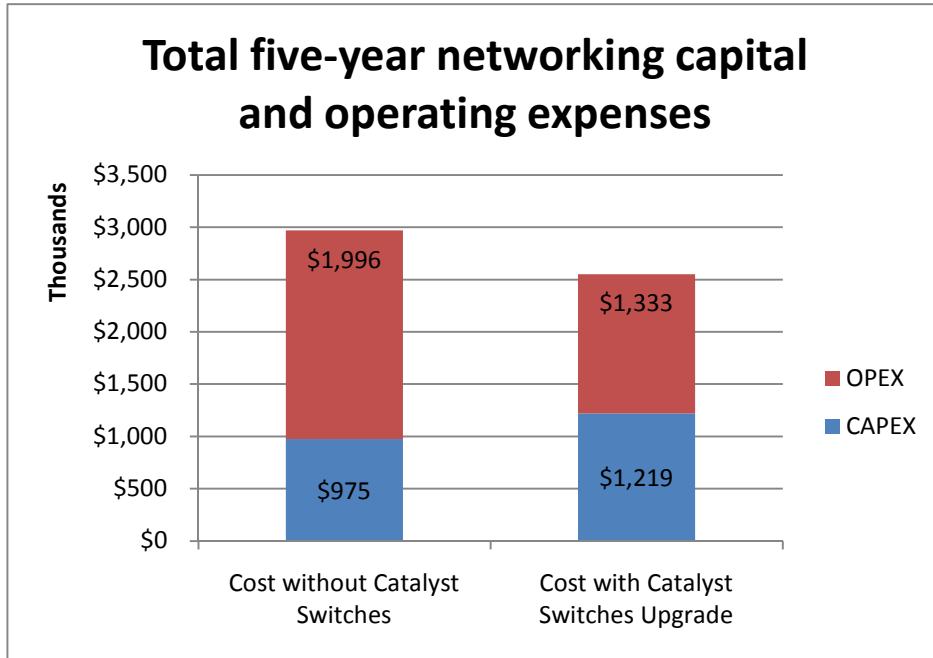
achieve policy compliance. The enabled Cisco Security solutions contributed to 13% of the overall TCO savings comes from Cisco Catalyst Access Switching.

- **Costs.** The composite organization experienced the following costs:
  - **Hardware costs.** Hardware costs for the switches make up the bulk of the investment in Cisco Catalyst Access Switches. For 121 new switches, the composite organization invests \$1,219,075, of which \$243,815 is the incremental cost above non-Catalyst switches.
  - **Software costs.** Cisco Prime LAN Management Solution (LMS) at \$10,000.
  - **Implementation and configuration costs.** The composite organization uses internal resources to install the 121 devices for a cost of \$113,498. However, as these costs are the baseline when installing Catalyst or non-Catalyst switches, they are not included in the ROI analysis, which only includes incremental costs and benefits.

**Figure 2**

Financial Summary — Five-Year Risk-Adjusted ROI

Numbers are reflected upon the size of the composite organization and associated network infrastructure laid out in Appendix A.



Source: Forrester Research, Inc.

## Disclosures

The reader should be aware of the following:

- The study is commissioned by Cisco and delivered by the Forrester Consulting group.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Cisco Catalyst Access Switches.
- Cisco 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.
- The customer names for the interviews were provided by Cisco.
- The respondents to the market survey of 104 senior network managers were randomly selected.

## TEI Framework And Methodology

---

### Introduction

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing Cisco Catalyst Access Switching. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

### Approach And Methodology

Forrester took a multistep approach to evaluate the impact that Cisco Access Switches can have on an organization (see Figure 2). Specifically, we:

- Interviewed Cisco marketing/sales/consultants personnel and Forrester analysts to gather data relative to Cisco Access Switches and the marketplace for Access Switching.
- Fielded an online survey via a reward panel in five countries in North America, Europe, and Asia. Data from 104 respondents was used primarily to determine baseline metrics.
- Interviewed five organizations currently using Cisco/Access Switches to obtain data with respect to costs, benefits, and risks.
- Designed a composite organization based on characteristics of the interviewed organizations (see Appendix A).
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization. Considering that many companies upgrade their networks based on their refresh cycle, this analysis examines the incremental benefits of Catalyst switches as compared to the additional cost paid for them.

---

**Figure 2**

TEI Approach



Source: Forrester Research, Inc.

---

Forrester employed four fundamental elements of TEI in modeling Cisco/Access Switching's service:

1. Costs.
2. Benefits to the entire organization.



3. Flexibility.

4. Risk.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves the purpose of providing a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

## Analysis

---

### Interview Highlights

In addition to the data analyzed from the market survey of 104 senior IT managers, a total of five customer interviews were conducted for this study, involving representatives from the following companies:

1. A European university.
2. A large US-based energy company.
3. A large US financial institution.
4. A global manufacturing company.
5. A large US school district.

The interviews with these five companies and data from the market survey uncovered the following points:

- **Cisco Catalyst Access Switching energy management capabilities save money.** More and more companies are looking at their IT and network infrastructure to examine potential areas for savings as part of corporate-mandated green initiatives. The European university had such a mandate from the government to reduce its carbon footprint and, after examination, was “quite amazed by how much power is used by IT.” Using funds from the university’s sustainability funding, it looked to Cisco and its EnergyWise capabilities to manage VoIP phones on the switches. The university found that by managing the power consumption of its phones for eight hours a day allowed it to save more than \$25,000 per year, paying for its investment in a year. Other interviewed companies were later on the energy-savings adoption curve, yet indicated that they were exploring these built-in Cisco capabilities in the coming years as their corporate green initiatives moved into the IT infrastructure. This is reflective of the online market survey where 16% of respondents indicated that they were currently energy-managing devices, while 52% were considering do it in the future.
- **Catalyst SmartOperations reduces IT operating costs.** Both the university and school district have completed pilot programs using the Catalyst SmartOperations tool kit (specifically Smart Install and Auto Smartports features) of Cisco Catalyst Access Switching. Both organizations have a relatively distributed model with numerous buildings located across the campus or the district. Deploying, configuring, and testing the switches and the devices connected to the ports requires time and effort. Both organizations found the results of the pilot programs to be quite promising, with one indicating it found results to be “really quite awesome.” Savings comes from reducing or eliminating the need to configure a switch before deployment; reducing the effort to configure and test each port (up to a 75% savings); and reducing the number of switches deployed due to maximizing port usage on the switch (reduction of overprovisioning). “Not only can we save time in deploying switches and configuring devices, but we can use that time to do something more important,” one organization remarked.
- **Cisco Catalyst Access Switching devices reduce unplanned and planned downtimes.** The interviewed customers noted the quality and features of the Cisco Access Switches, resulting in few failed switches per year. Sixty-seven percent of survey respondents who primarily use Cisco Access Switches reported five or fewer total

failures per year. Cisco Access Switches further accrue uptime savings via fully redundant, hot-swappable power supplies (no un-cabling and un-racking required).

- **Cisco Catalyst Access Switching devices promote longer refresh cycles.** All interviewed companies noted the high reliability and superior functionality of Cisco Access Switches; Cisco support for the latest standards like power over Ethernet (PoE), power over Ethernet plus (PoE+), and 802.1X; and excellent product support and ease of updating software on existing Cisco switches. These characteristics allow them to delay capital investments in network device hardware by up to a year.
- **Cisco Catalyst Access Switches improve security, policy compliance and reduce virus/malware security incidents.** The market survey noted that Cisco Catalyst Access Switches make it easier to implement authorized access solutions (such as 802.1x using monitor mode), reduce losses associated with unauthorized access, and reduces the number of virus/malware security incidents, on average, using some of the security solutions provided by Cisco Catalyst Access Switching.

### *Composite Organization*

Based on the interviews with the five existing customers provided by Cisco, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization that Forrester synthesized from these results represents a company with 2,500 employees and supporting 5,788 devices. See Appendix A for more information on the composite organization.

### *Framework Assumptions*

Table 2 provides the model assumptions that Forrester used in this analysis.

**Table 2**

Model Assumptions

Ref.	Metric	Value
A1	Discount rate	10%
A2	Length of analysis	5 years

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10% and time horizon used for the financial modeling is five years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

## Costs

This section describes the overall costs to initially purchase, install, and configure Cisco Catalyst Access Switching devices, based on the characteristics of the composite organization.

### *Incremental Hardware Costs*

Hardware for the purchase of Cisco Catalyst Access Switching devices is the bulk of the costs associated with Cisco Catalyst Access Switching. The composite organization supports 5,788 devices (or ports) on its network and selects switches from the 3750X product family (48 port, PoE, IP Base). As the composite organization is doing a full upgrade of its access switching network, *this analysis looks at the incremental costs and benefits associated with the Catalyst switches*. The assumption used in this model is that the Catalyst 3750-X Series Switches are at a 20% premium to a non-Catalyst implementation.

Note that there are no annual maintenance fees for support of Cisco Catalyst Access Switching devices using the Base functionality (LAN Base or IP Base features).

**Table 3**

Incremental Hardware Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
B1	Number of switches		121					
B2	Selling list price		\$13,000					
B3	Total list price of switches	B1 * B2	\$1,573,000					
B4	Extra cost of network modules for 10G uplinks		\$302,500					
B5	Hardware subtotal	B3 + B4	\$1,875,500					
B6	Volume discount of 35%	B5 * 35%	(\$656,425)					
B7	Total hardware (including discount)	B5 - B6	\$1,219,075					
B8	Premium above non-Catalyst switches		20%					
Bt	Incremental cost above non-Catalyst switches	B7 * B8	\$243,815	\$0	\$0	\$0	\$0	\$0

Source: Forrester Research, Inc.

*Incremental Software Fees*

The composite organization elects to purchase Cisco Prime LAN Management Solution (LMS) for network management at an additional \$10,000.

**Table 4**

## Incremental Software Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Ct	LMS for network management		\$10,000					

Source: Forrester Research, Inc.

*Implementation And Configuration Fees*

Implementation fees for switches run \$938 per switch and \$113,498 for the installation of 121 switches. However, as this analysis is examining the **incremental** costs and benefits of installing Cisco Catalyst Access Switches, this cost, although incurred by the organization, is not included in the incremental cost category.

*Total Incremental Costs*

The total incremental cost for the composite organization to purchase Cisco Catalyst Access Switching devices is illustrated in Table 5.

**Table 5**

## Total Incremental Costs (Non-Risk-Adjusted)

Ref.	Costs	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	PV
Bt	Incremental hardware costs above non-Catalyst switches	\$243,815						\$243,815	\$243,815
Ct	Software costs	\$10,000						\$10,000	\$10,000
TCt	Total incremental costs	\$253,815						\$253,815	\$253,815

Source: Forrester Research, Inc.

## **Benefits**

The next component of this analysis examines the potential benefits associated with the composite organization investing in Cisco Catalyst Access Switching devices. Interviewed customers identified several benefit areas where they were able to realize tangible value as a result of their investment in Cisco. These include:

- Energy benefits, specifically energy management savings through EnergyWise.
- Catalyst SmartOperations benefits, including those from Smart Install and Auto Smartports.
- High availability benefits affecting both business and IT staff.
- Refresh cycle benefits in terms of savings from delayed purchases of switches.
- Security benefits from a reduction in unauthorized access and reduced virus/malware security incidents.

### *Energy Benefits*

#### *Energy Management Savings*

Cisco EnergyWise enables the composite organization to measure and manage the power consumption of network infrastructure and network-attached devices with specific policies. As a result, the organization reduces power consumption to realize increased cost savings. By using EnergyWise to manage thousands of VoIP phones and desktops and wireless access points, the composite organization is able to realize savings via energy management as shown in Table 6. Energy savings account for 13% of the overall benefits.

**Table 6**  
Energy Savings

Equipment	Total number of devices managed (t1)	Idle power (kWh/hour) (t2)	Approximate energy cost per year	Standby power mode (watts/hour) (t3)	Watts per hour saved (t4=t2-t3)	Average hours per day saved (t5)	KwH saved per year (t6=t1*t4/1000*365 days)	Annual savings (t7=t6 * 0.10)
Desktops	1,625	80	\$113,880	5	75	5.5	244,664	\$24,466
IP telephones	2,750	4	\$9,636	0	4	6.5	26,098	\$2,610
Wireless access points	250	11	\$2,409	0	11	4.0	4,015	\$402
Annual energy savings from EnergyWise								\$27,478

Source: Forrester Research, Inc.

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Dt	Energy savings	From table above		\$27,478	\$27,478	\$27,478	\$27,478	\$27,478

Source: Forrester Research, Inc.

### *Catalyst SmartOperations Benefits*

#### ***Reduction In Initial And Ongoing Configuration Of New Switches With Smart Install***

The composite organization utilizes Smart Install and Auto Smartport features to enable plug-and-play configurations and images, which reduces the time to install new access switches as well as the effort to test and configure devices.

SmartOperations savings account for 26% of the overall benefits.

**Table 7**

Reduction In Initial And Ongoing Configuration Of New Switches With Smart Install

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
E1	Number of access switches configured		133	12	12	12	12	12
E2	Time spent to configure new devices prior to Smart Install (hours)		0.75					
E3	Savings per switch		75%					
E4	IT staff hourly rate		\$48.68					
Et	Reduction in initial and ongoing configuration costs — switches		\$3,645	\$331	\$331	\$331	\$331	\$331

Source: Forrester Research, Inc.

***Reduction In Testing And Initial Configuration Of New Devices With Auto Smartports***

The composite organization has 30 different device types to test and configure. With new switches, IT staff normally spent considerable time with initial testing and configuration of devices that will be connected to the switches. With Auto Smartports, this task is done automatically, saving IT staff time and effort, as shown in Table 8.



**Table 8**

Reduction In Initial Testing And Initial Configuration Of New Devices With Auto Smartports

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
F1	Number of different devices			30				
F2	Time spent to initially test and configure a switch (days)			5.0				
F3	Savings per device			80%				
F4	IT staff hourly rate			\$48.68				
Ft	Reduction in initial testing and configuration costs — devices			\$46,733				

Source: Forrester Research, Inc.

***Reduction In Ongoing Configuration Of Devices (Owing To Mobility) With Auto Smartports***

Throughout the year, change requests come to the staff at the composite organization, at the rate of 20% of users per year, to add, modify, or delete devices connected to the switches due to users mobility of primary office location.

Network administrators at the composite organization utilize Auto Smartport capabilities that apply device configuration to a port when the device is plugged in and removes the configuration when the device is plugged out. This reduces the need to reconfigure ports every time a new device is plugged in. See Table 9.

**Table 9**  
Reduction In Ongoing Configuration Of Devices With Auto Smartports

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
G1	Number of users			2,500				
G1	Number of moves (additions, changes, replacements)			20%				
G2	Time spent to add/change/delete a port (hours)			0.33				
G3	Savings per device			75%				
G4	IT staff hourly rate			\$48.68				
Gt	Reduction in ongoing configuration of devices			\$6,024	\$6,024	\$6,024	\$6,024	\$6,024

Source: Forrester Research, Inc.

### ***Reduction In Overprovisioning***

Before the installation of Cisco Catalyst Access Switching devices, the composite organization preconfigured each switch with a number of ports allocated for certain types of devices (for example, 10 for VOIP phones, 10 for PCs, 2 for wireless access points, and 2 for printers). Auto Smartports allows the composite organization to more optimally use ports on a switch, thus reducing overprovisioning costs and number of additional switches/ports it has to purchase, install, and configure.

**Table 10**

## Reduction In Overprovisioning

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
H1	Number of switches		121					
H2	Approximate number of ports		5,808					
H3	Percentage of ports saved		10%					
H4	Number of ports "conserved"	H2 * H3	581					
H5	Number of switches "conserved"	H4 / 48 ports per switch	12					
H6	Capex savings	H5 * \$10,075	\$121,908					
H7	Installation savings per switch	H5 * \$938	\$11,350					
Ht	Reduction in overprovisioning	H6 + H7	\$133,257					

Source: Forrester Research, Inc.

*High Availability Benefits**Increased Business Productivity Due To Reduction In Unplanned Downtime*

The composite organization installs the latest Cisco Catalyst Access Switching devices with the expectation that the hot-swappable, redundant components and mature operating system will reduce the number of unplanned downtime events. High availability savings account for 12% of the overall benefits.

**Table 11**

## Increased Business Productivity Due To Reduction In Unplanned Downtime

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
I1	Number of unplanned downtime events due to access switch failures prior to Cisco Access Switching			2				
I2	Number of users affected by each downtime			100				
I3	Length of downtime in hours			1				
I4	Reduction in downtime events with Cisco Access Switching			50%				
I5	Amount of productivity captured			50%				
I6	General staff hourly rate			\$64.90				
It	Increased business productivity	$I1 * I2 * I3 * I4 * I5$		\$3,245	\$3,245	\$3,245	\$3,245	\$3,245

Source: Forrester Research, Inc.

***Increased IT Productivity Due To Reduction In Planned Downtime***

The IT staff at the composite organization spends more time monitoring the network and less time in planned downtimes like maintenance windows due to features like Smart Install and rolling stack upgrade. These features use the intelligence built into the switches to make sure that image updates happen during the non-business hours and the effective downtime is as low as possible.

**Table 12**

Increased IT Productivity Due To Reduction In Planned Downtime

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
J1	Number of switches			121				
J2	Number of planned downtime events per year			12				
J3	IT staff time spent on planned downtime event (hours)			0.5				
J4	Reduction in events per year			40%				
J5	IT staff hourly rate			\$48.68				
Jt	Increased IT productivity			\$14,137	\$14,137	\$14,137	\$14,137	\$14,137

Source: Forrester Research, Inc.

***Avoidance Of Revenue Lost To Network Outages***

The composite organization buys the most current Cisco technology, which makes sure that failovers due to switch malfunctions do not impact its revenue-generating website.

**Table 13**

Avoidance Of Revenue Lost To Network Outages

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
K1	Number of unplanned outages that impact revenue			1				
K2	Average revenue lost per outage			\$50,000				
K3	Reduction in events			50%				
K4	Gross margin			30%				
Kt	Avoidance of lost revenue			\$7,500	\$7,500	\$7,500	\$7,500	\$7,500

Source: Forrester Research, Inc.

## Refresh Cycle Benefits

### Savings From Delayed Purchase Of Switches

Cisco Catalyst Access Switching provides the composite organization with support and updates of the latest standards and technologies that allows it to delay refresh cycles by a year. This delay allows it to delay a purchase by a year, saving \$446,641 in hardware savings (25% — moving from a four- to five-year refresh cycle — of the total hardware and installation costs), as shown in Table 14. Refresh cycle savings account for 36% of the overall benefits.

**Table 14**  
Savings From Delayed Purchase Of Switches

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
L1	Total hardware plus installation costs							\$1,332,573
L2	Increase in length of refresh cycle (from four to five years)							25%
L3	Hardware savings from delay	L1 * L2						\$333,143
L4	Installation costs savings							\$113,498
Lt	Savings from delayed purchase of switches	L3 + L4						\$446,641

Source: Forrester Research, Inc.

## Security Benefits

### Reduction In Virus/Malware Security Incidents

Cisco Catalyst Access Switching enables end-to-end security solutions using identity-based policy and threat intelligence capabilities, reducing unauthorized access violations and virus/malware security incidents, as shown in Table 15. Security savings account for 12% of the overall benefits.

**Table 15**  
Reduction In Virus/Malware Security Incidents

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
M1	Number of virus/malware incidents per year			4				
M2	Average end-user down time per incident (in hours)			0.75				
M3	Number of users			2,625				
M4	% of users affected			10%				
M5	Number of hours lost per year	$M1 * M2 * M3 * M4$		788				
M6	Incident reduction			50%				
M7	General staff hourly rate			\$64.90				
Mt	Security incidents reduction savings	$M5 * M6 * M7$		\$25,554	\$25,554	\$25,554	\$25,554	\$127,772

Source: Forrester Research, Inc.

### **Total Benefits**

Table 16 summarizes the total benefits (non-risk-adjusted) associated with the purchase of Cisco Catalyst Access Switching devices.

**Table 16**

Total Benefits (Non-Risk-Adjusted)

Ref.	Benefits	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	PV	% TCO savings
Dt	<b>Energy benefits:</b> energy savings		\$27,478	\$27,478	\$27,478	\$27,478	\$27,478	\$137,388	\$104,162	13%
	<b>Catalyst SmartOperations benefits</b>									
Et	Reduction in initial and ongoing configuration costs — switches		\$3,645	\$331	\$331	\$331	\$331	\$4,970	\$4,268	
Ft	Reduction in initial testing and configuration costs — devices		\$46,733					\$46,733	\$42,484	
Gt	Reduction in ongoing configuration of devices		\$6,024	\$6,024	\$6,024	\$6,024	\$6,024	\$30,121	\$22,836	
Ht	Reduction in over provisioning	\$133,257						\$133,257	\$133,257	
Nt	<b>Catalyst SmartOperations benefits total</b>	<b>\$133,257</b>	<b>\$56,402</b>	<b>\$6,355</b>	<b>\$6,355</b>	<b>\$6,355</b>	<b>\$6,355</b>	<b>\$215,081</b>	<b>\$202,846</b>	<b>26%</b>
	<b>High availability benefits</b>									
It	Increased business productivity		\$3,245	\$3,245	\$3,245	\$3,245	\$3,245	\$16,225	\$12,301	
Jt	Increased IT productivity		\$14,137	\$14,137	\$14,137	\$14,137	\$14,137	\$70,683	\$53,589	
Kt	Avoidance of lost revenue		\$7,500	\$7,500	\$7,500	\$7,500	\$7,500	\$37,500	\$28,431	
Ot	<b>High availability benefits total</b>		<b>\$24,882</b>	<b>\$24,882</b>	<b>\$24,882</b>	<b>\$24,822</b>	<b>\$24,822</b>	<b>\$124,408</b>	<b>\$94,321</b>	<b>12%</b>
Lt	<b>Refresh cycle benefits:</b> savings from delayed purchase of switches						\$446,641	\$446,641	\$277,329	36%
Mt	<b>Security benefits:</b> reduction in virus/malware security incidents		\$25,554	\$25,554	\$25,554	\$25,554	\$25,554	\$127,772	\$96,871	12%
TBt	Total benefits (Dt + Nt + Ot + Lt + Mt)	\$133,257	\$134,316	\$84,269	\$84,269	\$84,269	\$530,910	\$1,051,290	\$775,529	

Source: Forrester Research, Inc.



## Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some 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. There are multiple scenarios in which a customer might choose to implement Access Switching and later realize additional uses and business opportunities. An example of flexibility for Catalyst Access Switches is if an organization were to initially purchase the switches and create a business case using SmartOperations, high availability, and refresh cycle benefits only — not energy management benefits. However, knowing it could later enable EnergyWise to gain additional benefits could be modeled and valued in its initial justification. Other benefits not quantified in this study, such as further TrustSec security solutions (including Flexible NetFlow), Medianet, and power over Ethernet capabilities, may also benefit the composite organization in the future and could be a consideration in making a purchasing decision.

## Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. “Implementation risk” is the risk that a proposed investment in Access Switching may deviate from the original or expected requirements, resulting in higher costs than anticipated. “Impact risk” refers to the risk that the business or technology needs of the organization may not be met by the investment in Access Switching, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

Quantitatively capturing investment and impact risk by directly adjusting the financial estimates results in more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as “realistic” expectations since they represent the expected values considering risk.

Table 17 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. The TEI model uses a triangular distribution method to calculate risk-adjusted values. 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 the mean of the distribution of those points. For both costs and estimates, Forrester has conservatively used “low” risk adjustments to increase cost estimates by 8% and decrease benefit estimates by 17%. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

**Table 17**  
Cost And Benefit Risk Adjustments

	Low	Most likely	High	Mean
Costs	100%	100%	125%	108%
Benefits	50%	100%	100%	83%

Source: Forrester Research, Inc.



## Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the return on investment, net present value, and payback period for the organization's investment in Cisco Access Switching. These are shown in Table 18 below.

**Table 18**

Cash Flow — Non-Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present value
Costs	(\$253,815)						(\$253,815)	(\$253,815)
Benefits	\$133,257	\$134,316	\$84,269	\$84,269	\$84,269	\$530,910	\$1,051,290	\$775,529
Net benefits	(\$120,558)	\$134,316	\$84,269	\$84,269	\$84,269	\$530,910	\$797,475	\$521,714
ROI	206%							
Payback period	11 months							

Source: Forrester Research, Inc.

Table 19 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 17 in the Risk section to the cost and benefits numbers in Tables 17 and 18.

**Table 19**

Cash Flow — Risk-Adjusted

	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Total	Present value
Costs	(\$274,966)						(\$274,966)	(\$274,966)
Benefits	\$111,048	\$111,929	\$70,224	\$70,224	\$70,224	\$442,425	\$876,075	\$646,274
Net benefits	(\$163,919)	\$111,929	\$70,224	\$70,224	\$70,224	\$442,425	\$601,109	\$371,308
ROI	135%							
Payback period	21							
% TCO savings (Catalyst Access Switching over non Catalyst)	14%							

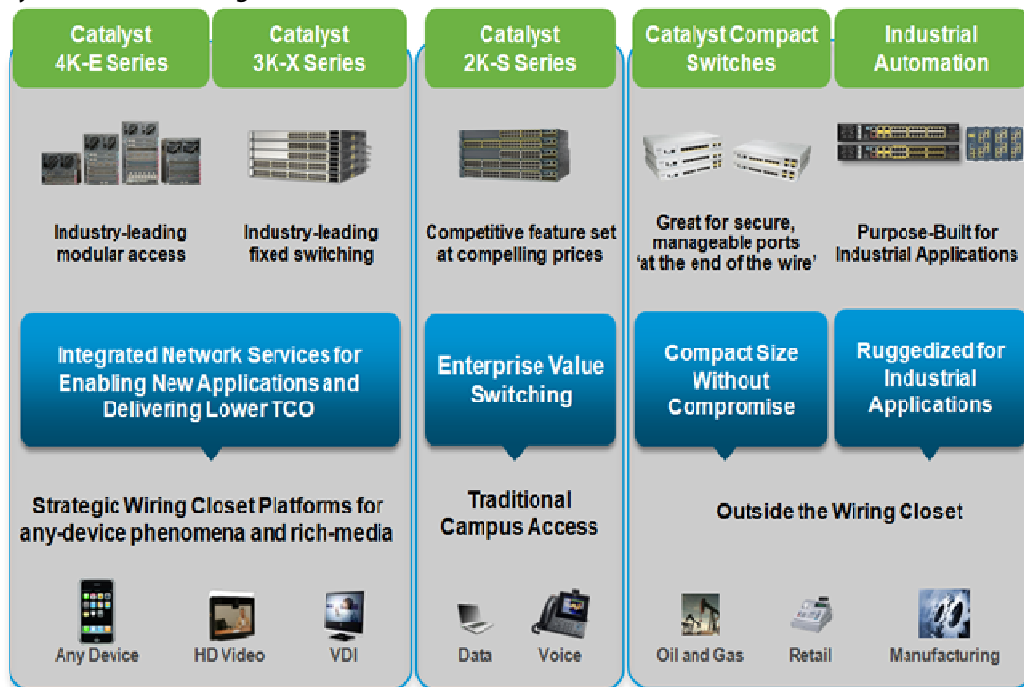
Source: Forrester Research, Inc.

## Cisco Access Switching: Overview

According to Cisco, Catalyst Access Switches address the major market discontinuities enterprises are facing in their campus access networks:

- The explosion of wireless devices in campus networks, the growth of video, and the Internet-of-Things are creating new challenges for IT staff. IT departments are getting stretched while managing the growth and diversity of devices joining campus networks. If managed effectively, these market trends can drive superior employee collaboration, business agility, and simplified operations, while improving productivity.
- Cisco helps enterprises harness this opportunity by embedding more intelligence into Catalyst Access Switches. Cisco Catalyst Access Switches deliver innovations in security, video, high availability, and PoE with a focus on lowering total cost of ownership.
- Cisco Catalyst Access Switches help enterprises drive superior employee collaboration and productivity by enabling secure, any-device connectivity, and by scaling rich-media applications in the campus cost-effectively.
- The portfolio is comprehensive, comprised of fixed, modular, and compact switches, as well as ruggedized switches for deploying in harsh environments — all running battle-hardened Cisco IOS operating system.

### Cisco Catalyst Access Switching Portfolio



For more information, please visit:

[http://www.cisco.com/en/US/products/ps5718/Products\\_Sub\\_Category\\_Home.html](http://www.cisco.com/en/US/products/ps5718/Products_Sub_Category_Home.html)

## Appendix A: Composite Organization Description

---

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of implementing Cisco Catalyst Access Switching. The composite company is intended to represent a large company of 2,500 employees. Of the 2,500 employees, 40% have laptops, 60% have desktops, and there are 250 wireless access points; 2,750 IP telephones are used throughout the organization and there are more than 160 additional peripheral devices like printers and telepresence. There are 5,788 total devices supported on the network. The composite organization is planning to do a full upgrade of all its network switches.

In purchasing Access Switching, the composite company has the following objectives:

- Reduce energy costs to save money and to meet corporate objectives around green initiatives.
- Reduce IT operating expenses in the deployment, testing, and maintenance of the organization's network devices.
- Improve security and reduce the number of security events in a year.

## Appendix B: Total Economic Impact™ Overview

---

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.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility.

### *Benefits*

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place 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. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

### *Costs*

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

### *Risk*

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as “triangular distribution” to the values entered. At minimum, three values are calculated to estimate the underlying range around each cost and benefit.

### *Flexibility*

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point in time. However, having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

## Appendix C: Glossary

---

**Discount rate:** The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

**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.

**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 net present value of cash flows.

**Payback period:** The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

**Return on investment (ROI):** A measure of a project’s expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

### *A Note On Cash Flow Tables*

The following is a note on the cash flow tables used in this study (see the example table below). The initial investment column contains costs incurred at “time 0” or at the beginning of Year 1. Those costs are not discounted. All other cash

flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.

---

**Table [Example]**

Example Table

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

---